**Supplementary Materials**

**Supplementary Material 1: TNHS Attendance Record, 1935–1941 (Excel file: Supp. 1)**

Tabulated attendance records of TNHS members, workmen, and visitors from 28 October 1935 to 1 December 1941, compiled from the excavation journals (Beynon & Ogilvie, 1932–1938, Ogilvie, 1938–1941). Note that the attendance records are intermittent from 28 October 1935 to 11 May 1936. Another gap in the records occurs from 25 January 1937 to 15 February 1937.

**Supplementary Material 2: Work Area and Workmen Record, 1926–1941 (Excel file: Supp. 2)**

Tabulated record of areas worked during the excavation, and workmen employed from 27 January 1926 to 1 December 1941, compiled from the workmen’s payslips and paybook (Supplementary Material 3) and excavation journals (Beynon & Ogilvie, 1932–1938; Ogilvie, 1938–1941). Note that a gap in records occurs between the end of the paybook on 31 December 1934 to the start of attendance records in the journals on 28 October 1935. Attendance records are intermittent from 28 October 1935 to 11 May 1936, and another gap in the records occurs from 25 January 1937 to 15 February 1937. For a few days the payslip record the workmen’s presence on days differing from the recorded work day in the journal. These are noted on the table but in most cases are probably due to bookkeeping errors on the payslips which were filled in some days after the work.

**Supplementary Material 3: The TNHS Excavation Archive**

The excavation archive is held by Torquay Museum. A summary is provided here: a full list is provided by the museum catalogue. The archive also contains some material not relevant to the excavation, which is not itemised here. AR numbers are to the museum catalogue numbers.

*Excavation journals*

The bulk of the written archive comprises the three excavation journals, which between them cover the whole period of the excavation. For the areas covered by these journals see Supplementary Material 2.

*AR4262*

Beynon, F., Dowie, H.G. & Ogilvie, A.H. 1926–1932.Kent’s Cavern Exploration Journal 1, 27 January 1926 to 29 February 1932.

*AR4263*

Beynon, F. & Ogilvie, A.H.H.dd. 1932–1938.Kent’s Cavern Excavation Journal 2, 7 March 1932 to 28 March 1938.

*AR4267*

Ogilvie, A.H. 1938–1941. Kent’s Cavern Excavation Journal 3, 3 October 1938 to 1 December 1941.

*Drawn sections*

*AR4270*

Two longitudinal sections of the Vestibule, drawn before excavation on 1 February 1926, and the same section on 18 March 1926. Although these sections were drawn very early in the investigation they are important for showing features which are referred to in the journals but not shown in the later section drawings (AR 4271, AR4273).

*AR4271*

Longitudinal section of the Vestibule trench, 1927–1928. It initially showed Trench C as 15feet (4.57 m) deep, implying it was drawn about 23 May 1927. A pencilled addition shows the area excavated in the 1927–1928 season, showing the full depth of Trench C reached on 7 May 1928. This section has the slope of the deposits accurately represented, but it lacks details shown on AR4273.

*AR4273*

Longitudinal section of the Vestibule trench 1926–1927, showing many of the same details as AR4271. The datum line is drawn horizontal, thus not showing the true slope of the deposits. However it shows more details of the sediments in and around Trench C, including the Void under Trench B, which is not shown on AR4271. In addition to the main longitudinal section, there is a cross section of the void. The depth of Trench C is shown as 20 ft6 in (6.25 m), suggesting it was drawn at the end of the 1926–1927 season, on or shortly after 27 June 1927.

*Flint book*

*AR4265.1*

Exercise book containing tabulated descriptions of flints nos. 1–126 (found 3 February 1926 to 11 June 1926), and less detailed descriptions of nos. 127–163, 169 and 188 (found 18 June 1926 to 24 January 1927).

*AR4265.2*

Page from exercise book with classification of flints found up to 18 June 1926.

*Workmen’s payslips and paybooks*

*AR4295*

Series of payslips to Lewis (workman), 5 February 1926 to 19 March 1926.

