Quarrying the Mixon Reef at Selsey, West Sussex

By David and Anne Bone

The Mixon Reef off Selsey Bill has attracted a number of theories about its historic use. Observations of scuba divers have encouraged ideas of the reef being the site of a Roman fort, whilst medieval maps suggest an 'ancient city' on the reef. These suggestions have become accepted as fact, although never critically examined. The reef is known to have been quarried for building stone, although the circumstances surrounding its cessation have never been adequately investigated. Documents preserved in The National Archives have verified the historic accounts of the Mixon Reef as a quarry, and the prohibition of quarrying by the Admiralty in 1827. This information, together with geological and archaeological knowledge of the region, allows a new understanding of the Mixon Reef and the exploitation of its stone.

INTRODUCTION

The Mixon Reef lies 2km south-east of Selsey Bill in West Sussex (SZ 868903; Fig. 1). At some time in the past the reef would undoubtedly have formed the tip of Selsey Bill, but by 1911, although it could be reached on foot at low tide, there was not 'time for the return journey and the walk … must not be attempted without a boat in attendance' (Heron-Allen 1911a, 53).

Stone from the reef is geologically distinctive, and has been used for building since the Roman period. Understanding the quarrying history of the reef has been complicated by differing views on relative sea level in historical times and ideas about the reef as a site of settlement or fortifications. There is also an undocumented story, never substantiated, about the prohibition of quarrying due to increased coastal erosion or the loss of a safe anchorage. The present authors have been intrigued by these accounts, but also concerned about the lack of evidence to support frequently quoted privately published writings by Hume Wallace, a local scuba diver (discussed below). The historical facts surrounding the Mixon Reef, first recorded in summary by Bone (2010a), are set out in this article.

Fig. 1. Aerial view of the Mixon Reef, off Selsey Bill (reproduced courtesy of Chichester District Council).

ORIGIN OF THE NAME

'Mixon' is an old English word for a dung heap or midden (Cullen and Jones 2012), although not included in Mawer and Stenton (1929–30). According to Richardson (2001), Wallace believed that the name arose from the smell of rotting kelp, whilst Richardson himself suggests that it could have arisen from dung, gathered and stored in the area. Kenny (2006) suggests that the name is due to the shape of the reef. We suggest that the waterworn blocks of stone can look like petrified cow-pats with fragments of straw (actually the fossilised remains of foraminifera).

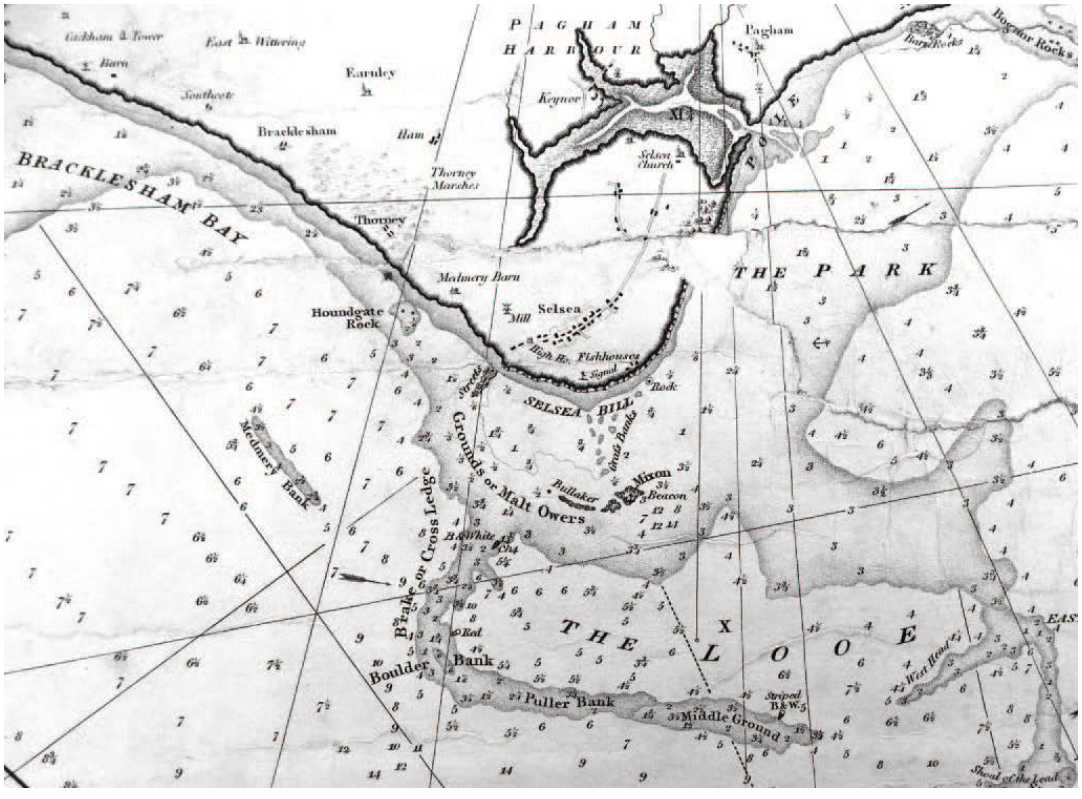


Fig. 2. Location map of the Mixon Reef, off Selsey Bill. Extract from *Steel's New and Accurate Chart of the Coasts of Sussex, Hampshire and Dorset from Selsea Park to Poole Harbour, including the Isle of Wight*, 1835 (reproduced courtesy of the National Archives, MPEE 1/169).

