THE GEOARCHAEOLOGY OF PAST RIVER THAMES CHANNELS AT SYON PARK, BRENTFORD

Jane Corcoran, Mary Nicholls and Robert Cowie

SUMMARY

Geoarchaeological investigations in a shallow valley in Syon Park identified two superimposed former channels of the River Thames. The first formed during the Mid Devensian c.50,000 bp. The second was narrower and formed within the course of the first channel at the end of the Late Devensian. Both would have cut off part of the former floodplain, creating an island (now occupied by Syon House and part of its adjacent gardens and park). The later channel silted up early in the Holocene. The valley left by both channels would have influenced human land use in the area. During the Mesolithic the valley floor gradually became dryer, although the area continued to be boggy and prone to localised flooding till modern times, leaving the 'island' as a distinct area of higher, dryer land. The deposition of numerous Neolithic and Bronze Age objects, possibly votive offerings, in Syon Reach might indicate that this 'island' had a ritual function. The valley was exploited (at least for some of the historic period) by a misfit stream, which was probably a factor in the choice of site for Syon Abbey in the early 15th century and two lakes created by 'Capability' Brown in the mid-18th century.

INTRODUCTION

One of the most significant topographical features of Syon Park in west London is a broad shallow valley left by a silted up branch of the Thames. The full extent of the palaeochannel has yet to be traced, but it probably begins opposite Isleworth Ait and ends near the mouth of the River Brent. In Syon Park its course is identified by a gentle arc now marked by two long narrow lakes created during the mid-18th century (discussed later). The western lake extends from the Isleworth end of the park to the main car park for both Syon House and the Hilton London Syon Park Hotel (hereafter the hotel site), while the other lies to the north-east near the Brentford end of the park. The south-west and north-east ends of the arc are respectively centred on NGR 516650 176370 and 517730 177050 (Fig 1). In dry conditions part of the palaeochannel may be seen from the air as a dark cropmark on the south-east side of the west lake and is visible, for example, on an aerial photograph taken in August 1944.[1]

This article presents a summary of the geoarchaeological investigation carried out between 2004 and 2010 by Museum of London Archaeology (MOLA), supplemented by documentary research. The investigations included the excavation of archaeological trenches across parts of the palaeochannel and examination of geotechnical window sample logs undertaken in advance of the construction of the hotel on the north side of the main car park (site code SYV04), as well as power auger surveys drilled next to the west lake during independent MOLA research. Together they formed a geoarchaeological project to establish the nature and extent of the former channel and its chronological development (Figs 1–2).

The research archive of this project is lodged with the London Archaeological Archive and Research Centre (LAARC), under the site code SYV04 (Corcoran *et al* 2011).

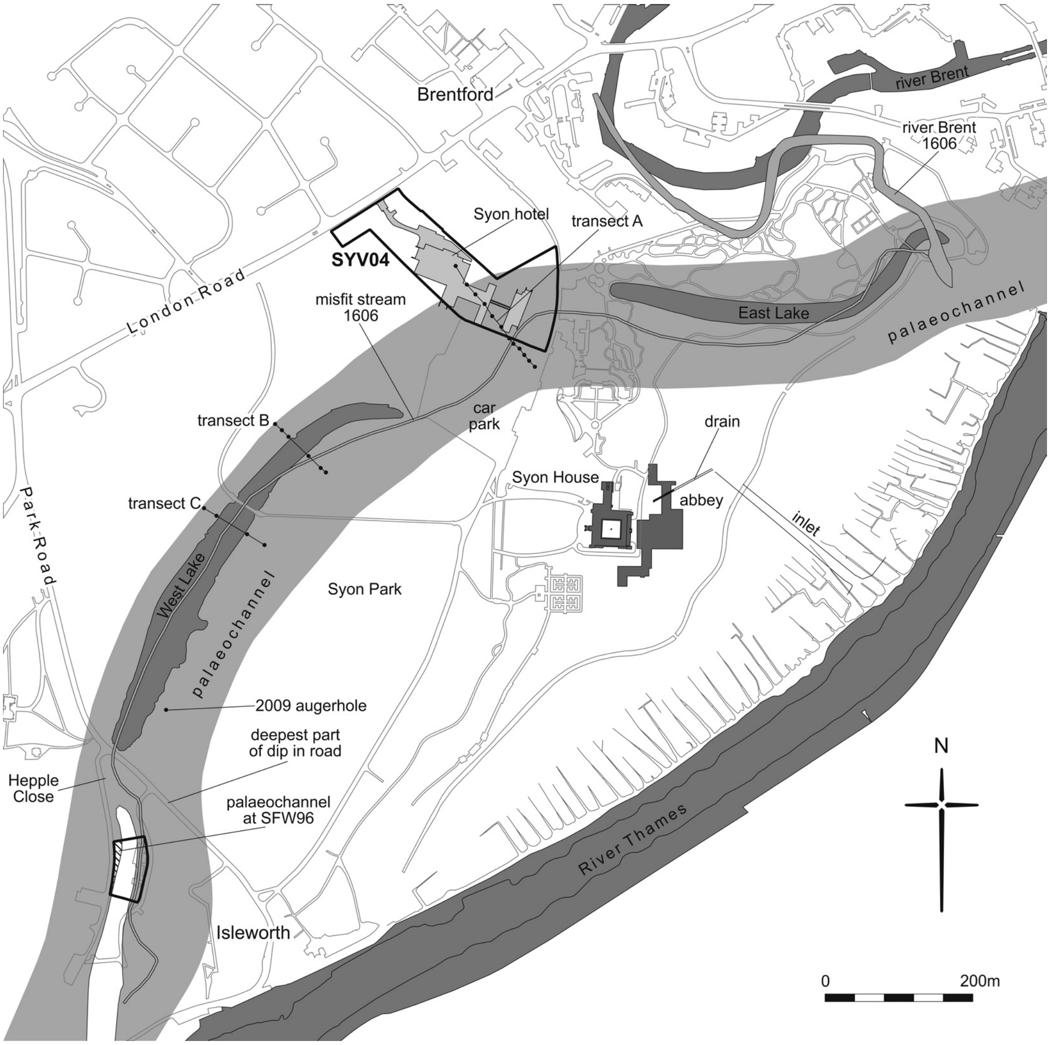

Fig 1. Site location, showing approximate position of the palaeochannel, a former misfit stream (as mapped in 1606), and archaeological investigations

PREVIOUS INVESTIGATIONS

The palaeochannel was first recorded in 1996 during excavations by the Oxford Archaeological Unit to the west of Syon Park (Bell 1996, 37, 41, 55). In this area the former arm of the Thames seems to have flowed north as two channels separated by a narrow gravel bank or island (Fig 1). Further evidence for the palaeochannel was discovered in Syon Park in 2001, when a line of geotechnical window sample boreholes was drilled across the hotel site and car park and across the projected line of the channel (Shepherd Gilmour Environment 2001). The boreholes provided sufficient information to reconstruct a partial cross-section of the channel, extending *c.*140m from its north-west bank. In its lowest part the channel dipped down to near Ordnance Datum.

CIRCUMSTANCES OF FIELDWORK

The results of the borehole survey in 2001 were confirmed by an archaeological evaluation on the hotel site in 2004 (Fig 2).