*AR4297*

Series of payslips to Acome (workman), 25 March 1926 to 11 January 1929.

*AR4298*

Paybook, covering work by and payments to:

Acome (workman), 25 June 1928-20/3/1933

Tickell (workman), 3 April 1933-24/4/1933

Bassett (workman), 6 November 1933 to 31 December1934

Lake (workman), 18 December 1933 to 22 January 1933

Quarrymen, 5 February1934.

*A4304*

Receipt for quarrymen, 5 November1934

Receipt for quarrymen, gelignite, detonators and fuse, 14 February 1935

Receipt for man removing broken stone, 23 March1935.

*Receipts etc.*

*AR4296.1*

Explosives licence from Devon Constabulary, 25 February 1926.

*AR4296.2*

Receipt for Gelignite, fuse and caps, 26 February1926.

*AR4300*

Tool and equipment receipts, 3 February1926 to 29 October1934.

*Reports, surveys etc.*

*AR4276*

Handwritten draft report for 1928–1929 excavations season, F. Beynon.

*AR4284*

Copy of the survey of Kent’s Cavern produced in 1934 by P.M.B. Lake.

*AR4266*

Exercise book with discussion of geology of Kent’s Cavern and other south Devon cave sites.

*Letters*

*AR4268, AR4269, AR4274–4281, AR4283–4288, AR4290–4292.*

Miscellaneous letters between the TNHS excavation directors, members of the BA committee, and the secretary of the TNHS, covering the excavation and discussion of the stratigraphy of Kent’s Cavern.

*Newspaper cuttings*

*AR2472*

Five newspaper cuttings, four dated from 1926, the fifth undated, describing the start of excavations in Kent’s Cavern.

**Supplementary Material 4: Photographs from the TNHS Excavations**

*Photographs held by Torquay Museum*

The Torquay Museum photographs have labels providing supporting information. PR and AR numbers are the museum catalogue numbers.

*PR4801*

Newspaper clipping, labelled as from the Western Morning News, unknown date. Posed photograph of two people in the trench with tools one of whom is the cave’s owner, W.F. Powe.

*PR4814*

Photograph of the sorting tables set up in the north corner of the Vestibule with, from left to right, Dr B.N. Tebbs, Mr A.H. Ogilvie, Miss C. Dick, Miss E.A. Webb, Rev. Arthur E. Shooter, Mr E.H. Rogers and Mr Bassett. Comparison with the attendance records (Supplementary Material 1) shows that the photograph dates from between 7 November 1938 and 16 January 1939.

*PR7804*

Photograph of the sorting tables set up in the north corner of the Vestibule, labelled ‘Copyright photo. By A. Vincent Bibbings of Newton Abbot.’ Miss E.A. Webb between the Misses Dick on the left, with Rev. Shooter and Mr E.H. Rogers on the right. Comparison with the attendance records (Supplementary Material 1) shows that the photogrpah dates from between 7 November 1938 and 30 January1939.

*PR20556.1*

Photograph of the sorting tables set up in the north corner of the Vestibule, labelled ‘Copyright photo. By A. Vincent Bibbings of Newton Abbot.’ From left, Mr Ogilvie, in charge of the work, on extreme right, Mr E.H. Rogers, and seated at the table Miss Webb. Comparison with PR4814 and PR7804 also allows us to identify the Rev. Shooter and Miss Dick. A fourth man at the table remains unnamed. Comparison with the attendance records (Supplementary Material 1) shows that the photograph dates from between 7 November 1938 and 6 February 1939.

*PR7805*

View of the excavation area in the Vestibule from the Passage of Urns, labelled as having been printed in *The Sphere*, 14 January 1939. The caption identifies a group of sightseers being shown round by Mr Bassett, Further away are members of TNHS working under the direction of Mr Ogilvie. Resolution of the picture is insufficient to allow identification of the people at the sorting tables, but the tables are set up in the same position as in PR4814 and PR7804, suggesting this photo was taken around the same time, between 7 November 1938 and 6 February 1939.