'The Myxon' first appears in Speed's 1610 map of the Isle of Wight, where a reef is shown, possibly misplaced, on the north-east coast of the island (HRO 15M84/P3/1371). The 'Mixon' or 'Mixens' appear in some late 17th-century charts and sailing directions (Richardson 2001), but the first detailed description 'Mixons, a ridge of rocks dry near a mile at low water' is given in Anson's nautical chart of 1765 (ALP Vz11/21). The first chart with any detail is Mackenzie's of 1766, which shows 'the Mixims' as a reef with shallows extending to the Selsey shoreline (ALP Vz11/26). Further information is given in the 'Sailing Directions' that were subsequently produced in 1805 to accompany the same chart (ALP Ua04). These note that the Mixon:

> consist of large detached Beds of high flat top'd Rocks … being 4 or 5 feet higher than the low water level of a Spring Tide. This eastern high part is properly called the Mixon (Fig. 2).

'Mixon' seems to be the established spelling subsequently used in navigation charts, such as in Steel's chart of 1833 (TNA MPEE 1/169).

Walpoole (1784, 48) uses the spelling 'Mixen' which, following the geological descriptions by Webster (1814, 190), Mantell (1822, 271) and Dixon (1850, 25), is the spelling most commonly adopted by geologists (as noted by Worssam 2006). Other authors, such as Heron-Allen (1911a) and Mee (1988), the Ordnance Survey and later navigational charts, continue with 'Mixon'. The documents consulted for this study mainly use the spelling 'Mixon', although occasional phonetic alternatives such as 'Mixstone' and 'Mixim' are also used. A consistent spelling of 'Mixon' has been adopted in this paper.

MIXON ROCK

The stone from the Mixon Reef, formally named Mixon Rock by geologists (Worssam 2006), is a

grey to pale yellow-coloured limestone that occurs within the sands and silts of the Bracklesham Group (Curry *et al.* 1977), which date to about 45 million years ago. It is a distinctive rock type that occurs only at this location, being recognisable by its microfossil fauna of foraminifera (Fig. 3), particularly *Fasciolites fusiformis* and *Nummulites variolarius* (Adams 1962). An alternative name is *Alveolina* (a synonym of *Fasciolites*) or Selsey limestone (e.g. Brewster 1969). It is frequently encountered as a local building stone.

Mixon Rock occurs in fractured layers around 150–200mm thick, that are broken up by tidal action to produce waterworn blocks. Evidence of an offshore origin for the building stones can often be seen in blocks with waterworn surfaces, encrusting serpulid shells and barnacles, and borings by marine organisms (Worssam 2006). These blocks, usually roughly trimmed, have been used throughout the local area since Roman times (Appendix 1). Mixon Rock as a building stone is best seen in the walls and buildings of the older parts of Selsey (Mee 1988).

Fig. 3. Detail of Mixon Rock showing foraminifera (photograph: David & Anne Bone).

MIXON MYTHS

The history of the Mixon Reef has been beset by myths, misinterpretations and repeated legends. Among the most persistent sources are the writings of Hume Wallace, a keen scuba diver who was intensely interested in maritime archaeology and coastal change. Wallace and a team of divers undoubtedly made many useful observations, but unfortunately worked without expert guidance. His observations were reported in a series of popular articles and self-published manuscripts between 1967 and 1999. The reputed discovery of a Roman quarry, a fort, and even a lighthouse, was widely repeated, and is now commonly accepted as fact by recreational divers who still frequent the adjacent dive site of the Mixon Hole (Ackers 1977; McDonald 1999; Hampshire & Wight Trust for Maritime Archaeology 2006; Balanced Seas 2011). Furthermore, these features have often been used to argue the case for local sea level during Roman times. However, the features that Wallace identified can now be challenged.

Wallace records the discovery of a collapsed Roman wall (illustrated on the cover of Wallace 1996) with loose squared stones and rounded boulders on the adjacent sea bed. He suggests that this represents the corner of a city or fortress and that the boulders are ballista balls. The improbability of Roman structures surviving is discussed below in the light of extensive 19th-century quarrying. The boulders, which occur around the Mixon Reef and in an offshore area to the west known as the Bracklesham Balls, include examples up to 1.5m in diameter (Barne *et al.* 1998; Irving 1996; 1999). Similar boulders were first recorded by Dallaway (1815, 5) as 'stone balls, the weapons of a ruder age', although this could be referring to examples found on land. Wallace apparently accepted that the Bracklesham Balls were natural, but argued that they had been used by the Romans as ballista balls (Irving 1999, 63, 69) and subsequently identified a ballista platform within a 'curtain wall' constructed on the reef (Wallace 1967a; 1967b; 1968; 1996; 1999).

An examination of the Mixon balls, reported by the Hampshire & Wight Trust for Maritime Archaeology (1996), proved them to be identical to the typical spherical and sub-spherical concretions from the '*Miocardia* Bed' exposed on the foreshore west of Selsey (Curry *et al.* 1977). A presumed ballista ball found by Wallace and illustrated in *The Times* (1967) can be directly compared with identical natural concretions in an archive photograph of the British Geological Survey (1932) (Fig. 4). These were excavated from Bracklesham Group sands, comparable to the *Miocardia* Bed, at a depth of around 10m during dock excavations in Southampton (Anderson 1933). The concretions were described as 'of a perfectly spherical form, like huge cannon balls about 3 feet in diameter'