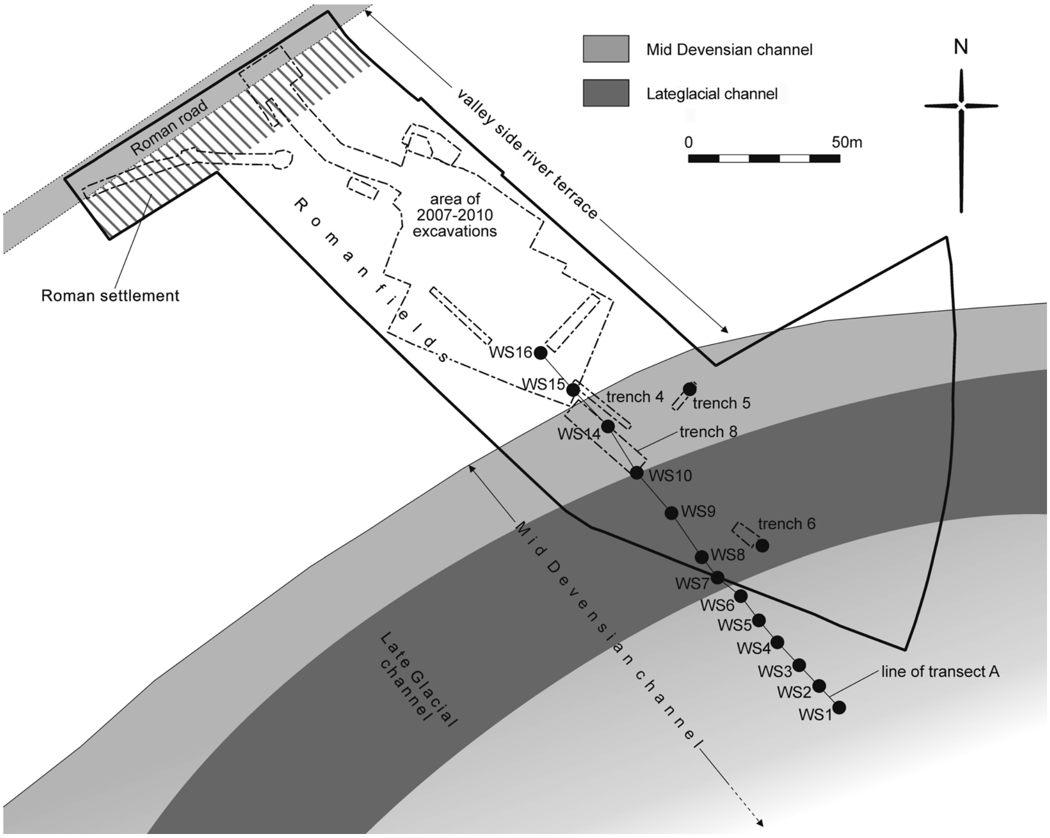

Fig 2. Plan of the hotel site in Syon Park showing the location of boreholes, augerholes and trenches

Traces of Roman settlement were uncovered at the top of the valley side. Trenches lower down the valley side revealed contemporary field ditches. Trench 4 crossed the north-west edge of the channel (at about 4.9m OD). Augered boreholes in Trenches 5 and 6 revealed deeper parts of the channel at *c*.3.2m and 1.1m OD respectively (Cowie 2004).

Archaeological fieldwork on a much larger scale continued intermittently on the site from 2007 to 2010 (Fig 2). This revealed the remnants of a Roman landscape, extending from the London–Silchester road (now London Road) and the adjacent settlement, down across fields to the valley floor. The investigations included the excavation of a large stepped trench (Trench 8; Figs 2–3) with the aim of recording as much of the channel profile as possible. A detailed section of the trench was drawn and two columns of monolith samples (undisturbed sediment blocks) and adjacent bulk soil samples were collected from the ends of the trench closest to the deeper part of the channel and closest to the valley side (columns A and B respectively) for recovery of environmental indicators, such as pollen, diatoms, seeds and ostracods, that would aid the reconstruction of the sequence of environments represented by the palaeochannel fills. Data on strata recorded in the trench were then combined with those previously logged in the geotechnical window samples to provide a more extensive profile of the palaeochannel (Fig 1, Transect A).

In 2009 an augerhole was drilled near the south-west end of the west lake as part of a MOLA research and training exercise to obtain information about the palaeochannel closer to Isleworth (Nicholls 2009). Further information about the palaeochannel was

Fig 3. Trench 8 looking north-west towards the archaeological excavation on the hotel site

obtained in 2010 by the drilling of ten augerholes close to the central part of the lake, as part of a research project funded by LAMAS (Fig 4). The latter formed two transects across the projected line of the palaeochannel; one comprised four augerholes (Fig 1, Transect C), the other, about 120m to the east, comprised six augerholes (Fig 1, Transect B).

THE CHANNEL PROFILE AND SEQUENCE OF DEPOSITS

The shallow depression in the modern landscape created by the palaeochannel is roughly 200m wide (Fig 5). The profile of the palaeochannel shows that it actually comprises two superimposed Devensian channels (Fig 6).[2] Most of the evidence recovered from the palaeochannel relates to its northern side, where there is a pronounced step down into the earliest channel cut from the Kempton Park river terrace, as observed in Trench 4 (Fig 6, Transect A).

Fig 4. Power augering next to the west lake in Syon Park during investigations on the palaeochannel in 2010

