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Use of an electronic, hydrostatic level (NIVCOMP) to record the three-dimensional appearance of a stone fragment

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General Editor: Vince Russett

Team YCCCART 'surveying' the stone fragment using the electronic, hydrostatic level.

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Abstract

A stone fragment was found in a soil, spoil heap in an unconsecrated area of the demesne of the local Parish Church in Congresbury, North Somerset. It had a partially hollowed appearance and was considered to be, possibly, a fragment of the head end of a stone sarcophagus.

Acknowledgements

A Heritage Lottery Grant allowed YCCCART to acquire a Nivcomp, electronic, hydrostatic level which provided the data for the "Surfer10" software program, kindly donated by Golden Software Ltd.

The authors are grateful to Vince Russett for editing this report.

Introduction

YCCCART is one of a number of Community Archaeology Teams across North Somerset, supported by the North Somerset Council Development Management Team.

The objective of the Community Archaeology Teams is to carry out archaeological fieldwork, for the purpose of recording, and better understanding and management of, the heritage of North Somerset.

Site Location

The stone fragment was moved to a local residence for safe keeping.

Historical & Archaeological Context

The fragment (Fig 1) was thought to be possibly medieval (personal communication - V Russett)

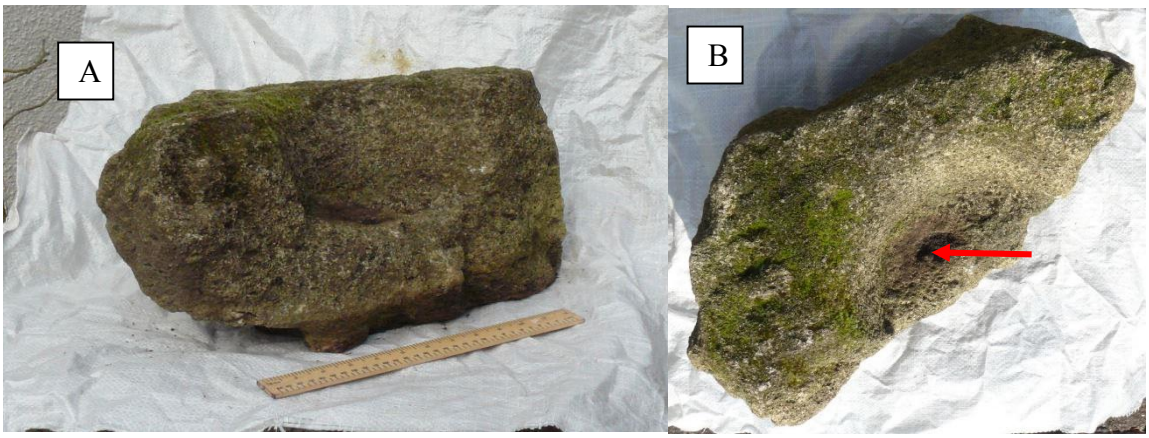

Figure 1. Stone fragment. A, viewed from the front, Scale = 30cm. B, viewed from above. Small depression, red arrow.

Survey objectives

To produce a 3-dimensional image of the stone fragment, for recording purposes, in the absence of obtaining a manual drawing.

Methodology

The survey technique was modified from that previously described (*YCCCART 2014/Y19*). Briefly, instead of using tapes, brick supports were placed alongside the stone fragment (Fig. 2), and a grid formed of two fridge shelves, fixed at right angles to each other, forming 2 x 2 cm squares, was prepared and laid over the stone fragment on the brick supports (Fig. 3). The fragment was surveyed' using the electronic, hydrostatic level (Nivcomp), with a fine probe, engineered by Brian Wills, to enable the measurements at 2 cm intervals to be performed.

Figure 2. The fragment is placed on the ground, and a support for the grid is prepared.

Figure 3. A 'grid formed of two fridge shelves, fixed at right angles to each other, form 2 x 2 cm squares. A fine probe (red arrow) attached to the electronic, hydrostatic level, is used for measurements.