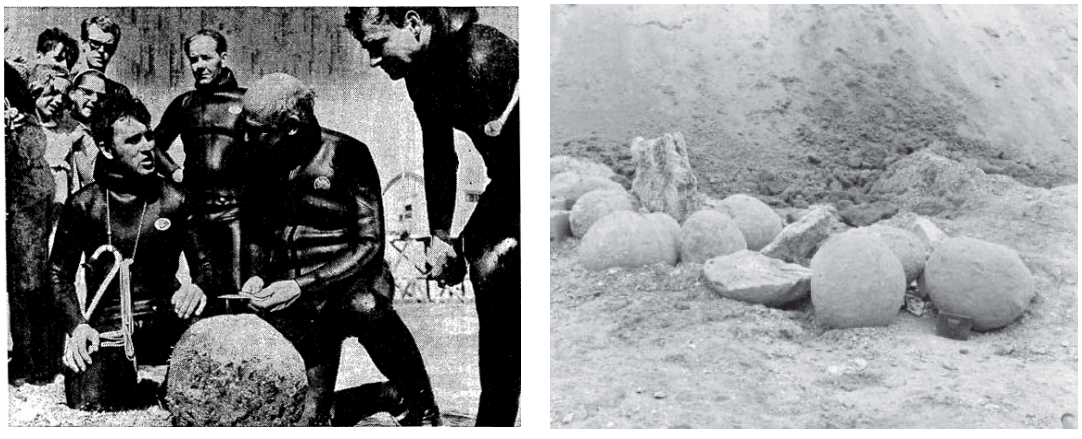


Fig. 4. Comparison of geological concretions from the Bracklesham Formation. Left: Wallace and other divers with so-called 'ballista ball' from the Mixon Reef (*The Times*). Right: natural concretions from Southampton Dock excavations in the 1930s (reproduced courtesy of the British Geological Survey, CP13/002).

(Wrigley 1934, 4). Eroded concretions from the *Miocardia* Bed would readily assume a near-spherical shape through tidal action. Hundreds, if not thousands, of years of coastal erosion around Selsey would produce an abundance of such hard spherical concretions on the sea bed without the need for human intervention.

Richardson (2001) draws heavily upon Wallace's alleged identification of a Roman fort on the Mixon Reef, suggesting that a Roman wall was sufficiently upstanding for it to be recognised and shown on a map of 1313, and gave rise to the name of the 'old city'. Richardson cites 14th- and 16th-century maps and other sources that suggest an 'old city' on the Mixon Reef, the Owers, or other offshore reefs in the area, although he acknowledges that some of the references are confused and conflate a number of historical periods. He found no evidence that the 'old city' was a term used by English mariners, although Camden writing in 1586 noted that 'there are some obscure remains of that little ancient city, in which those bishops resided, cover'd at high water, but plainly visible at low water' (Copley 1977, 35). In contrast, Walpoole (1784, 48) refers to the nearby reef of The Streets as the site of the city where the cathedral once stood, but states that 'there is not the least vestige of the remains of any buildings'. Camden's assertion is not supported by recent thinking, as the site of the late-Saxon cathedral is now believed to be at Church Norton, Selsey, and not lost to the sea (Kelly 1998).

Cracknell (2005, 155), probably misquoting from Richardson (2001, 71), goes further and states that 'a wall, at least 1,300 metres long, still existed on the Mixon in 1313'. None of the early charts consulted in this study provides any evidence for enclosures, walls or buildings, although Wallace (1996, 37–8) controversially suggests that documentary evidence supports the existence of a stone tower on the reef to at least 1580.

So was there ever a Roman fort or an 'old city' on the Mixon? Investigations of the archaeology of Roman Chichester and its hinterland do not support the theory of a Roman fort at the Mixon. There is significant evidence for the establishment of *Noviomagus* as a Roman *civitas* by the late 1st century (Westman 2012). Whilst the nature of its early defences is not clear, there certainly was an urban boundary, which the 1st- and 2nd-century cemeteries at St Pancras and Northgate respected (Down and Rule 1971; Down 1978). Work in the Fishbourne area suggests that there was an early focus of trading activity in the pre-Roman period near to the palace (Manley and Rudkin 2003), whilst the establishment of the Chichester city walls in the late 3rd century provided urban defences (Westman 2012). Equally, there is no evidence to support the idea of a lost city, and the stories can perhaps be explained as romantic fiction, as has been previously suggested (Salzman 1953, 205). It is surprising that academic articles, as well as popular accounts, continue to repeat such myths 50 years after their debunking by Salzman.

QUARRYING THE MIXON REEF

Heron-Allen (1911a), Wallace (1999), Richardson (2001) and others have discussed the impact of coastal erosion and sea-level rise during the last few thousand years, which has led to considerable loss of land from the Selsey area. Undoubtedly, the Mixon Reef was part of the Selsey peninsula at one time and would have been easily accessible from land, perhaps as a foreshore outcrop, and may have been quarried. Other, now offshore, reefs such as The Hounds could also have provided building stone.

Wallace (1967b, 1968) noted that Mixon Rock used in the Chichester Forum and the foundations of Fishbourne Roman Palace have no evidence of marine erosion, and suggested that the stone originated from a Roman quarry, now submerged, which he identified on the north side of the reef. He concluded that sea level was some 6m lower to enable the working of this quarry. In contrast, recent studies in the area have identified Roman sea level to be much nearer that of today, at around 2–2.3m below current sea level for Langstone Harbour (Allen and Gardiner 2000, 201) and the north coast of the Isle of Wight (Long and Scaife 2012, 127–8; Long *et al*. 2012, 133). Depending on tidal ranges, it is just possible that the feature noted by Wallace is a former Roman quarry, but most Mixon Rock used as a Roman building stone seen by the present and previous authors has waterworn surfaces and marine borings (Appendix 1). This strongly suggests that the stone was worked from a tidal outcrop, i.e. the reef.

Quarrying the Mixon Reef for building stone must have continued in some form, albeit on a relatively small scale (Appendix 1). In 1827, in evidence gathered by the Chichester solicitor J. B. Freeland (see below), William Perrin, a 68-year-old fisherman from Selsey, reminisced that 'old people say that they had been told that formerly at low water people used to fetch this rock away in carts' (TNA TS 25/2040, 197–9). At the same time, William Warner, a 70-year-old Selsey fisherman, stated that people had always taken small amounts of stone for ballast, although not in any amount until six or seven years before (around 1820), when it started to be worked in quantity. Warner gives some insight into earlier working methods when he says 'now and then a few [stones] were taken away on the inside in Fishing Boats for building and other purposes' (TNA TS 25/2040, 198), where 'inside' probably means that the boats are approaching the reef from the inshore side. By this time, stone was 'landed at moderate expense' (Dallaway 1815, 11), so the Mixon Reef may have been sufficiently offshore for access by boat to be necessary.