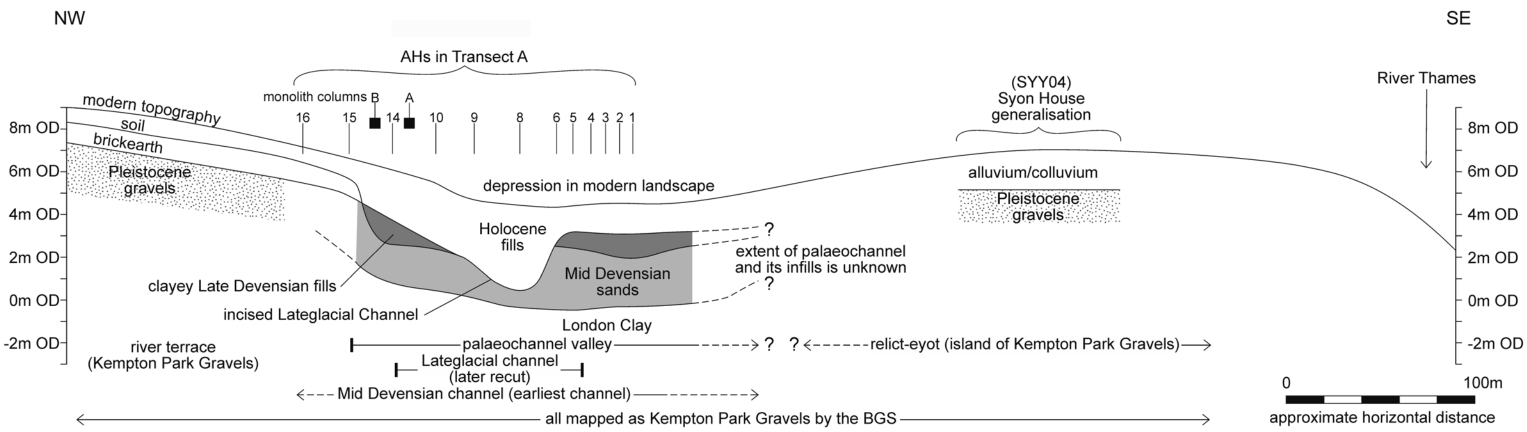

Fig 5. Schematic cross-section across the natural topography of Syon Park

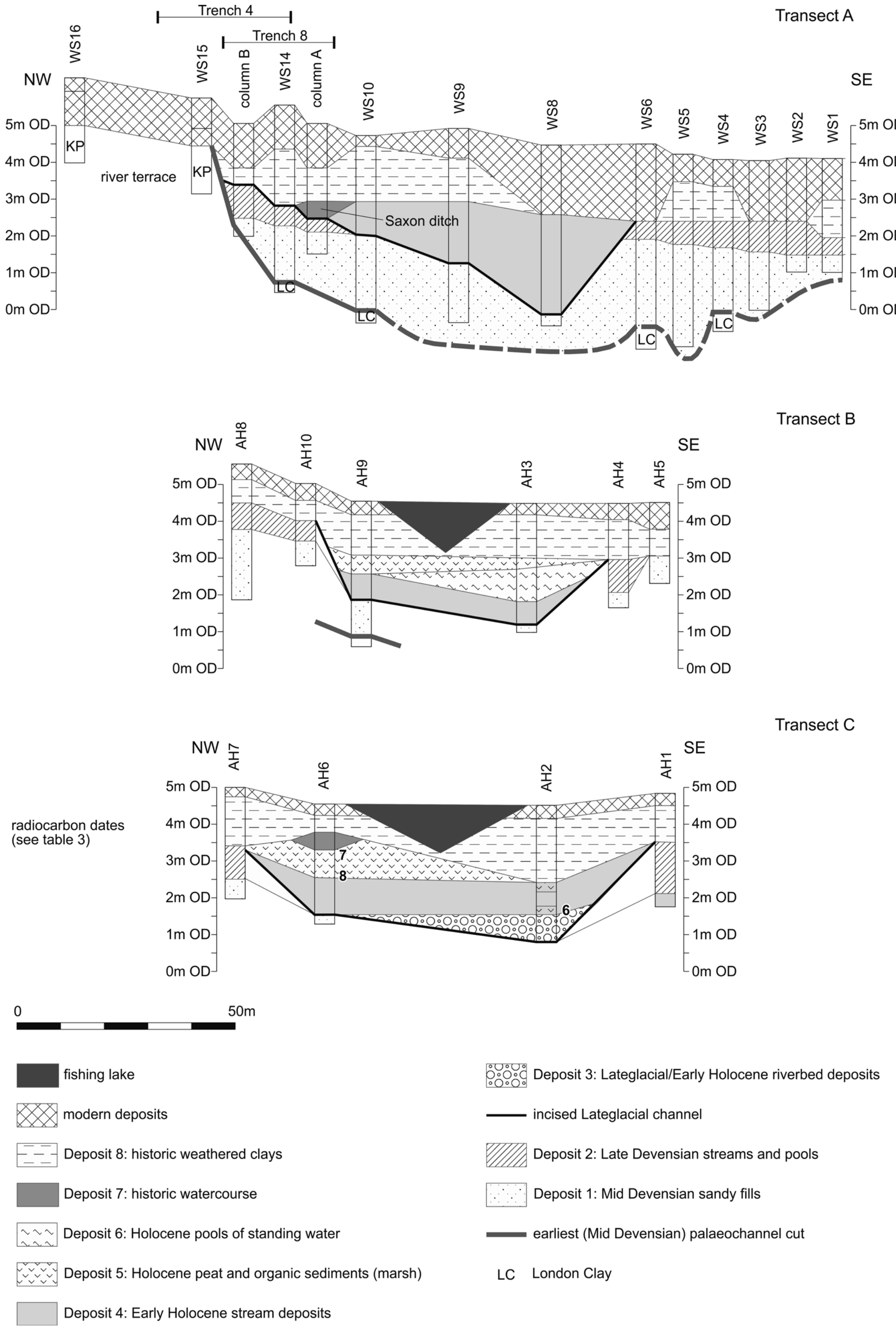

Fig 6. Profile of the Syon palaeochannel as recorded in Transects A–C, for location of transects see Fig 1

Table 1. Palaeochannel history linked to Late Quaternary chronology

Palaeochannel history: Lateglacial channel	Palaeochannel history: Mid Devensian channel	Late Quaternary chronology: Marine Isotope Stage (MIS)	Approx date (thousands of years ago)	Epoch	Stage name				archaeology	Climate	
misfit stream, wet fields, man-made lakes		1	0.5	Holocene	Late			Historic	post medieval	warm	Interglacial
colluvium (SE bank), Saxon ditch			1						Medieval		
colluvium+flooding			2						Roman		
colluvial build-up begins (NW bank)			3					Prehistoric	Iron Age		
stream/wetland possibly restricted to SE, with drier soils developing in NW			4		Mid				Bronze Age		
increase in pooling (Deposit 6) + streams and wetland (Deposits 4+5)			6						Neolithic		
sluggish streams, pools and peat (Deposits 4, 5 + 6)	soil development + tree growth		11.5		Early				Mesolithic		
Channel carved out and gravel deposited (Deposit 3)	scour / truncation	2	13	Late Pleistocene	Devensian	Late	Devensian 'Lateglacial'	Loch Lomond Stadial	Upper Palaeolithic	cold	Glacial (last cold stage)
	Interbedded silts and fine sands, overlain by clays (Deposit 2)		15					Windemere Interstadial		warmer	
			25					Dimlington Stadial (Last Glacial Maximum, c 20,000yrs ago)		cold	
	Channel carved out and infilled with sands (Deposit 1)	3	58			Middle		Upton Warren interstadial	Middle Palaeolithic	warmer	
		4	75			Early				cold	
		5a	79		Variably referred to as Ipswichian or Devensian			Brimpton interstadial		warmer	
		5b	96							cold	
		5c	103					Chelford interstadial		warmer	
		5d	115							cold	
		5e	125		Ipswichian					warm	Inter glacial

Table 2. Summary of the sequence of deposits within the palaeochannel

Deposit number	Sediment type	Radiocarbon sample no.
8	Colluvium, weathered clays with poorly sorted inclusions, derived mainly from slope processes; of mainly Iron Age and later date	3
7	Sands and silts with organic and artefact inclusions relating to Saxon watercourses	1
6	Clays with occasional plant remains, representing pools of standing water	none
5	Peat and organic sediments, representing marsh and fringing vegetation marginal to pools and watercourses	7 & 8
4	Sands and silts, frequently bedded and with organic inclusions, relating to stream channel deposits	6
3	Sandy gravels, representing riverbed and channel bars	none
2	Interbedded silts and fine sands overlain by clays, representing sluggish stream and pool deposits	2, 4 & 5
1	Sands (not investigated in detail) probably deposited by the Mid Devensian meandering river	none

Mid Devensian channel (*c.*55,000–*c.*25,000 BP): Deposit 1

The earliest fills of the Mid Devensian channel were not reached in most augerholes and trenches. However, Eocene London Clay was recorded in AH9 (Fig 6, Transect B) and in some of the geotechnical window sample holes of Transect A (Fig 6, WS4, 5, 6, 10 & 14), which provides a profile for the first channel. This channel was over 200m wide and about 8m deep from the contemporary floodplain surface with a fairly flat base at about -1 to -2m OD (Fig 6; Table 1; Table 2, Deposit 1). The sandy nature of the channel fills indicates deposition as a result of channel migration during the temperate climate of an interstadial, most probably the Upton Warren Complex.[3]

Late Devensian channel fills (*c.*25,000–*c.*11,500 BP): Deposit 2

The channel infilled with slow moving stream deposits as it was gradually cut off from the Thames (Table 2, Deposit 2). A more detailed investigation of the overlying finer-grained fills of the channel (Deposit 2) was undertaken in Trench 8, where they comprised three successive deposits: interbedded clays, silts and sands, overlain by a distinct dark bed of manganese-stained clay, overlain by soft clay.

The bedded sands, silts and clays ([502–5], [511] and [520]) are indicative of flowing water, with calcareous precipitates (rhizoliths) and iron concretions implying episodic short-lived drying out (Fig 7). A radiocarbon date of 17,530–17,080 cal BC (Beta-261187) was obtained from a small amount of unidentifiable detrital organic material found within the silty sands [520] (Table 3, Date 5; Fig 7). It suggests that these deposits may have accumulated towards the end of the Dimlington Stadial, the coldest episode of the Late Devensian, when ice sheets advanced as far south as Norfolk.[4] However, the date, as with all radiocarbon determinations on fluvial deposits, can only provide an estimate of the time after which the sediment body formed, as reworking is possible.

Almost no plant remains, pollen or diatoms were recovered from the channel fills in Trench 8. This reflects the depositional conditions, as oxidisation and abrasion in cold climate river sediments mean that fossils, which would help in reconstructing the riverine and surrounding environment, are rarely preserved. Nevertheless, a freshwater ostracod (bivalve crustacea), *Limnocytherina sanctipatricii*, was recovered from fill [502]. This is a cool/cold species, associated with summer tundra pools in periglacial environments (Whittaker 2009), and could indicate a thaw episode during the Dimlington Stadial.