A zero point for the electronic hydrostatic level was established on the ground adjacent to the stone fragment, and the height in millimetres at each point in the grid, above the zero point, was recorded on paper. The data were entered into an Excel file (Microsoft) and processed using the "Surfer 10" software programme (kindly donated by Golden Software, USA). Paper and electronic copies of the raw data are preserved in the archives.

Result

The area of the grid covering the stone fragment was 44 x 28 cm. The Z axis for the grid was the height above, (+), or below, (-), the zero point in mm. The heights above the zero point ranged from 0 - 233 mm (Appendix). The raw data were processed electronically as described previously, and a 3-dimensional image, including contours (Fig 4), was produced.

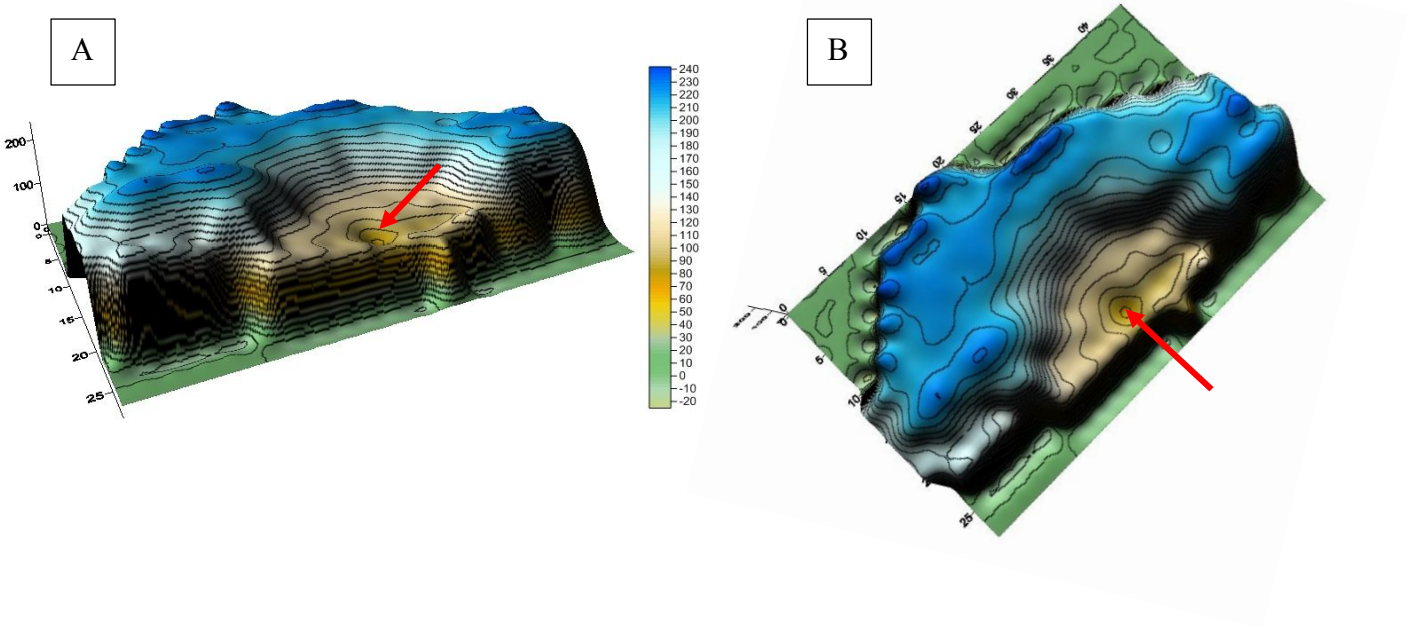

Figure 4. Three-dimensional, contoured images of the stone fragment. A, viewed from the front: B, viewed from above. Small depression, red arrows. Scale, mm

Comparison of the appearance of the stone fragment, (Figure 1), with the three-dimensional images, (Fig. 4) gives a good correlation. In addition, a small feature (a shallow depression) was accurately recorded (figures 1 and 4, arrows) in the 'hollowed out' area of the stone fragment.