*PR20558*

Photograph of the sorting tables set up at the entrance to the North Sally Port, labelled ‘Copyright photo by the Devonshire Press’. Labelled as showing Mr Ogilvie and helpers, with Miss E. Webb (donor of the photograph) second from left. The location dates the photograph to between 27 November 1939 and 29 April 1940. The picture shows a small pick and small hand shovels on the tables, confirming the use of small hand tools.

*AR4261*

Photograph of A.H. Ogilvie standing beside a table with finds from the excavations. Also on display is a human skull found in a fissure outside the cave in 1925.

*Photographs held by Torquay Library*

The library photographs are unlabelled apart from being from the ‘Ogilvie’ excavation.

*Kents Cavern A. Ogilvie 019*

Duplicate of Torquay Museum PR20556.1.

*Kents Cavern A. Ogilvie 022*

View of the excavation area in the Vestibule from the Passage of Urns. The viewpoint is almost identical to PR7805, but slight differences are apparent and there are some small changes in the scene. This implies a lapse of time between the two photographs, though this may not have been very long; thus it was probably taken by the same photographer, and on the same day as PR7805. Comparison with PR4814 and PR7804 allows identification of A.H. Ogilvie, Miss Webb, E.H. Rogers, and possibly Tebbs. A man sitting at the table to Miss Webb’s left is unidentified but is the same unnamed person shown (seated in the same place) on PR20556.1. The attire of the people is identical to that in PR20556.1, suggesting it was taken on the same day, between 27 November 1939 and 29 April 1940.

*Kents Cavern A. Ogilvie 025*

View of the trench with three men posed with tools, to with pickaxes, the third with a spade. This picture was published by White and Pettitt (2012) and Zilhao (2013) both of whom suggest it was taken in 1927. Comparison with PR4814 shows that the man with the spade is William Bassett; the others are unidentified. On the left side of the picture is a bedrock outcrop with bedding dipping down to the right and many joints dipping steeply down to the left. This confirms that the photo was taken looking SW, and that the rock outcrop is the Sloping Rock. The position of the trench relative to the Sloping Rock (which lies to the left, and therefore SE of the trench) suggests that the photograph shows the Vestibule Pit West Extension, thus dating the photograph to between 7 November 1938 and 6 February 1939. The presence of Bassett further indicates that the photograph was taken late in the excavations, as he was not employed in the cave until November 1933.

**Supplementary Material 5: Trench Depth Record, 1926–1928 (Excel file – Supp. 3)**

Tabulated records of trench depths for the first three seasons of work in the Vestibule, from 27 January 1926 to 2 February 1928, compiled from the excavation journal (Beynon, Dowie, & Ogilvie, 1926–1932).