Radiocarbon dates were also obtained from unidentifiable detrital organic material

Table 3. AMS Radiocarbon dates from detrital organic material within palaeochannel sediments from columns A and B in Trench 8, plus augerholes AH2 and AH6. Dates were calibrated using OxCal 4.1 (Bronk Ramsey 2009) and the IntCal09 calibration curve (Reimer et al 2009) and are listed as the two sigma calibrated result

Ref no. (for text and figs)	**Height (m AOD) [Context]**	**Column/ Augerhole**	**Laboratory no.**	**$^{13}C/^{12}C$ ratio (%)**	**Radiocarbon determination (BP)**	**Calibrated date 2 σ (95% probability)**
1	2.95 [517]	A	Beta-261186	-26.5	1130±40	cal AD 870– 1010
2	2.45 [506]	A	Beta-261185	-27.3	9540 ± 50	9130– 8990 cal BC 8920–8700 cal BC 8680–8650 cal BC
3	3.69 [512]	B	Beta-261189	-25.2	2300±40	410–360 cal BC 290–240 cal BC
4	3.13 [506]	B	Beta-261188	-25.9	9940 ± 50	9650–9580 cal BC 9540–9480 cal BC 9470–9280 cal BC
5	2.49 [520]	B	Beta-261187	-24.4	16110±90	17530–17080 cal BC
6	1.51	AH2	SUERC-29053	-27.5	8460±35	7580–7485 cal BC
7	3.1	AH6	SUERC-29054	-28.6	4960±35	3800–3650 cal BC
8	2.66	AH6	SUERC-29055	-28.1	7805±35	6700–6570 cal BC

in the manganese stained bed [506] that dipped gently down from the valley side into the palaeochannel (Fig 7). One date was 9130–8650 cal BC (Beta-261185), while the other was 9650–9280 cal BC (Beta-261188) (Table 3, Dates 2 & 4 respectively). These two similar dates place fill [506] at the interface between the short cold snap, known as the Loch Lomond Stadial (Younger Dryas), and the Holocene (Table 1). The clayey nature of [506] and the overlying [508] suggests that these deposits probably accumulated within a lake or pool of standing water on the frozen valley floor. Gravel clasts and reworked ancient pollen within the clay are indicative of eroded sediments. It is likely that soils developed during the previous Windermere Interstadial were eroded from the valley sides and washed into the lake in brief episodes of summer thaw at this time (Spurr 2009, 78) (Table 1).

Lateglacial/Early Holocene channel (*c.*11,500 BP–*c.*7,500 cal BC): Deposit 3

Severe erosion is likely to have been associated with the thawing of the frozen arctic landscape with climatic amelioration at the end of the Loch Lomond Stadial. The volume of water that was created as the arctic landscape thawed, together with low river levels, led to deeper channels being incised into the Late Devensian floodplain (Fig 6). A narrower channel, about 70m wide, was scoured into the Devensian fills. However, the survival of the Late Devensian deposits at the margins of the palaeochannel implies that this part of the contemporary floodplain was not entirely scoured out by the Lateglacial meltwater and lay within a relatively sheltered part of the environment during the Lateglacial/Holocene transition.[5] This is probably because the main focus of channel incision at this time took place within what was to become the modern Thames floodplain.

Gravels at the base of AH2 in the deepest part of the transects, at about 1m OD, represent the braided river bed of the high-energy arctic meltwater stream that carved out the channel. Similar gravels were recorded at a comparable elevation at the base of the 2009 augerhole (Fig 1). The woody clasts and organic matrix of these gravels represent vegetation colonising the gravel bars during the Early Holocene.

Migrating Mesolithic channels (*c.*7500–*c.*6600 cal BC): Deposit 4

The deposits of this period in AH2 consisted of interbedded silts and humic, peaty silts,

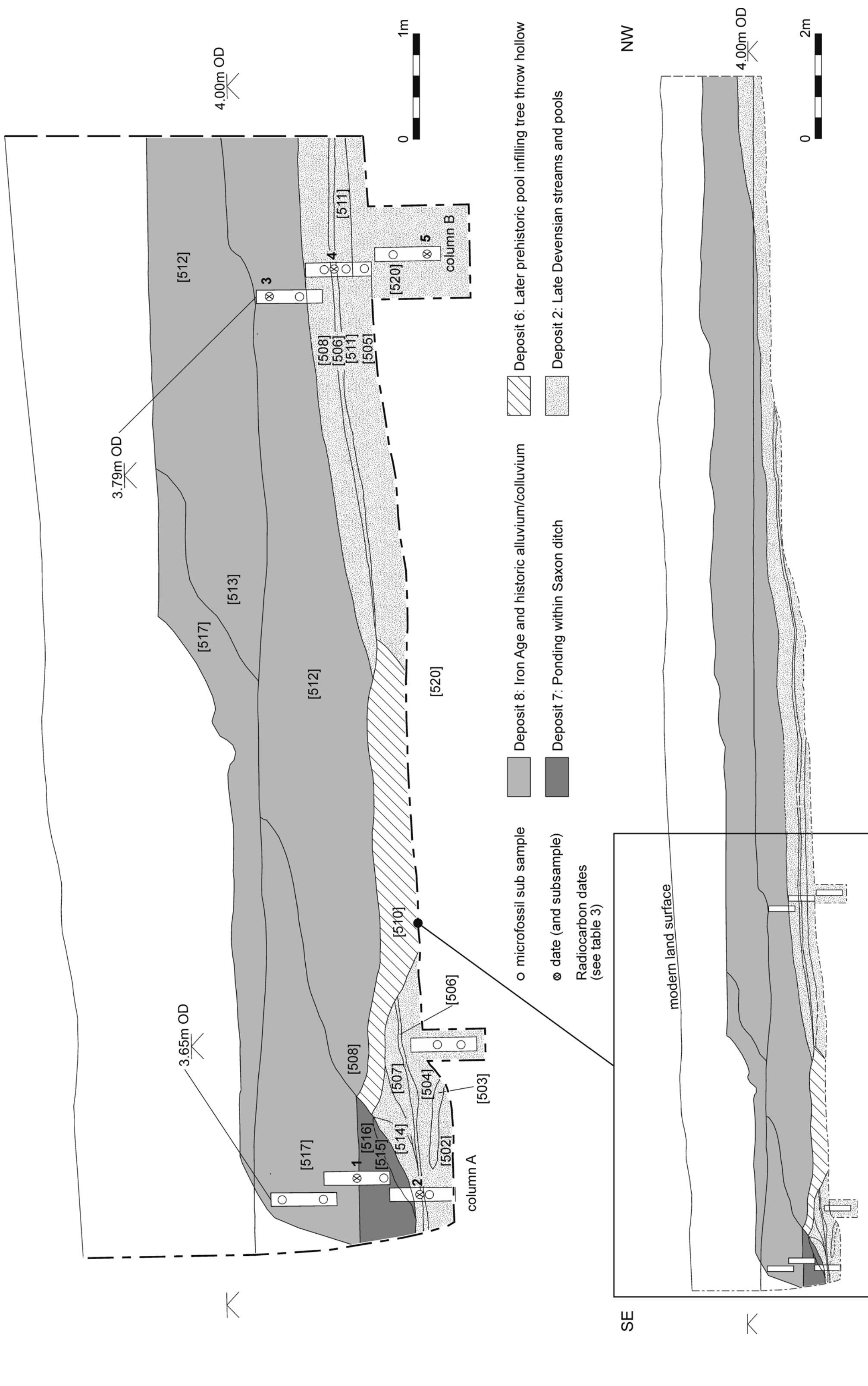

Fig 7. North-east-facing section across part of the palaeochannel in Trench 8

which indicate intermittent episodes of sluggish water flow and vegetation growth (Fig 8). As the volume of water declined the river no longer occupied the full width of the Lateglacial channel. Instead the river probably occupied a series of rapidly shifting channels, which ran across the floor of the Lateglacial channel. These infilled multiple channels are represented by a range of deposits within the augerholes: sands containing wood fragments and organic remains, which overlay the gravels in the 2009 augerhole; silty sediment with sand lenses at the base of AH3; and organic silty sands at the base of AH9 (Fig 6, Transect B). Peat and clay interleaved with the stream deposits suggest that sluggish and possibly ephemeral streams flowed along the valley floor, which was also wet and marshy, with pools of standing water. An early Mesolithic date of 7580–7485 cal BC (SUERC-29053) was obtained from silty peat above the gravels in AH2 (Table 3, Date 6; Fig 8). This organic deposit probably developed on a gravel bar, left behind by the main channel of the Early Holocene watercourse.