Comments

An electronic, hydrostatic level (NIVCOMP), in conjunction with computer software (Surfer, Golden Software) has been used previously to survey sites of archaeological interest *(YCCCART Reports, 2014/Y15; 2014/Y19; 2014/Y20),* involving individual grid areas up to 20 x 20 m. The present report, demonstrating a good correlation between the appearance of a stone fragment and a three-dimensional representation, indicates that the technique can also be used on a small scale, in this case only 44 x 28cm.

The actual nature of the stone fragment, ie as a fragment of a possible medieval sarcophagus, remains to be determined. However, intriguingly, there is a reference, (Cran, 1983), to a stone sarcophagus, containing a skeleton, being found at the church, when preparing the foundations for the new boiler house in the Victorian era (possibly late 1880's). It was apparently broken up to make stone steps for the new stoke hole for the

heating system. Unfortunately, this cannot be verified (C. Short, personal communication). However, could this be a remaining piece of that suspected act of wanton vandalism?

Recommendations

The technique may have applications in the recording of selected archaeological artefacts, in conjunction with photographs, when manual drawings are unavailable.

References

Cran, A.S, 1983. *The story of Congresbury. Burleigh, Bristol, p199*

YCCCART Report, (2014/Y15). *Manual surveys using an electronic, hydryostatic level (NIVCOMP) at Woodspring Priory*.

YCCCART Report, (2014/Y19). *Cadbury Congresbury Hill Fort: Use of an electronic, hydrostatic level as an aid to manual surveying.*

YCCCART Report, (2014/Y20). *Manual survey using an electronic, hydryostatic level (NIVCOMP) at Wemberham Roman Villa.*

Authors

Pearson, G R., Wills, B., and Rosevink, M

Appendix

Site record

YCCCART Site Survey Project – Manual survey	
Survey date	27-3-14
Location	N/A
Site name	Stone Fragment
Reference	
Type / Instrument	NIVCOMP electronic hydrostatic level
Survey area	44 x 28 cm grid X axis 15 columns @ 2cm intervals Y axis 23 columns @ 2cm intervals Z axis: height above (+), or below (-) Zero point in mm Zero point: On adjacent ground level.
Data files	Raw data: Paper copy in Manual Folder Scanned copy in Stone Fragment Surfer: Stone fragment.xls Stone fragment.rtf Stone fragment.grd
Team	G Pearson, B Wills, M Rosevink
Weather	Dry, very cold
Additional information	
Landowner	N/A
Tenant	N/A
HER ref	N/A
Site type	N/A
Description	N/A
Period	N/A
Geology	N/A
Land use	N/A
Comments	The fragment was found in a soil heap in the new cemetery of Congresbury Parish Church, during a 'dig' carried out by members of YCCCART in June 2012. It was thought to represent the 'head area' of an early sarcophagus.
Report date	18-12-14
Author	G Pearson

Electronic data

From EXCEL file

Xcm	Ycm	Zcm
0	0	0
0	2	0
0	4	0
0	6	0
0	8	0
0	10	0
0	12	0
0	14	0
0	16	0
0	18	0
0	20	0
0	22	0
0	24	0
0	26	0
0	28	0
0	30	0
0	32	0
0	34	0
0	36	0
0	38	0
0	40	0
0	42	0
0	44	0
2	0	0
2	2	0
2	4	0
2	6	0
2	8	0
2	10	0
2	12	0
2	14	0
2	16	216
2	18	212
2	20	147
2	22	0
2	24	0
2	26	0
2	28	0
2	30	0
2	32	0
2	34	0
2	36	0

