
Kenn Church

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Highlights

Kenn Church is an excellent representative of the later transgressive marine deposits in the Kenn area. It contains fossiliferous sands overlying glaciofluvial gravels, and shows a transition from brackish to fully marine conditions with the transgression reaching 14–21 m OD. It is proposed as the type-site of the Kenn Church Member.

(Table 10.2) Fossil molluscs from the interglacial deposit at Yew Tree Farm (after Gilbertson and Hawkins, 1978a)

Species	Number
<i>Valvata cristata</i> Müller	12
<i>Valvata piscinalis</i> (Müller)	3324
<i>Beigrandia marginata</i> (Michaud)	970
<i>Bithynia tentaculata</i> (Linné) shells	1039
<i>Bithynia tentaculata</i> (Linné) opercula	1755
<i>Carychium minimum</i> Müller	2
<i>Lymnaea truncatula</i> (Müller)	192
<i>Lymnaea palustris</i> (Müller)	1
<i>Lymnaea peregra</i> (Müller)	886
<i>Planorbis planorbis</i> (Linné)	25
<i>Anisus vorticulus</i> Troschel	147
<i>Anisus leucostoma</i> Müller	141
<i>Gyraulus laevis</i> Alder	1613
<i>Armiger crista</i> (Linné)	615
<i>Planorbis</i> spp.	3
<i>Hippentis complanata</i> (Linné)	21
<i>Acroloxus lacustris</i> (Linné)	8
<i>Oxyloma</i> cf. <i>pfeifferi</i> Rossmässler	6
<i>Cochlicopa lubrica</i> (Müller)	2
<i>Pupilla muscorum</i> (Linné)	2
<i>Vallonia costata</i> (Müller)	4
<i>Vallonia puicbella</i> (Müller)	6
<i>Vallonia</i> spp.	1
<i>Cepaea nemoralis</i> (Linné)	1
<i>Tricbia bispida</i> (Linné)	3
<i>Punctum pygmaeum</i> Draparnaud	1
<i>Zonitoides nitidus</i> (Müller)	4
<i>Agrolimax</i> cf. <i>agrestis</i> (Linné)	6
<i>Agrolimax</i> spp.	42
<i>Spbaerium corneum</i> (Linné)	1
<i>Corbicula fluminalis</i> (Müller)	72
<i>Pisidium amnicum</i> (Müller)	44
<i>Pisidium casertanum</i> (Poli)	7
<i>Pisidium obtusale</i> (Lamarck)	10
<i>Pisidium milium</i> Held	56
<i>Pisidium subtruncatum</i> Malm	138
<i>Pisidium benslowanum</i> (Sheppard)	24
<i>Pisidium nitidum</i> Jenyns	270

<i>Pisidium pulchellum</i> Jenyns	2
<i>Pisidium moitessierianum</i> Paladilhe	3
<i>Pisidium</i> spp.	190
Total	11 649

Introduction

At Kenn Church, interglacial estuarine deposits occupy a channel incised into the glacial Kenn gravels. The sequence is overlain by aeolian coversands.

Pleistocene gravels have been known in the Kenn area since the work of Ussher (in Woodward, 1876), who described gravels at Kenn and Kennpier and sandy soil over gravels at Yatton. They also noted that '... small pebbles and large subangular and angular pieces of Carboniferous Limestone, and a few of sandstone, occur in greyish-brown soil ...' near Kenn (Woodward, 1876; p. 154). Greenly (1921) described poorly sorted sediments from Yatton and wrote '... the formation recalls true boulder clays, but the extreme rarity of striated stones, the feebleness of the striations, and the almost total absence of erratics, forbid us to regard it as such.' (Greenly, 1921; p. 147).

Five feet of sand and gravel with pockets of coarse quartz sand containing *M. balthica* were reported from a degraded pit at St John's Church, Kenn (Welch, 1955). Welch described further gravels with *Macoma* elsewhere in the neighbourhood of Kenn. The gravel lithologies included flint, Greensand chert, quartz and Jurassic rocks. These deposits were equated with the Burtle Beds of King's Sedgemoor, a conclusion endorsed by ApSimon and Donovan (1956) and Kidson (1970). These latter authors also correlated the Kenn gravels with the marine deposits at Weston-in-Gordano and favoured an Ipswichian age for the marine incursion. Tills with striated boulders and coarse gravels overlain by marine and freshwater sands and gravels were briefly described by Hawkins and Kellaway (1971).