Mesolithic and Neolithic marsh and wet woodland (*c.*6600–*c.*3700 cal BC): Deposit 5

As the climate warmed, vegetation would have spread across the barren arctic riverbed. As plants colonised the exposed fluvial sediments and encroached on the shallow pools, organic deposits accumulated in marshy hollows (Deposit 5 in AHs 2, 3 & 9). Peat also accumulated in the slightly dryer conditions on the margins of the valley and is likely to have gradually spread across the pools and boggy hollows, as the latter silted up and dried out (Fig 6, Transect C). In AH6 peat developed and formed a bed about 0.5m thick, above about a metre of silt which had accumulated within or at the margins of a stream channel. The base of the peat was dated to 6700–6570 cal BC (SUERC-29055) (Table 3, Date 8; Fig 6, Transect C). Humic silt was recorded at a similar elevation (between about 2.5m and 3m OD) in AH9 (Fig 6, Transect B).

The date and distribution of these peaty sediments along the northern side of the Lateglacial channel suggest that by the start of the later Mesolithic a dryer environment was encroaching south-westwards across the valley. The top of the peat in AH6 was dated to 3800–3650 cal BC (SUERC-29054), the Early Neolithic (Table 3, Date 7; Fig 6, Transect C).

Pollen recovered from AH2 provides information about Mesolithic vegetation within the valley and on the surrounding river terrace (Boast 2011). Samples from the silts at the base of the pollen profile suggest that reed-beds bordered the sluggish stream, as the dense Boreal pine forest was opening up and tracts of wet grassland and thickets of hazel were appearing on the valley sides, perhaps around 7000 BC (Fig 8). The overlying pollen samples showed that the spread of organic and peaty deposits across the valley floor coincided with the colonisation and expansion of alder, although oak with a hazel under-storey had replaced the pine forest on the valley sides. Following its initial colonisation of Syon Park sometime after *c.*7000 BC, alder carr is likely to have remained a significant component of the forest.[6] However, because alder grows on the wetter parts of the floodplain (the locations where pollen samples are usually taken), it often disproportionately dominates the pollen record for the later Mesolithic woodland (Scaife 2000, 111–12).

The clays, which accumulated in pools that developed as the valley floor became wetter (see below), were sampled in the upper part of the AH2 pollen profile. They yielded high levels of lime pollen suggesting warmer conditions that accord with the 'Climatic Optimum' of the warm wet 'Atlantic' period during the Mesolithic/Neolithic transition. The later Mesolithic wildwood saw the replacement of oak with lime. Hazel and ferns also apparently decreased at this time, probably because the growth of shrubs and ground cover would have been inhibited by the relatively dark conditions beneath the high dense canopy characteristic of lime woodland. The pollen profile from AH2 corresponds to evidence from elsewhere in South-East England for the development of mature deciduous woodlands by the later Mesolithic (see Elias *et al* 2009, 548). Although the composition of 'wildwood' in South-East England varied depending on soil and groundwater conditions it was, as

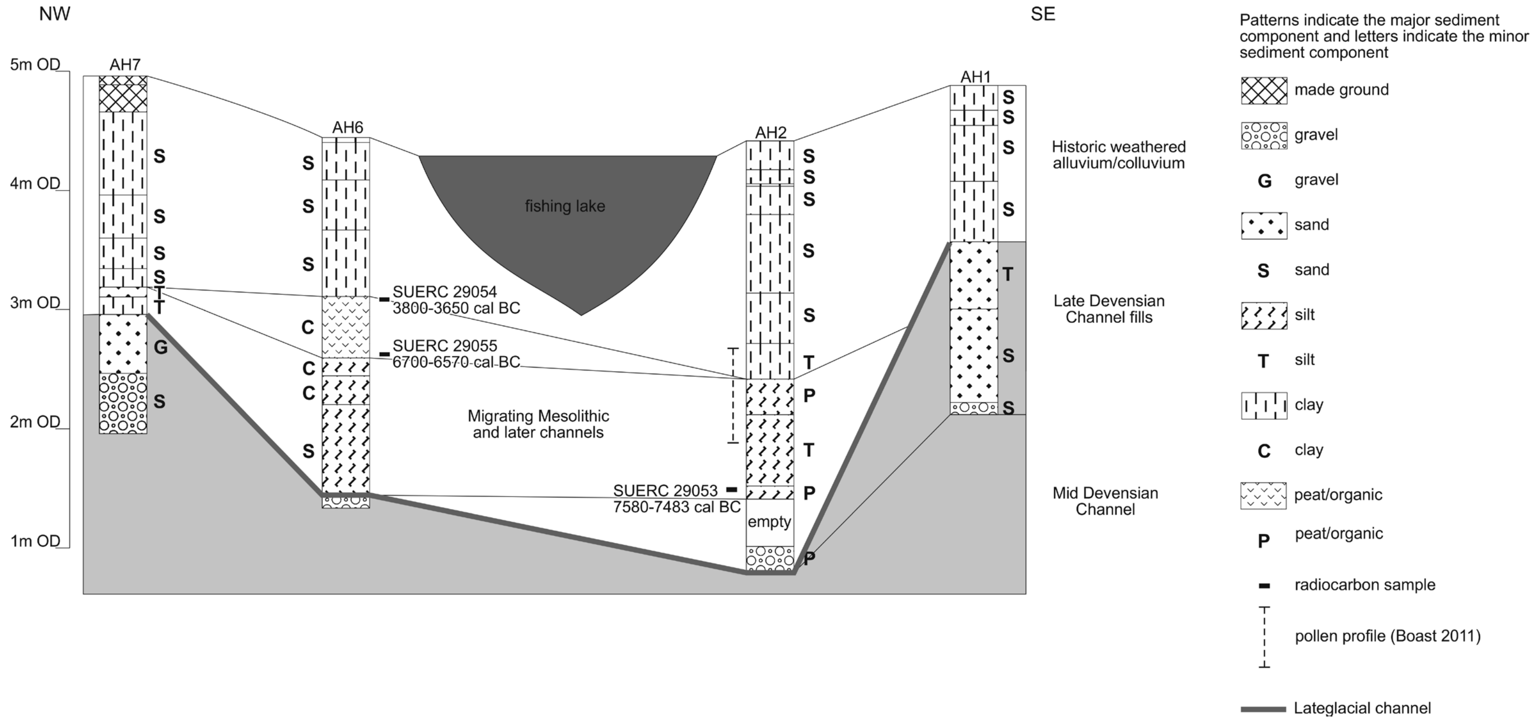

Fig 8. Transect C showing deposits recorded in the augerhole logs, with radiocarbon sample locations

at Syon, generally dominated by lime, with a scattering of oak and elm on better soils and oak and hazel on less fertile ground (see Rackham 1986, 68–71).

Pools and groundwater (*c.*3700–*c.*400 cal BC): Deposit 6

Pools formed in hollows in the Lateglacial riverbed apparently due to high groundwater. In the 2009 augerhole, the presence of humic clay above the fluvial sands suggests that a backwater developed, as the Early Holocene stream abandoned the location. About a metre of soft clay in AH3 between *c.*1.5m and 2.5m OD (Deposit 6) had probably accumulated within the standing water of a pool or cut-off, perhaps through overbank flooding from the channel. Similar clays in the 2009 augerhole between *c.*2m and 2.5m OD indicate a change from the shallow backwater fringed with vegetation to a deeper less well-vegetated body of water. Similar deposits in Trench 8 filled a tree throw hollow. Although it is likely that any feature cut into the floor of the palaeochannel at this time would fill with water, the stratigraphic position of the pools recorded in the augerholes and the tree throw are similar and it is possible that they both reflect an increase in groundwater levels, perhaps associated with woodland clearance in the Neolithic or later.