2	38	0
2	40	0
2	42	0
2	44	0
4	0	0
4	2	0
4	4	0
4	6	0
4	8	0
4	10	205
4	12	211
4	14	222
4	16	217
4	18	217
4	20	213
4	22	125
4	24	0
4	26	0
4	28	0
4	30	0
4	32	0
4	34	0
4	36	0
4	38	0
4	40	0
4	42	0
4	44	0
6	0	0
6	2	0
6	4	0
6	6	0
6	8	217
6	10	225
6	12	221
6	14	221
6	16	220
6	18	216
6	20	216
6	22	221
6	24	220
6	26	220
6	28	214
6	30	177
6	32	140
6	34	0
6	36	0
6	38	0
6	40	0

6	42	0
6	44	0
8	0	0
8	2	0
8	4	0
8	6	205
8	8	218
8	10	225
8	12	224
8	14	223
8	16	224
8	18	223
8	20	223
8	22	220
8	24	220
8	26	222
8	28	219
8	30	217
8	32	210
8	34	156
8	36	138
8	38	0
8	40	0
8	42	0
8	44	0
10	0	0
10	2	0
10	4	204
10	6	211
10	8	218
10	10	223
10	12	225
10	14	220
10	16	225
10	18	218
10	20	212
10	22	217
10	24	216
10	26	219
10	28	218
10	30	215
10	32	212
10	34	209
10	36	185
10	38	150
10	40	131
10	42	0
10	44	0

12	0	150
12	2	189
12	4	214
12	6	213
12	8	220
12	10	222
12	12	218
12	14	218
12	16	216
12	18	207
12	20	201
12	22	198
12	24	189
12	26	201
12	28	200
12	30	209
12	32	212
12	34	212
12	36	211
12	38	207
12	40	182
12	42	175
12	44	0
14	0	151
14	2	184
14	4	210
14	6	219
14	8	218
14	10	219
14	12	219
14	14	207
14	16	192
14	18	180
14	20	171
14	22	167
14	24	154
14	26	172
14	28	189
14	30	201
14	32	212
14	34	206
14	36	217
14	38	220
14	40	209
14	42	199
14	44	0
16	0	164
16	2	204

16	4	223
16	6	230
16	8	221
16	10	231
16	12	228
16	14	213
16	16	182
16	18	154
16	20	131
16	22	127
16	24	124
16	26	129
16	28	156
16	30	188
16	32	204
16	34	224
16	36	227
16	38	228
16	40	233
16	42	216
16	44	0
18	0	156
18	2	171
18	4	198
18	6	193
18	8	194
18	10	202
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18	14	187
18	16	157
18	18	119
18	20	111
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18	24	112
18	26	111
18	28	115
18	30	132
18	32	172
18	34	204
18	36	211
18	38	2211
18	40	216
18	42	212
18	44	175
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20	4	162
20	6	162

20	8	147
20	10	181
20	12	185
20	14	128
20	16	120
20	18	114
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20	24	105
20	26	106
20	28	115
20	30	123
20	32	175
20	34	206
20	36	221
20	38	228
20	40	228
20	42	219
20	44	174
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22	4	155
22	6	143
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22	10	99
22	12	138
22	14	118
22	16	112
22	18	101
22	20	98
22	22	77
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22	26	90
22	28	93
22	30	102
22	32	130
22	34	187
22	36	176
22	38	175
22	40	172
22	42	164
22	44	107
24	0	0
24	2	0
24	4	0
24	6	0
24	8	0
24	10	0

24	12	100
24	14	106
24	16	103
24	18	97
24	20	97
24	22	87
24	24	97
24	26	102
24	28	107
24	30	122
24	32	67
24	34	92
24	36	75
24	38	31
24	40	69
24	42	76
24	44	28
26	0	0
26	2	0
26	4	0
26	6	0
26	8	0
26	10	0
26	12	0
26	14	0
26	16	0
26	18	0
26	20	0
26	22	0
26	24	0
26	26	86
26	28	0
26	30	0
26	32	0
26	34	0
26	36	0
26	38	0
26	40	0
26	42	0
26	44	0
28	0	0
28	2	0
28	4	0
28	6	0
28	8	0
28	10	0
28	12	0
28	14	0

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28	18	0
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