Certainly, by 1820 quarrying was being undertaken by a number of local entrepreneurs with other business interests, although there is no evidence of a specialist quarrying business. This trade was considerably stimulated by the demand for stone for the Hayling Island bridge and causeway works (see below) from 1823 to 1824. Investigations in 1823 by Captain Charles Newland of Chichester revealed that '8 or 9 boats are very frequently employed at that work' (TNA TS 25/2040, 192) and, also in 1823, Mr Trow of the Owers Light reported that the boats were 'from five to fifteen tons' (TNA TS 25/2040, 192). By 1827 the vessels employed in the trade were of greater capacity (20–40 tons), coming from more places and sometimes in poor condition, and quarrying was carried out partly with the aid of explosives (ADM 1/2200, Cap M 344). Warner, the fisherman noted above, also stated that suitable boats had been especially built for this trade and that as 'many as eight or nine together have been employed in taking the rock away' and that 'They now lay their vessels on the Crown, load them and wait for the tide. Some of the vessels take off 20 or 30 tons at a time' (TNA TS 25/2040, 198–9).

In 1827, J. B. Freeland, on behalf of the Attorney General, sought independent comments from three local men who had been with the crew of the cutter *Falcon* (TNA TS 25/2040, 199–200). James Allen, formerly employed on the Owers Light, aged 63 and living in Sidlesham, said that he had known the Mixon for 34 years and that the stone was removed in small amounts for ballast until about 6 or 7 years before, when it started to be taken for building stone. John Mountifield, aged 54 and living at Itchenor, had known the Mixon for 35 years, and the removal of stone had started about 20 years before. William Mant, aged 56 and living at Birdham, had had his own small boat for the last 20 to 30 years and, at the beginning of this period, people took away some stone, but extraction had increased about 22 or 23 years earlier and the quantities removed had increased greatly in the previous 6 or 7 years. Estimates by the authors

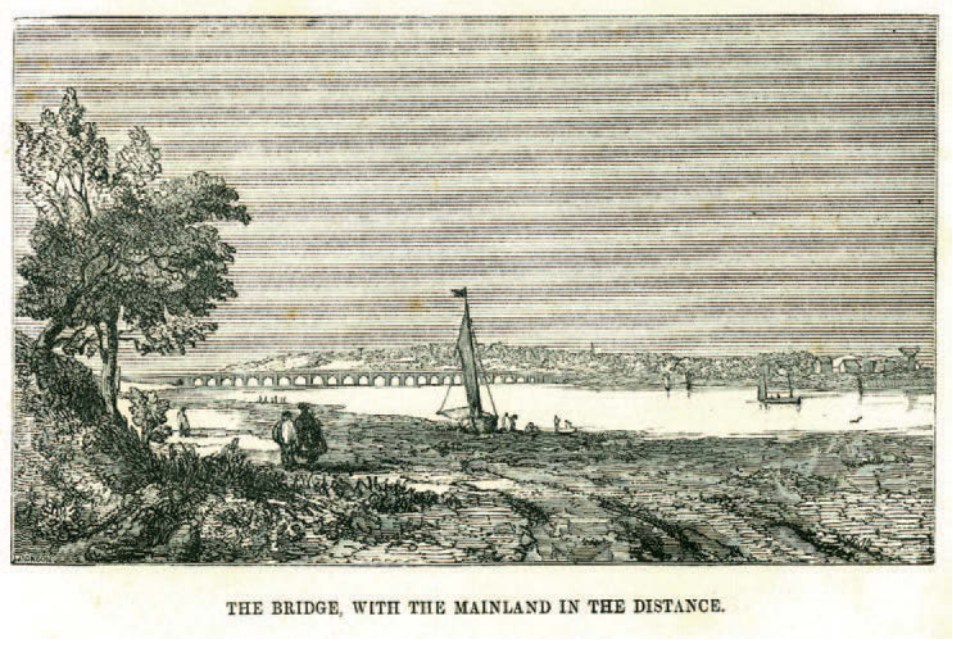


Fig. 5. Contemporary illustration of the Hayling Island bridge soon after its construction (from Longcroft 1856, facing page 292 and reproduced in Rogers 2000, 32).

based on statements in the documents discussed below suggest that up to 9000 cubic metres (18,000 tonnes) of stone may have been removed from the reef during this latter period (Appendix 2).

HAYLING ISLAND BRIDGE

The construction of a new bridge from Langstone to Hayling Island was a key element in the subsequent prohibition of quarrying the Mixon Reef. The route to Hayling Island had previously used a narrow causeway, the 'Wadeway', which crosses the mud flats at Langstone. However, this was to be severed by the 'New Cut' required for the construction of the new Portsmouth to Arun canal (Vine 2005, 44–5, 65–8). In 1823, the Duke of Norfolk, who held the Manor of Hayling, sponsored an Act of Parliament to build a bridge, leading to the creation of the Hayling Island Bridge and Causeway Company to raise the necessary capital. The account book for the Company shows a total cost of £11,300 for the bridge and causeway and £580 for the wharf at Langstone (Portsmouth Records Office, 780A/1/5/1/2). The new bridge was opened in 1824 with great ceremony (*Hampshire Telegraph* 1824; Skelton 1826, 9–12).

Plans for the bridge, drawn by James Hollingsworth on 23 September 1822 in Chichester, show the construction details including the causeways (Fig. 5; Hampshire Record Office, DP/37/1). The bridge was a significant structure, around 1100m in length including the causeways at each end (Fig. 6). These causeways had sloping sides and were faced with stone (Skelton 1826, 10). Captain Mingaye of the Navy's Blockade Service records that the Mixon Rock was used principally for the construction of a 'Wadeway' from Hayling Island to Langstone (TNA ADM 1/2198, Cap M 380). Given the coincidence of dates, it is more likely that the Mixon was being worked for the new bridge and its approaches than for the old Wadeway.