Gilbertson (1974) and Gilbertson and Hawkins (1978a) described the stratigraphy of the deposits at Kenn Church in a detailed survey of Pleistocene deposits in the Kenn area. These authors described coversands overlying interglacial deposits which in turn rested on coarse, unfossiliferous cold-stage gravels. Molluscan studies showed an initial brackish-water environment, with marine influence becoming stronger upwards. Amino-acid ratios were determined from a variety of fossil molluscs from the interglacial deposit at Kenn Church by Andrews *et al.* (1984). Most ratios were around 0.2, and were interpreted by these authors as indicating an Ipswichian age. The site was recently proposed as the type-locality of the Kenn Church Member by Campbell *et al.* (in prep.), who suggested assignment of the unit to Oxygen Isotope Stage 7.

Description

The following description is taken from Gilbertson (1974) and Gilbertson and Hawkins (1978a) and the fossil mollusc fauna is listed in Table 10.3. The Pleistocene deposits at Kenn form a low 'island' amidst the Holocene alluvium of the Avon Levels, rising to around 8.2 m OD (Gilbertson, 1974). They overlie Triassic mudrocks of the Mercia Mudstone Formation and are in places over 6 m thick. At Kenn Church [ST 4159 6890], a channel containing interglacial estuarine deposits is incised into the Kenn gravels. The channel appears to follow a slight rise to the south of the village to [ST 412 686] where shelly gravel with abundant *M. balthica* was found in 1969 (Gilbertson, 1974). The sequence can be summarized as follows (maximum bed thicknesses in parentheses).

9. Tarmac — made ground. (0.15 m)
8. Pale grey-brown cobbly sand — made ground. (0.38 m)
7. Pale red sand with cobbles — Brean Member. (0.21 m)
6. Dark grey sand — Kenn Church Member. (0.01 m)

<i>Nassarius</i> <i>reticulatus</i> (Linné)						1	
<i>Cerastoderma</i> spp.	3f	8f	1f	f	f	f	if
<i>Macoma</i> <i>balthica</i> (Linné)	7f	16f	23f	2f	6f	90f	50f
Brackish-water taxa							
<i>Hydrobia</i> <i>ventrosa</i> Montagu	163	125	16	2	1		
<i>Hydrobia</i> <i>ulvae</i> (Pennant)	103	75	19	4	2	1	
Freshwater taxa							
<i>Valvata</i> <i>piscinalis</i> (Müller)	6	2					
<i>Belgrandia</i> <i>marginata</i> (Michaud)	1						
<i>Bithynia</i> <i>tentaculata</i> (Linné)	3						
<i>Lymnaea</i> <i>peregra</i> (Müller)	20	14	5				
<i>Planorbis</i> <i>planorbis</i> (Linné)	1	2					
<i>Anisus</i> <i>vorticulus</i> Troschel	2						
<i>Gyraulus</i> <i>laevis</i> (Alder)	11	15	1				
<i>Corbicula</i> <i>fluminalis</i> (Müller)					2		
<i>Pisidium</i> <i>subtruncatum</i> Malm							
<i>Pisidium</i> <i>nitidum</i> Jenyns	1						
<i>Pisidium</i> <i>moitessierianum</i> Paladilhe							
<i>Pisidium</i> spp.	2	2					

Terrestrial

taxa

<i>Vallonia pulchella</i>	1	
(Müller)		
<i>Vallonia enniensis</i>	1	
(Gredler)		
<i>Trichia striolata</i>	1	
Pfeiffer		
<i>Helicella virgata</i> (Da Costa)		1
<i>Discus rotundatus</i>		1
(Müller)		

The basal Kenn gravels (bed 1) were regarded as sandur deposits by Gilbertson (1974) and Gilbertson and Hawkins (1978a). The sands of the interglacial Kenn Church Member (beds 2–6) contain fossil mollusc assemblages which enable detailed palaeoenvironmental reconstruction (Gilbertson, 1974; Gilbertson and Hawkins, 1978a). A fully interglacial but rather continental environment, with July temperatures perhaps 2°C warmer than present, is suggested by the presence of the thermophilous *C. fluminalis*, *O. erinacea*, *B. marginata*, *Vallonia enniensis* (Gredler) and *A. vorticulus* (Gilbertson, 1974). The basal sands of the Kenn Church Member contain abundant brackish-water taxa, some marine and some freshwater species, probably reflecting a brackish-water environment with input from a clear freshwater stream. The freshwater taxa decrease rapidly upwards through the deposits, and *H. ulvae* becomes increasingly important at the expense of the less salt-tolerant *H. ventrosa* before both decline rapidly as marine taxa become dominant. Gilbertson (1974) computed a maximum mean sea level of 14–21 m OD for the height of the transgression.