**Supplementary Material 6: Calibrated age ranges and modelled age ranges for the Kent’s Cavern Bayesian model shown in Figure 6.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Unmodelled (BP) | |  |  | Modelled (BP) | |  |  |  |
|  | from | to | from | to | from | to | from | to | Convergence |
| End |  |  |  |  | 31600 | 29930 | 32730 | 28800 | 94.2 |
| OxA-21895 Vestibule 3'0''-4'0'' | 31360 | 30670 | 31920 | 29970 | 31740 | 30680 | 33450 | 30260 | 98.9 |
| OxA-21106 C4'4''-4'8'' | 34230 | 33880 | 34460 | 33740 | 34230 | 33870 | 34460 | 33730 | 99.6 |
| OxA-13455 C5'0'' | 34230 | 33670 | 34590 | 33410 | 34230 | 33670 | 34620 | 33370 | 99.5 |
| OxA-13456 C5'9'' | 32800 | 31780 | 33280 | 31470 | 32870 | 31820 | 33380 | 31470 | 99.4 |
| OxA-30351 6'0'' | 34910 | 34220 | 35350 | 33930 | 34770 | 34170 | 35100 | 33880 | 99.4 |
| 6' and above |  |  |  |  |  |  |  |  |  |
| OxA-30352 6'6-7'' | 35180 | 34350 | 35670 | 34030 | 35310 | 34580 | 35860 | 34290 | 99.4 |
| OxA-X-2582-19 6'6''-7'' | 38160 | 36630 | 38780 | 36060 | 38170 | 36630 | 38740 | 36040 | 99.4 |
| 6'6''-7' samples |  |  |  |  |  |  |  |  |  |
| OxA-13457 C7'3'' | 40970 | 39370 | 41620 | 38690 | 39860 | 38850 | 40290 | 38360 | 99.5 |
| OxA-13429 B8'0'' Stalagmite floor | 42200 | 39620 | 43800 | 38360 | 40360 | 39550 | 40570 | 38900 | 99.8 |
| OxA-13921 | 41080 | 40260 | 41430 | 39880 |  |  |  |  |  |
| OxA-14701 | 40700 | 39880 | 41130 | 39520 |  |  |  |  |  |
| OxA-14210 | 41370 | 40710 | 41620 | 40350 |  |  |  |  |  |
| Wooly rhino C8'3'' | 40990 | 40450 | 41230 | 40210 | 40560 | 40070 | 40810 | 39370 | 99.8 |
| OxA-14059 9'0'' | 41050 | 39460 | 41680 | 38740 | 40770 | 40240 | 41070 | 39780 | 99.9 |
| OxA-30162 9'0'' | 40050 | 38710 | 40980 | 38230 | 40750 | 40220 | 41040 | 39690 | 99.9 |
| 9'0 |  |  |  |  |  |  |  |  |  |
| OxA-13965 C9'6'' | 42120 | 41220 | 42540 | 40650 | 40970 | 40460 | 41260 | 40130 | 99.9 |
| OxA-30161 9'9'' | 41780 | 40400 | 42360 | 39660 | 41410 | 40740 | 41810 | 40420 | 99.9 |
| OxA-30272 C10'0'' | 40330 | 38890 | 41170 | 38430 | 41270 | 40660 | 41640 | 40330 | 99.8 |
| OxA-30274 C10'0'' | 40160 | 38790 | 41050 | 38340 | 41260 | 40650 | 41620 | 40300 | 99.8 |
| OxA-27527 C9-10'0?'' | 41950 | 40600 | 42520 | 39860 | 41440 | 40750 | 41840 | 40430 | 99.9 |
| 10'0'' samples |  |  |  |  |  |  |  |  |  |
| Maxilla age est |  |  |  |  | 41820 | 41090 | 42370 | 40760 | 99.8 |
| OxA-1621 C10'6'' (100% outlier) | 35800 | 34040 | 37440 | 33400 | 42060 | 41230 | 42760 | 40890 | 99.7 |
| OxA-27442 C10'9'' | 37640 | 36240 | 38380 | 35840 | 42300 | 41400 | 43170 | 41070 | 99.7 |
| OxA-27444 C10-11' | 41430 | 40030 | 42010 | 39290 | 42550 | 41570 | 43580 | 41260 | 99.6 |
| OxA-30273 C12'6''-12'9'' | 43790 | 42090 | 45030 | 41500 | 44080 | 42370 | 45290 | 41910 | 99.1 |
| OxA-27443 C12'9-13'8'' | 36660 | 35540 | 37590 | 35080 | 45770 | 42060 | 48400 | 41710 | 96.9 |
| OxA-14715 C12'-13' | 40090 | 39290 | 40460 | 38900 | 46150 | 42160 | 48470 | 41760 | 87.9 |
| OxA-14285 C13'3'' | 49480 | 45170 | ... | 43280 | 48110 | 44300 | 49240 | 42930 | 99.3 |
| OxA-14761 C14'-0'' | 49850 | 47000 | ... | 45470 | 48530 | 45860 | 49590 | 44680 | 99 |
| OxA-13888 C15'0'' | 44260 | 43050 | 44960 | 42640 | 44340 | 43090 | 45080 | 42640 | 99.2 |
| 12-15' |  |  |  |  |  |  |  |  |  |
| OxA-14714 C19'-20' | 52580 | 47320 | 57390 | 45630 | 50010 | 48410 | 50010 | 46670 | 99.3 |
| Kent's Sequence |  |  |  |  |  |  |  |  |  |
| Start |  |  |  |  | 50540 | 48320 | 51870 | 46670 | 92.7 |