The use of Mixon in the bridge construction was confirmed by the current authors in 2011. Mixon cobbles were identified in the remains of an old sea wall on the Hayling Island western approach (opposite the filling station), along with the footings of the former causeways on both sides of the channel (Fig. 7). Elsewhere, the old bridge construction has been concealed beneath later improvements and the new bridge of 1956. It is difficult to estimate how much Mixon Rock may

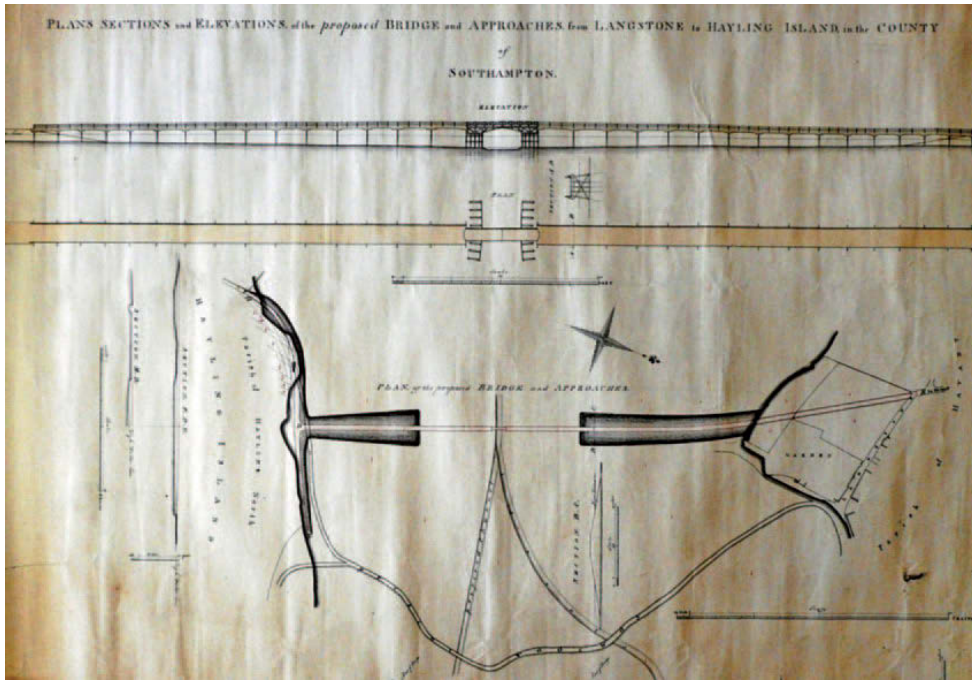


Fig. 6. Plan for a new Hayling Island bridge by James Hollingsworth of Chichester, 1822 (reproduced courtesy of the Hampshire Record Office, DP/37/1). The route of the Wadeway is shown in the lower part of the drawing.

have been used in the bridge construction. If the causeway facings used the same stone as is still visible today, then up to 7600 tonnes of Mixon Rock may have been used in the causeway facings alone (Appendix 2). This compares well with the total estimate of stone removed from the reef, noted above.

THE END OF QUARRYING

Existing literature commonly notes that quarrying of the Mixon Reef had ceased by 1830, but no documentary evidence is ever quoted to support this statement. In a local guide book, Dally (1828, 112) noted that the Government has 'lately prohibited further access to this ledge on account of an alleged injury to the harbour'. Dixon (1850, 10, 25) also notes that the extraction of the stone was so great that it was banned in 1830 because the reef protected the land from erosion, a suggestion repeated by Reid (1897, 8). Most recent studies usually refer to Heron-Allen (1911a, 38), who actually states that he 'endeavoured in vain' to obtain any information from various government departments, although he also refers

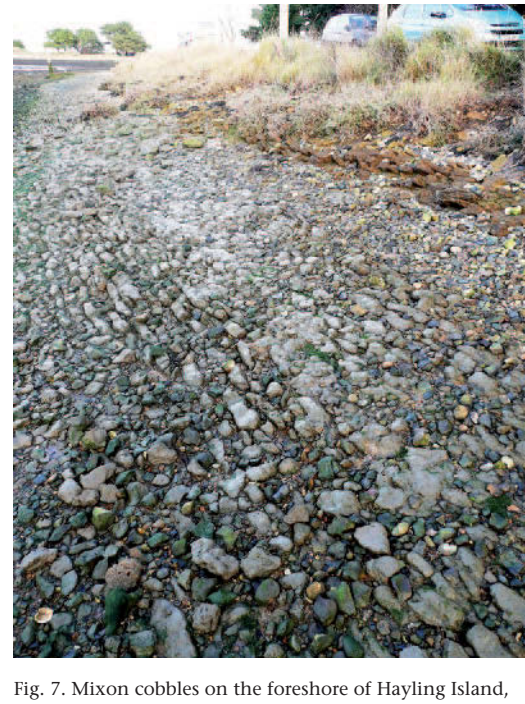
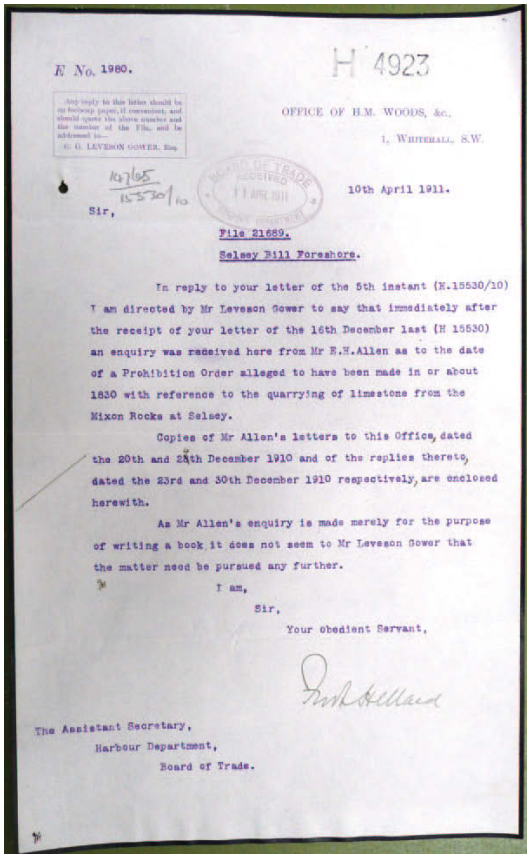