The red cobbly sands of the Brean Member (bed 7), Overlying the interglacial deposit, are most likely the result of cold-climate sedimentation, probably having formed as niveo-aeolian coversands with an admixture of cobbles introduced by cryoturbation and solifluction (Gilbertson, 1974; Gilbertson and Hawkins, 1978a).

The aminostratigraphic data, with most ratios of c. 0.2, suggest comparison with Oxygen Isotope Stage 7 or older. The initial correlation of these sites with the Ipswichian interglacial is unlikely, as Ipswichian sites are characterized by ratios of about 0.1. (Bowen *et al.*, 1989; Campbell *et al.*, in prep.). Comparison with the Group 4 ratios of Mottershead *et al.* (1987) suggests an age of around 200 ka BP for deposits characterized by amino-acid ratios of c. 0.2. The presence of *Corbicula* also points to a pre-Stage 5 age, since Keen (1990) and Bridgland (1994) have argued that this species is not present in Britain after Stage 7.

Conclusion

Kenn Church GCR site is important as a representative of the later interglacial marine transgressive deposits in the Kenn area. Detailed studies of its molluscan fauna have showed the progression of a marine transgression to 14–21 m OD in a warm continental climate, probably around 200 ka BP. The Kenn Church interglacial deposits occupy a channel incised into glaciofluvial gravels and are overlain by niveo-aeolian coversands.

[References](#)

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<i>Bitbynia tentaculata</i> (Linné) shells	1039
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<i>Pupilla muscorum</i> (Linné)	2
<i>Vallonia costata</i> (Müller)	4
<i>Vallonia pulchella</i> (Müller)	6
<i>Vallonia</i> spp.	1
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<i>Trichia bispida</i> (Linné)	3
<i>Punctum pygmaeum</i> Draparnaud	1
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<i>Pisidium benslowanum</i> (Sheppard)	24
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<i>Pisidium</i> spp.	190
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(Table 10.2) Fossil molluscs from the interglacial deposit at Yew Tree Farm (after Gilbertson and Hawkins, 1978a).

Sample	A	B	C	D	E	G	J	O
Sample depth (m)	2.7	2.2	1.7	1.5	1.2	0.8	unstratified	
Marine/estuarine taxa								
<i>Patella vulgata</i> Linné						2		
<i>Gibbula</i> sp.							1	
<i>Littorina littorea</i> (Linné)	1						2	
<i>Littorina saxatilis</i> (Olivi)	2						1	
<i>Littorina littoralis</i> (Linné)	1				1	1		
<i>Littorina</i> sp.	2f	f	2f	1f		f	f	f
<i>Nucella lapillus</i> (Linné)							1	2
<i>Ocenebra erinacea</i> (Linné)						1	1	
<i>Buccinum undatum</i> (Linné)							1	3
<i>Nassarius reticulatus</i> (Linné)							1	
<i>Cerastoderma</i> spp.	3f	8f	1f	f		f	f	1f
<i>Macoma balthica</i> (Linné)	7f	16f	23f	2f		6f	90f	50f
Brackish-water taxa								
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<i>Planorbis planorbis</i> (Linné)	1	2						
<i>Anisus vorticulus</i> Troschel	2							
<i>Gyraulus laevis</i> (Alder)	11	15	1					
<i>Corbicula fluminalis</i> (Müller)						2		
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<i>Pisidium moltesstertanum</i> Paladilhe	1							
<i>Pisidium</i> spp.	2	2						
Terrestrial taxa								
<i>Vallonia pulchella</i> (Müller)	1							
<i>Vallonia enntensis</i> (Gredler)		1						
<i>Trichia striolata</i> Pfeiffer	1							
<i>Helicella virgata</i> (Da Costa)						1		
<i>Discus rotundatus</i> (Müller)						1		

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