**Supplementary Material 7:** Outlier detection results for the Kent’s Cavern Bayesian model.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Prior** | **Posterior** | **Type** | **Element** | **Prior** | **Posterior** | **Type** |
| OxA-14714 C19'-20'-0 | 5 | 7 | t | OxA-30162 9'0 | 5 | 2 | t |
| OxA-13888 C15'-0 | 5 | 2 | t | OxA-14059 9'0 | 5 | 1 | t |
| OxA-14761 C14'-0 | 5 | 4 | t | Wooly rhino 8'3 | 5 | 11 | t |
| OxA-14285 C13'3” | 5 | 3 | t | OxA-14210 | 5 | 14 | s |
| OxA-14715 C12'-13'-0 | 5 | 100 | t | OxA-14701 | 5 | 4 | s |
| OxA-27443 C12'9-13'8 | 5 | 100 | t | OxA-13921 | 5 | 2 | s |
| OxA-30273 C12’6” – 12’9 | 5 | 3 | t | OxA-13429 B8'0 Stalagmite floor | 5 | 2 | t |
| OxA-27444 C10-11 | 5 | 22 | t | OxA-13457 C7'3 | 5 | 3 | t |
| OxA-27442 C10’9 | 5 | 100 | t | OxA-X-2582-19 6’6”-7 | 5 | 2 | t |
| OxA-1621 C10’6 original date of the maxilla | 100 | 100 | t | OxA-30352 6'6-7 | 5 | 2 | t |
| OxA-27527 C9-10’0 | 5 | 1 | t | OxA-30351 6'0 | 5 | 2 | t |
| OxA-30274 C10'0 | 5 | 6 | t | OxA-13456 C5'9 | 5 | 2 | t |
| OxA-30272 C10'0 | 5 | 4 | t | OxA-13455 C5'0 | 5 | 1 | t |
| OxA-30161 9'9 | 5 | 1 | t | OxA-21106 C4’4”—4’8 | 5 | 1 | t |
| OxA-13965 C9'-6 | 5 | 6 | t | OxA-21895 Vestibule 3’-4’.0 | 5 | 9 | t |

Notes on outliers: for OxA-27442 (32,800±500 BP); catalogued as “*Megaceros*” and selected because it matched a journal entry for a deer tooth found at 12’8” on the day it was recorded as being excavated. Later we identified it as being *Bos* sp. In the journal there is an entry that states ‘Ox. Fine tooth’ which we conclude is probably the reference for this tooth. Unfortunately the entry is the only one for the day with no depth appended, creating some uncertainty as to its proper position within the sequence. A clue to the possible depth is given by the format of the journal, however. If several finds were made at the same depth, the depth was listed for the first find only, and thereafter labelled ‘do’ (‘ditto’). For 27 April 1927, we have an entry directly above the tooth find of 10 ft 9 in (3.28 m). It is possibly risky in this instance to assume that this must be the depth for this particular sample. Instead, the range of depths of 10 ft 9 in to 12 ft 8 in (3.28–3.86 m) recorded for this date might be the safest indication of depth. Although there is uncertainty regarding the precise context of this tooth, then, the result does not fit within the expected sequence and is an outlier.

OxA-27443 (32,200+450 BP) is a *Cervus* tooth from a depth of 13 ft 0 in (3.96 m).

How may we explain these two aberrant determinations? It is possible that they were picked out from the side of the excavation trench and therefore derive from a shallower depth than other finds from the days in question. However, there are only two occasions when this did occur and both events were recorded in the journal. The only instance in 1926–1928 was on 25 April 1927 when an *Arvicola*? (vole?) tooth was found in the entrance to the ENEG trench at a depth of 4 ft 6 in (1.37 m), when the other samples recovered were all from a depth of 11 ft 6 in to 12 ft (3.50–3.65 m). The fact that it was a rodent tooth may be significant. We therefore reject this as a likely explanation with a reasonable degree of confidence. There is a possibility that the results could be due to problematic AMS determinations; however the chemistry of the samples was acceptable and there is nothing that suggests a problem. Again, we think this is less likely, although it is testable by AMS dating a single amino acid from excess bone collagen. Although the precise context remains elusive, it is likely that within the margins of uncertainty, the most plausible reason for these two results is post-depositional intrusion of younger material.