Fig. 7. Mixon cobbles on the foreshore of Hayling Island, west of the Langstone Bridge, in 2011 (photograph: David & Anne Bone).



E No. 1980. H 4923

OFFICE OF H.M. WOODS, &c.,
1, Whitehall, S.W.

10th April 1911.

Sir,

File 21689.
Selsey Bill Foreshore.

In reply to your letter of the 5th instant (H.15530/10) I am directed by Mr Leveson Gower to say that immediately after the receipt of your letter of the 16th December last (H 15530) an enquiry was received here from Mr H.H.Allen as to the date of a Prohibition Order alleged to have been made in or about 1830 with reference to the quarrying of limestone from the Mixon Rocks at Selsey.

Copies of Mr Allen's letters to this Office, dated the 20th and 28th December 1910 and of the replies thereto, dated the 23rd and 30th December 1910 respectively, are enclosed herewith.

As Mr Allen's enquiry is made merely for the purpose of writing a book, it does not seem to Mr Leveson Gower that the matter need be pursued any further.

I am,
Sir,
Your obedient Servant,

The Assistant Secretary,
Harbour Department,
Board of Trade.

Fig. 8. Correspondence between civil servants regarding Heron-Allen's enquiry about the Mixon reef, April 1911 (reproduced courtesy of The National Archives, MT 10/1381). The last sentence reads 'As Mr Allen's enquiry is made merely for the purpose of writing a book, it does not seem to Mr Leveson Gower that the matter need be pursued any further'.

to Reid 'who tells us … the Admiralty thought that the destruction of the rocks would damage the anchorage on the lee-side of Selsey Bill'. Heron-Allen, in a pamphlet of the same date (1911b, 11), states that the quarrying was forbidden by the Government because it was 'accelerating the erosion of our peninsula'. Since this time, authors have generally attributed the prohibition of quarrying with the Admiralty without further investigation (Mee 1988).

In 2010, the current authors were guided to papers at The National Archives relating to Heron-Allen's own investigations of this story (George, *pers. comm.*). In 1910, Heron-Allen sought clarification from the Board of Trade on the banning of extraction of the Mixon Reef. The civil servants passed his letters to the Commissioner of Woods and Forests, who referred the correspondence back to the Harbour Department of the Board of Trade (TNA MT 10/1381). The notes on his letter and in the files show that the civil servants gave very low priority to this request (Fig. 8). Eventually the Divisional Commander of the Bognor coastguards was instructed to investigate, and the father of a 60-year-old Selsey fishermen provided boyhood stories of stone quarrying on the Mixon (which might date to the 1820s or thereabouts). There is also an intriguing footnote by a civil servant that if Mr Heron-Allen had just taken the stone he wanted for his garden none of this trouble would have been caused!

Both Trinity House and the Admiralty were involved in the coastal trade of Sussex in the 1820s. Trinity House maintained a number of markers around the Mixon to protect shipping, including a beacon erected on the reef in 1793 and, further out to sea, a lightship off the Owers Reef. Between 1817 and 1831, the Royal Naval Coast Blockade also operated along the Sussex coast. This was an anti-smuggling operation under the command of Captain Mingaye of HMS *Hyperion,* stationed at Newhaven (Philp 1999).

The Admiralty Digest (a series of annual indexed registers of correspondence, TNA ADM 12/247) between 1820 and 1830 contains entries relating to the Mixon in only 1826 and 1827. It was, however, clear that the Treasury had also played a crucial part in the story. The papers of the Treasury Solicitor included transcripts of documents originally sent by or to Trinity House, whose archives were mostly destroyed by bombing raids in London during World War II.

PETITIONS AND MEMORIALS

THE FIRST PETITION (1823)

The first evidence of concern about the quarrying is indicated by a Petition from the Selsey fishermen in 1823. This was delivered to Captain Charles Newland of Chichester, who sent it to Trinity House on 24 July 1823 (TNA TS 25/2040, 190–1). The fishermen's major concern was the impact on their livelihood if the sheltered anchorage on the leeward side of the Mixon Reef was lost because of the quarrying. They alleged that up to 100 tons of

stone a day was being removed, causing heavier seas in the sheltered anchorage known as 'The Park' on the east side of Selsey Bill. The Brethren of Trinity House were therefore asked to stop the quarrying. The petition was signed by William Perron, a pilot, and 13 others whose names, sadly, are not transcribed into the Treasury volume.

On 7 August 1823 the Elder Brethren of Trinity House sent a letter to Newland (TNA TS 25/2040, 191) instructing him to determine the true nature of the quarrying and the truth of the petitioners' allegations. Newland's reply of 12 August (TNA TS 25/2040, 191–2) made clear that he could not quantify the amount of rock being removed, but there were often eight or nine boats working each day. However, Newland did ask Mr John Trow, Master of the Owers Light, to make further enquiries. Trow provided two further documents, which Newland forwarded to Trinity House. In the first (TNA TS 25/2040, 192–3), the fishermen provided more details, stating that the quarrying had been going on for the previous eight or nine years but had increased in the last two years. Eight or nine boats of between 5 and 15 tons each were being used, and the fishermen feared that the quarrying would not stop until the reef had been reduced to below water level at ordinary ebb tides. Most of the stone was being used for building works, and the fishermen named the principal owners of boats involved in the trade – Henry Hopkins of West Wittering, Thomas Light of Itchenor, and Thomas Ransom, Thomas Caiger and William Resbridge (possibly a misspelling of Rusbridge) from Sidlesham – who they believed were acting independently.