Colluvium (started accumulating *c.*400 cal BC): Deposit 8

Weathered clayey deposits derived from the valley sides formed a swathe of colluvium about a metre thick across the palaeochannel (Figs 6–7).[7] The onset of this accumulation of colluvium was dated to between 410 and 240 cal BC (Beta-261189) in Trench 8 (Table 3, Date 3; Fig 7) and is likely the result of deforestation or farming in the surrounding landscape. Trench 5 on the hotel site near the north-east edge of the channel revealed nearly a metre of colluvium, containing pottery dated to AD 50–100 and AD 150–300, and a coin of Valentinian I or Valens dated to AD 364–78 (Cowie 2004, 21).

The ground disturbance that caused the erosion of soil and subsoil from upslope would also have opened up the ground cover, increasing rain penetration and the amount of sub-surface as well as overland water flow. This would have further raised groundwater levels within the palaeochannel making it wetter and boggier, as indicated by diatoms from Trench 8.[8] Although apparently only low numbers of diatoms were preserved in the clay deposits [512] and [517] (Fig 7), they were dominated by epiphytic freshwater species, representing shallow standing water habitats (Cameron 2009). The sparse pollen assemblage from these deposits did not represent aquatic plants, but recorded durable pollen (taxa with the most robust pollen walls, such as Lactucoideae, which includes plants like dandelions) and fern spores (Scaife 2009) almost certainly derived from the valley sides. As such, this may be old pollen derived from the sediment and not reflective of the contemporary vegetation.

Historic ditches and streams: Deposit 7

Evidence for historic watercourses, successors of the Mesolithic streams (Deposit 4), was found in several places. These included a ditch in Trench 8 (Fig 7, [513]). Its basal clayey fills [516] had settled out of standing water at some time in the Saxon period, as a date of cal AD 870–1010 was obtained from unidentifiable organic detritus from the base of the overlying weathered clay [517] (Table 3, Date 1; Fig 7). Humic sands that also indicate the course of historic stream channels lay below the colluvium (Deposit 8) in AH6 (Fig 6, Transect C) and above the colluvium in AH9 (Fig 6, Transect B).

DISCUSSION

The Syon palaeochannel and its regional context

The origin of the Syon palaeochannel lies in the climatic fluctuations of the Devensian. The earliest phase of the palaeochannel was probably carved out during an arctic/temperate transition at the beginning of the Mid Devensian (Table 2, Deposit 1). It was recut in the Lateglacial, when the Thames within the Greater London area consisted of a series of braided shifting channels (Bates & Whittaker 2004, 53).[9] Subsequently as the Holocene Thames gradually coalesced into a single main channel, a number of these braided channels were gradually abandoned and silted up (as discussed in Sidell *et al* 2000).

As a result of the Mid Devensian river erosion, a large chunk of the former Early Devensian floodplain, underlying the south-eastern part of Syon Park, appears to have been isolated from the rest of the floodplain creating a large island or eyot (Fig 1) similar to better known examples in the prehistoric floodplain of Central London, notably north Southwark, which are now deeply buried beneath historic alluvium (Sidell *et al* 2002, fig 28). However, the relict eyot in Syon Park is preserved as part of the river terrace and as a result, more accessible for future study.

Isolation from the modern floodplain also meant that the palaeochannel formed a sink in the Holocene landscape, where accumulated sediments and other remains indicative of past environments were preserved and not subsequently eroded. Although evidence exists for sluggish water flow within the channel in the Early Holocene, this was probably mainly derived from ground water as by this time the channel was apparently largely cut off from the Thames. This is in marked contrast to other Lateglacial channels within (or still influenced by) the modern floodplain. The Battersea Channel, for example, seems to have remained one of several channels of the Thames, infilling with Mesolithic and Neolithic fluvial sands before it became abandoned and subsequently exploited by Counters Creek (Morley 2009). Further downstream, the Bankside Channel was subject to a series of significant episodes of river erosion and tidal scour in the Neolithic and Bronze Age, with catastrophic erosion during a storm surge probably in the Early Roman period (Corcoran in prep).

The successive palaeochannels at Syon Park add to the growing number of former channels of the River Thames and its tributaries in west London and adjacent Surrey that have undergone archaeological investigation. Of particular importance was the research excavation undertaken in 1984–9 at Runnymede Bridge, *c*.34km upstream from Syon Park, where a complex configuration of palaeochannels showed how the course of the Thames at that site evolved from the eighth millennium BC to the post-medieval period (Needham 2000). Another former channel, probably of the Thames, was found during an evaluation on the site of the British Aerospace factory, Richmond Road, Kingston-upon-Thames, *c*.7.5km upstream from Syon Park (site code BHE94; Greenwood & Maloney 1995, 343). The undated palaeochannel was over 100m wide and located *c*.150m to the north-east of the modern course of the Thames on a parallel alignment (Cowie 1994). Palaeochannels of Parr's Ditch and the Ash were found close to their confluences with the Thames, during excavations at Hammersmith Embankment, Winslow Road, (site code HWR99; Maloney & Holroyd 2000, 47) and Staines Road Farm, Shepperton (Jones 2008) respectively. At a local level these discoveries have undoubtedly contributed to our knowledge of past environments and landscapes, but in order to understand their significance at a regional level there is now a pressing need for an overarching synthesis of palaeochannel data from London as a whole.

The Holocene floodplain and its exploitation

By the later Mesolithic the palaeochannel would have formed a wooded hollow in the landscape, infilled with Late Devensian silty soil, forming a low step below the sloping river terrace. Interestingly, dated evidence for the Neolithic and Bronze Age environment of the palaeochannel is absent. It is currently unclear whether there was a depositional hiatus, whether evidence has been removed by erosion, or whether the evidence exists but has not yet been found.

No prehistoric artefacts or anthropogenic features were found in the palaeochannel in Syon Park, although this might have been due to the limitations of the investigations in this area, which comprised only augerholes and machine-excavated trenches. A few residual Mesolithic, Neolithic and Bronze Age struck flints and sherds of Neolithic pottery were recovered during open area excavations higher up the valley slopes on the hotel site, but the only notable find in these areas was a fragment of a rare Late Bronze Age gold bracelet found near the London Road entrance to the hotel (Cowie *et al* 2013). By contrast, the adjacent stretch of the Thames has produced numerous prehistoric artefacts including Neolithic flint axes and a considerable quantity of Bronze Age metalwork. The frequency of such finds prompted George Lawrence (1929, 78–80) to describe Syon Reach as 'one of the most prolific and interesting localities in the whole of the river'. It is thought that many of these objects had been deposited as votive offerings, although some may have been lost by accident and in at least one case a hoard of Late Bronze Age scrap metal was eroded from the foreshore at Syon Reach (Needham & Burgess 1980, 445–9). The reason for the concentration of such material in this stretch of the Thames is unclear, but it might suggest that the relict island, isolated by a marshy valley, may have had a special (possibly ritual) significance at this time.

Iron Age occupation has been recorded on the river terrace close to the southern tip of the relict island. The excavations at Snowey Fielder Waye (Bell 1996, 56–7) recorded Iron Age features. The build-up of colluvium during the Iron Age is indicative of deforestation and agriculture (see above, Deposit 8). It appears that the accumulation of these deposits increased during the Roman period, suggesting agricultural intensification, connected with the establishment of fields during the second half of the 1st century AD on the north-west side of the valley. This period also saw the construction of the London–Silchester road, which overlooked the valley and survives today as the London Road (A315) bounding the north-west side of the park. A long straggling settlement soon grew up next to this important route, extending for a distance of at least 900m on either side of the road between Syon Park and the centre of Brentford (*cf* Canham 1978; Cowie 2009; Cowie *et al* 2013; Darton 2007). Its heyday was in the 2nd century, but occupation continued, at least intermittently, until the end of the 4th century. The palaeochannel lay about 200m south-east of the western arm of the roadside settlement — near enough to have been a source of water for local inhabitants and their livestock, as well as for travellers passing along the road.