**Supplementary Material 8:** Bayesian model code CQL for OxCal plot shown in Figure 6.

Plot()

{

Outlier\_Model("General",T(5),U(0,4),"t");

Outlier\_Model("SSimple",N(0,2),0,"s");

Sequence("Kent's Cavern")

{

Boundary("Start");

Sequence("Kent's Sequence")

{

R\_F14C("OxA-14714 C19'-20' ", 0.0021,0.0006)

{

Outlier("General", 0.05);

};

Phase("12-15'")

{

R\_F14C("OxA-13888 C15'0'' ", 0.0069,0.0006)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-14761 C14'-0'' ", 0.0037,0.001)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-14285 C13'3'' ", 0.0044,0.002)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-14715 C12'-13' ", 0.0126,0.0005)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-27443 C12'9-13'8'' ", 0.01816,0.00105)

{

color="red";

Outlier("General", 0.05);

};

R\_F14C("OxA-30273 C12'6''-12'9'' ", 0.00788,0.00106)

{

Outlier("General", 0.05);

};

};

R\_F14C("OxA-27444 C10-11' ", 0.01119,0.00099)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-27442 C10'9'' ", 0.01684,0.00104)

{

Outlier("General", 0.05);

color="red";

};

R\_F14C("OxA-1621 C10'6'' original date of the maxilla", 0.0213515,0.00239218)

{

Outlier("General", 1.00);

color="red";

};

Date("Maxilla age est");

Phase("10'0'' samples")

{

R\_F14C("OxA-27527 C9-10'0?'' ", 0.01035,0.00099)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-30274 C10'0'' ", 0.01291,0.00101)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-30272 C10'0'' ", 0.01269,0.00103)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-30161 9'9'' ", 0.01063, 0.001)

{

Outlier("General", 0.05);

};

};

R\_F14C("OxA-13965 C9'6'' ", 0.0098,0.0007)

{

Outlier("General", 0.05);

};

Phase("9'0")

{

R\_F14C("OxA-30162 9'0'' ",0.01307,0.00101)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-14059 9'0'' ", 0.0119,0.0011)

{

Outlier("General", 0.05);

};

};

R\_Combine("Wooly rhino C8'3'' ")

{

Outlier("General", 0.05);

R\_F14C("OxA-14210",0.0108,0.0004)

{

Outlier("SSimple", 0.05);

};

R\_F14C("OxA-14701",0.0118,0.0005)

{

Outlier("SSimple", 0.05);

};

R\_F14C("OxA-13921",0.0113,0.0005)

{

Outlier("SSimple", 0.05);

};

};

R\_F14C("OxA-13429 B8'0'' Stalagmite floor", 0.0108,0.0019)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-13457 C7'3'' ", 0.012,0.0011)

{

Outlier("General", 0.05);

};

Phase("6'6''-7' samples")

{

R\_F14C("OxA-X-2582-19 6'6''-7'' ", 0.01611,0.00114)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-30352 6'6-7'' ",0.02151,0.00113)

{

Outlier("General", 0.05);

};

};

Phase("6' and above")

{

R\_F14C("OxA-30351 6'0'' ",0.02207,0.00104)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-13456 C5'9'' ", 0.0292,0.0012)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-13455 C5'0'' ", 0.0244,0.001)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-21106 C4'4''-4'8'' ", 0.02389,0.00055)

{

Outlier("General", 0.05);

};

R\_F14C("OxA-21895 Vestibule 3'0''-4'0'' ", 0.03502,0.00208)

{

Outlier("General", 0.05);

};

};

};

Boundary("End");

};

};