Trow's second enclosure (TNA TS 25/2040, 193) is a certificate signed by 15 masters, of which only one name (presumably the first signatory) is transcribed: Thomas Cresswell, chief officer of the Coastguard station at Selsey. According to Cresswell and his colleagues, the Mixon Reef was important in creating a sheltered and safe anchorage from which they had all benefited. They agreed that continued removal of the rock would impair or destroy it.

THE FIRST MEMORIAL (1823)

Trow's enquiries were clearly well-known in the community, as a counter-petition, in the form of a 'Memorial' of 16 August 1823 and signed by 105 people in Sidlesham and nearby parishes in the Manhood, was sent to Trinity House (TNA TS 25/2040, 193–6). The Memorialists described the size of the reef, and stated that the stone had been worked for most of the buildings in the area, including the parish churches of Selsey and Sidlesham. They claimed that hundreds of local people, whose work relied upon the quarrying, would have to rely on parish relief if quarrying stopped, with a consequently sharp increase in the poor rate. They argued that the improvement of the area relied heavily on the availability of Mixon stone, there being nothing else available locally and the nearest brick kiln being ten miles away.

The signatories believed that the reef was not very important to the sheltered anchorage and, in their view, actually created a dangerous current between itself and the land. They refer to Captain Trow's inspection in August 1823 having confirmed that, so long as the rock was not worked around the beacon, there would be no damage to the navigation and shelter. The Memorial stated that three of the signatories to the Petition, William Warner and the two pilots William Perrin and John Laurence, were motivated by envy, and that all three had in the past worked the Mixon stone for themselves, including building their 'fish houses', homes and fences (boundary walls).

The Elder Brethren considered the evidence, and in a letter to Captain Newland of 4 September 1823 instructed him to advise the Memorialists that Trinity House had no authority to stop the removal of the rock so long as the exclusion zone around the beacon was respected. There is no reference to the fishermen's case regarding damage to the safe shelter, and the matter seems to have been dismissed.

THE SECOND PETITION (1826)

The extraction of the stone from the reef continued to greatly trouble the fishermen and pilots of Selsey, who on 17 October 1826 combined to write a second petition to Trinity House (TNA ADM 1/2198, Cap M 380), which was forwarded to Lieutenant James Carr of HMS *Hyperion,* formerly the commanding officer of the Blockade Station at Selsey. Carr passed the petition to his commanding officer Captain Mingaye (Appendix 3). A covering letter from the fishermen and pilots of Selsey asked Mingaye to inspect and approve the petition and to use his influence in having it considered. Both Carr and Mingaye had been serving officers in the

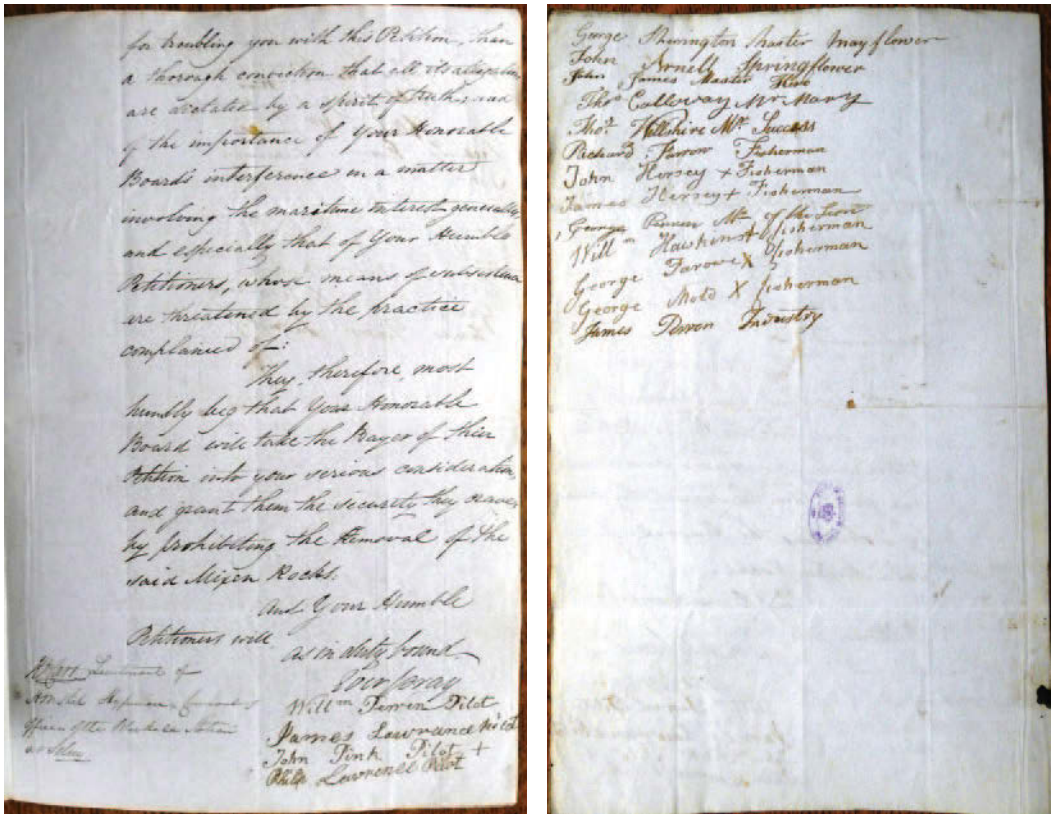


Fig. 9. Signatories to the Petition of 1826 (reproduced courtesy of The National Archives, ADM 1/2198, Cap M No. 380).