A misfit stream exploiting the palaeochannel hollow and probably fed by sub-surface groundwater following the surface of the impermeable London Clay, appears to have been a feature of the landscape for most of the historic period.[10] Documented evidence from historic maps suggests a channel of the River Crane could have adopted the palaeochannel valley, either as a natural consequence of channel migration or as a result of historic channel manipulation. During the medieval period this source of fresh water and the topography of the relict eyot may well have determined the location of the Bridgettine abbey (a double house for men and women) established in 1426 on the site now occupied by Syon House (Barron & Davies 2007; Foyle *et al* 2004). The stream formed the boundary of the abbey and would almost certainly have provided it with water for domestic use and drainage. Abbey building accounts between 1494 and 1502 refer to a pump in the convent garden, a pump for the brethren, a vault at the head of a conduit, a cistern for fish by the kitchen, and a sluice for the 'womenhouse' (TNA: PRO SC 6/Henry VII/1715 and 1727; Dunning 1981, 19–20). The last may have been discovered during excavations in 2010, when a large stone and brick drain, with its floor at 3.17m OD, was exposed *c.*40m north-east of Syon House on the site of the convent (Cowie 2011). The drain was probably flushed with water from the stream and appeared to head towards an inlet from the River Thames, which is shown on a plan of the manor of Isleworth-Syon dating to 1606 (Sy: MSS B.XIII.Id; Batho 1956, fig 4). This inlet was possibly the site of the abbey's wharf mentioned in 1492 and 1501–2 (Fig 1; *CPR* 1485–94, 382; TNA: PRO SC 6/Henry VII/1727; Dunning 1981, 19–20).

The stream and/or groundwater draining into the palaeochannel hollow also probably provided water to Syon House (built in the mid-16th century) in the days before the public supply of mains water. Records of payments for repairs at Syon in 1600–2 refer to 'Condeyth (conduit?)' pipes and a cistern chamber (Sy: MS U.I.3; Shirley 1983, 293). The mathematician and astronomer Thomas Harriot, who lived at Syon under the patronage of the 9th Earl of Northumberland, was personally involved with this work and produced an annotated sketch plan of the 'waterworks' (BL: MS 6786,fo.369^{r}; Shirley 1983, 294, fig 14). Significantly the diagram shows the source as 'the Springhead', from where a conduit ran towards the house, with branches serving various parts of the estate including ‘The farmes’, ‘the pond’, the ‘cesswell’, ‘the Stables’, the ‘Laundry’, and Harriot’s house (north of Syon House). The conduit to Syon House supplied to two cellars, the ‘Priuy’ in the kitchen and a cistern in the bathing room.

The stream is shown on the 1606 plan (Sy: MSS B.XIII.Id) passing close to the north-west edge of Isleworth, then running through Syon Meade (a long narrow field now occupied by the west lake) and Newe Orcharde Fielde (now the car park and site of the new hotel) and from there into the meandering course of the River Brent close to the confluence with the Thames. The stream is similarly shown on Moses Glover’s map of 1635 (Sy: B.XIII.1b), with the long narrow field renamed ‘Ferney Meade’, suggesting that the valley floor was then rather damp (Fig 9). The route of the stream depicted on these plans suggests the historic misfit streams could have originated as a channel of the River Crane, which may have captured the palaeochannel valley in later prehistory or the historic period. A similar process has been demonstrated for Counters Creek, which exploits the valley of the Battersea Channel (Morley 2009). Deposits that might represent the historic misfit stream were recorded in AH6 and AH9 (Fig 6), but the locations do not tie in with the historic mapping.

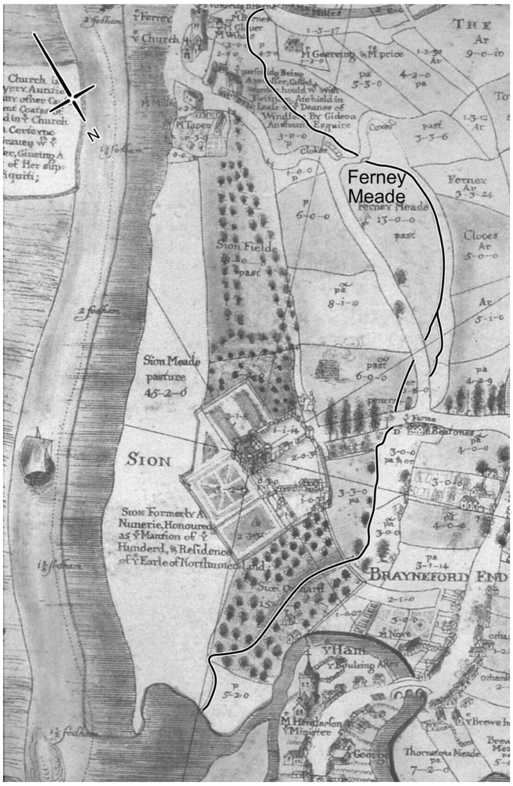

Fig 9. Detail from Moses Glover’s map of 1635 (reproduced by kind permission of His Grace the Duke of Northumberland)

Lancelot ‘Capability’ Brown exploited the valley, and its high water table and stream, to create the lakes that survive today in the park and garden of Syon House. This was part of a major landscaping project carried out between the early 1750s and the early 1770s to make a more informal landscape of lawns and meadows around Syon House (Laird 1999). Consequently the historic stream almost completely disappeared from the park, although a short stretch was left open for a while between the two lakes, as shown on Claude Joseph Sauthier’s map of the Manor of Isleworth/Syon, *c.*1786–7 (*ibid*, fig 83), which also clearly depicts the stream flowing from an area to the north of Isleworth. This stream also appears on 19th- and 20th-century Ordnance Survey maps.

The valley can still be seen today, and is perhaps most obvious in Park Road on the west side of Syon Park, where there is a pronounced dip in the road extending south-east from about the junction with Hepple Close for roughly 200m, with the lowest stretch just south-east of Snowy Fielder Waye (Fig 1). In the park it is best observed looking north from the road leading to Syon House. From this vantage point the land slopes very gently down to the west lake, and from there rises again towards the north-eastern edge of the park. The open parkland offers accessibility rarely found in Greater London that would facilitate further study of the palaeochannels, which still have considerable potential to add to our knowledge of the evolution of the natural landscape in west London.

ACKNOWLEDGEMENTS

Much of the fieldwork described here was undertaken with the kind permission of His Grace the Duke of Northumberland.

The authors are extremely grateful to the

London and Middlesex Archaeological Society Research Fund for providing a grant for fieldwork in 2010 and towards preparation of this report. Museum of London Archaeology would also like to thank Edwardian (Syon Park) Ltd and Ability Hotels for generously funding fieldwork on the palaeochannel at the hotel site in 2004 and 2008 respectively.

Thanks are also due to the staff of Syon Park Ltd for their help and co-operation during the fieldwork, especially Richard Pailthorpe (estate manager to 2007), Christopher Martyn (head gardener) and Andy Allen (fishery manager). Assistance with research was kindly provided by Alan Cattell and Sarah Harris (Structural Soils Ltd), Chris Hunwick and Lisa Little (Northumberland Estates), Cath Maloney (LAARC) and Gavin Selerie.

This account incorporates material from records and unpublished reports by Nigel Cameron (UCL), Rob Scaife (Southampton University) and John Whittaker (Natural History Museum), and by colleagues at MOLA: Mark Burch, Sarah Jones, Gideon Simons and Graham Spurr. The excavation of Trench 8 was supervised by Mike Morley, and that of other trenches by Robert Cowie, while the auger surveys were by Mary Ruddy (née Nicholls). Field investigations and post-excavation work relating to the hotel site were managed by Jo Lyon and Julian Hill respectively. The illustrations are by Juan José Fuldain González.

jane.corcoran@english-heritage.org.uk
mruddy@mola.org.uk
bcowie@mola.org.uk

NOTES

1 RAF 106G/LA/29 FR: 4059.

2 The Devensian is defined as the final cold stage in the Pleistocene, it began about 70,000 BP (before present), see Table 1.

3 An interstadial was a period of mild or temperate climate within a cold or glacial stage. Fluvial deposits dating to the Upton Warren Interstadial at Isleworth (2km south-west of Syon) show that the contemporary climate was probably warmer than the present day, but that the environment was devoid of trees (Coope & Angus 1975; Gibbard 1985, 64).

4 A stadial was an extremely cold period within a glacial stage, the opposite of an interstadial (see above).

5 The Holocene period (in which we live) is the most recent geological epoch, it began when the Pleistocene ended in *c.*11,500 BP.

6 Carr is a type of woodland that develops on wetlands; it probably consisted of alder with yew, willow and viburnum.

7 Colluvium is defined as unconsolidated material deposited at the base of a slope by erosion.

8 Diatoms are microscopic aquatic algae; different species occupy different environments, *eg* fresh or marine water, so they are an important indicator of past environments.

9 A braided river is one that is divided into numerous channels that branch, separate and rejoin, producing a tangle of channels, islands or eyots and sandbars.

10 A misfit stream is one that follows the former channel of a much larger water course.

MANUSCRIPT SOURCES

British Library (BL)
MS 6786,fo.369r Plan of waterworks by Thomas Harriot
The National Archives (TNA): Public Record Office, London (PRO)
PRO SC 6/HenryVII/1715 Syon Abbey account of works 1494–6
PRO SC 6/HenryVII/1727 Syon Abbey account of works 1501–38
Archives of the Duke of Northumberland at Alnwick Castle
Sy: U.I.3.4 Account of works 1600–2
Archives of the Duke of Northumberland at Syon House
Sy: MSS B.XIII.Id. Plan of the Manor of Isleworth-Syon, *c.*1606
Sy: B.XIII.1b Moses Glover's Map of Isleworth Hundred, 1635

BIBLIOGRAPHY

Barron, C M, & Davies, M, (eds) 2007 'House of the Bridgettines: Syon Abbey' in *The Religious Houses of London and Middlesex* (reprint of 1909 London and 1969 Middlesex Victoria County History volumes with revisions), London, 279–90

Bates, M R, & Whittaker, K, 2004 'Landscape evolution in the lower Thames Valley: implications for the archaeology of the earlier Holocene period' in J Cotton & D Field (eds) *Towards a New Stone Age: Aspects of the Neolithic in South-East England* CBA Res Rep 137, York, 50–65

Batho, G R, 1956 'Henry, Ninth Earl of Northumberland and Syon House, Middlesex, 1594–1632' *Trans Ancient Monuments Soc* 4, 95–109

Bell, C, 1996 'An archaeological excavation on land adjacent to Snowy Fielder Waye, Isleworth, London Borough of Hounslow, Middlesex' *Trans London Middlesex Archaeol Soc* 47, 35–60
Boast, L, 2011 *An Environmental Reconstruction of Syon Park Using Pollen Analysis* unpub undergraduate dissertation Royal Holloway University London
Bronk Ramsey, C, 2009 'Bayesian analysis of radiocarbon date' *Radiocarbon* 51 (1), 337–60
CPR Calendar of the Patent Rolls 1894–1974, London
Cameron, N, 2009 'Diatoms' in Cowie 2009, 74–5
Canham, R, 1978 *2000 Years of Brentford*, London
Coope, G R, & Angus, R B, 1975 'An ecological study of a temperate interlude in the middle of the last glaciation, based on fossil Coleoptera from Isleworth, Middlesex' *J Animal Ecol 44*, 365–91
Corcoran, J, Ruddy, M, & Cowie, R, 2011 *Past Landscapes of Syon Park, Brentford: a Geoarchaeological Investigation of a Palaeochannel* unpub MOLA rep
Corcoran, J, in prep 'Changing environment and prehistoric activity in the Bankside Channel: geoarchaeological investigations at St Christopher House, Southwark SE1' for *Surrey Archaeol Collect*
Cowie, R, 1994 *British Aerospace Site, Richmond Road, Royal Borough of Kingston-upon-Thames: an Archaeological Evaluation* unpub MOL rep
Cowie, R, 2004 *Hotel Development, Syon Park, Brentford, London, TW8, London Borough of Hounslow, a Report on the Archaeological Evaluation* unpub MOLA rep
Cowie, R, 2009 *Hotel Development, Syon Park, Brentford: Post-excavation Assessment* unpub MOL rep
Cowie, R, 2011 *Syon House, Syon Park, Birkbeck Univ London Training Excavation 2004–2010: Post-excavation Assessment* unpub MOLA rep
Cowie, R, & Blackmore, L, 2008 *Early and Middle Saxon Rural Settlement in the London Region* MOLA Monogr Ser 41, London
Cowie, R, Thorp, A, & Wardle, A, 2013 *Roman Roadside Settlement and Rural Landscape at Brentford: Archaeological Investigations at Hilton London Syon Park Hotel 2004–2010* MOLA Studies Ser 29, London
Darton, L, 2007 'Two multi-period excavations along the Roman road from Londinium to Silchester at Brentford' *Trans London Middlesex Archaeol Soc* 58, 89–140
Dunning, R W, 1981 'The building of Syon Abbey' *Trans Ancient Monuments Soc* 25, 16–26
Elias, S A, Webster, L, & Amer, M, 2009 'A beetle's eye view of London from the Mesolithic to Late Bronze Age' *Geol J* 44, 537–67
Foyle, J, Sloane, B, & Harding, P, 2004 'Syon Park: recovering medieval England's only Bridgettine monastery' *Curr Archaeol* 192, 550–5
Gibbard, P L, 1985 *The Pleistocene History of the Middle Thames Valley*, Cambridge
Greenwood, P, & Maloney, C, 1995 'London fieldwork and publication round-up 1994' *London Archaeol* 7, No. 13, 333–54
Jones, P, 2008 *A Neolithic Ring Ditch and Later Prehistoric Features at Staines Road Farm, Shepperton* Spoilheap Publ Monogr 1, Woking
Laird, M, 1999 *The Flowering of the Landscape Garden: English Pleasure Gardens 1720–1800*, Philadelphia
Lawrence, G F, 1929 'Antiquities from the Middle Thames' *Archaeol J* 86, 69–98
Maloney, C, & Holroyd, I, 2000 'London fieldwork and publication round-up 1999' *London Archaeol* 9, Supp 1, 35–65
Morley, M, 2009 'The Battersea Channel: a former watercourse of the River Thames?' *London Archaeol* 12, No. 7, 175–81
Needham, S P, 2000 *The Passage of the Thames: Holocene Environment and Settlement at Runnymede* Runnymede Bridge Res Excav 1, London
Needham, S, & Burgess, C, 1980 'The Late Bronze Age in the Lower Thames Valley: the metalwork evidence' in J Barrett & R Bradley (eds) *The British Later Bronze Age* BAR Brit Ser 83, Oxford, 437–69
Nicholls, M, 2009 'Geoarchaeology training augerhole at Syon House' unpub MOL rep
Rackham, O, 1986 *The History of the Countryside*, London
Reimer, P J, *et al* 2009 'IntCal09 and Marine09 radiocarbon age calibration curves, 0–50,000 years cal BP' *Radiocarbon* 51(4), 1111–50
Scaife, R, 2000 'Holocene vegetation development in London' in Sidell *et al* 2000, 111–17
Scaife, R, 2009 'Pollen' in Cowie 2009, 72–4
Sidell, J, Wilkinson, K, Scaife, R, & Cameron, N, 2000 *The Holocene Evolution of the London Thames: Archaeological Excavations (1991–1998) for the London Underground Limited Jubilee Line Extension Project* MoLAS Monogr Ser 5, London
Sidell, J, Cotton, J, Rayner, L, & Wheeler, L, 2002 *The Prehistory and Topography of Southwark and Lambeth* MoLAS Monogr Ser 14, London
Spurr, G, 2009 'Geoarchaeology' in Cowie 2009, 77–9
Shepherd Gilmour Environment Ltd 2001 'Syon Park, London', Job no. ME390
Shirley, J W, 1983 *Thomas Harriot: a Biography*, Oxford
Whittaker, J, 2009 'Ostracods' in Cowie 2009, 71–2