Blockade at the time of the first petition and must have heard of the enquiries undertaken in 1823.

This second petition repeated the concerns about stone removal threatening the safety of the anchorage but added that 'upwards of Eighty Tons of Small Vessels constantly employed, whenever the tide suits, in removing the Rock and the number continues to increase' (TNA ADM 1/2198, Cap M 380).

The petition makes a particular point that the fishermen had no other interest than the loss of the sheltered anchorage. It is signed by 17 individuals, headed by William Perren, pilot, probably the William Perron who signed the first petition (Fig. 9). It is interesting to note that of the 17, 4 describe themselves as pilots, 7 are masters of vessels, James Perren describes himself as 'Industry' and the remaining five give their occupation as fishermen. One of the pilots (John Pink) makes his mark with a cross, as do all five of the fishermen. Amongst the signatories are three members of the Perren family, two of each of the Lawrence and Hershey families, and one Arnell, families still living in the area today (Cocks 2004).

Mingaye wrote to the Admiralty on 28 October 1826, enclosing the fishermen's petition and letter (TNA ADM 1/2198, Cap M 380), and stressing the usefulness of the fishermen and the risk that they and their families would require parish relief if the quarrying was not stopped; he noted that their work was primarily in oyster dredging and lobster pots. It appears that Mingaye had been a champion of the fishermen for some time; he notes his successful request to Trinity House to put lights and buoys in various locations, including a beacon on the Mixon. Mingaye, as captain of HMS *Camelion* (Appendix 3), rode in the shelter of the Mixon during storms, and notes that for craft drawing

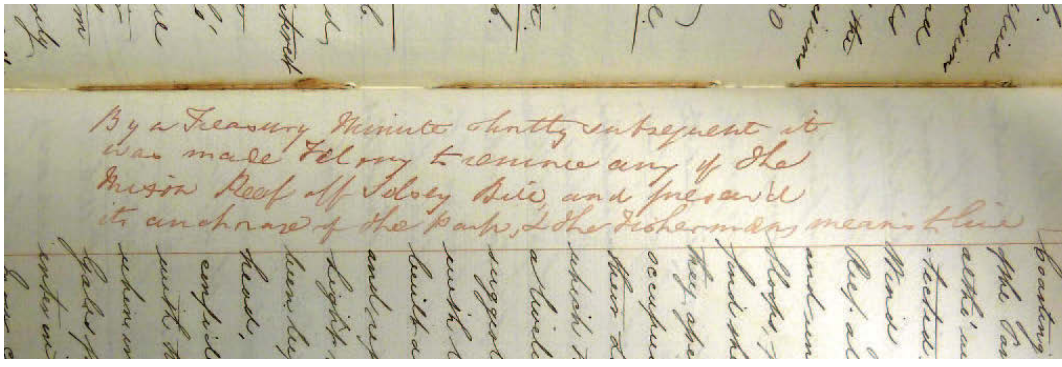


Fig. 10. Margin note in Captain Mingaye's 'correspondence out' book of 1826 declaring that '*By a Treasury Minute shortly subsequent it was made Felony to remove any of The Mixon Reef off Selsey Bill*' (reproduced courtesy of The National Archives, ADM 7/49).

less than 13 feet this is the best shelter between the Isle of Wight and the Downs (that is, the coast to Eastbourne). He reminded the Admiralty of the importance of the anchorage and described the size and location of the Mixon Reef.

Mingaye describes the scale of the quarrying, and that its prime use was the construction of a 'wadeway' at Hayling (see above); users of the stone also included the Duke of Norfolk and other gentlemen for a wide variety of building works. This use of the stone had been under way for some six years by 'a Mr Hopkins of Wittering, and a man named Light, of Itchenor, each employing four Sloops of Forty Tons, besides several other Craft which go to the Reef from Bosham, Emsworth, and Chichester' (TNA ADM 1/2198, Cap M 380).

Hopkins and Light were named in Wallington's letter in 1823 (TNA TS 25/2040, 192–3), but Mingaye added that there were other carriers from Bosham, Emsworth and Chichester. The lord of the manor was Lord Selsey, and the trade in Mixon stone was undertaken without his approval. The Admiralty decided to refer the matter to the Treasury to establish whether or not the Mixon Reef was Crown property (TNA T 1/2539, file 21092).

On 8 March 1827 Mingaye advised the Admiralty that the season for removing rock would soon begin, and sought permission to instruct the officer in charge of the Selsey Watch House to stop the quarrying – already there were 'vessels fitting out for the purposes of blowing up, and conveying away Rock from the Mixon Reef' (TNA ADM 1/2199, Cap M 67). The Treasury clerk was instructed to contact the solicitor, presumably to check on progress on the enquiry of October. On 20 March 1827 Lieut. Carr at Selsey wrote to Lieut. (ret'd) James Wilson, Divisional Commander at Littlehampton, asking him to tell Captain Mingaye that 'the Stone Vessels from Chichester and Pagham have already commenced their depredations on the Mixon Reef' (TNA ADM 1/2199, Cap M 84).

By 25 March 1827 Mingaye had received Carr's letter and sent it to the Admiralty, asking permission to stop the quarrying (TNA ADM 1/2199, Cap M 84). On 27 March 1827, the Admiralty noted that still no reply had been received from the Treasury, so John Barron (a clerk in the Admiralty) sent the letters to the Treasury on the same day with a request for a reply

The Treasury had not been totally ignoring the matter, but before March 1827 had clearly sent the papers, including Captain Mingaye's letters and the original of the 1826 petition, to the Attorney General (TNA T 1/2539, file 21092). The results of J. B. Freeland's investigations, dated March 1827, were forwarded to the Treasury Solicitor Charles Bouchier (TNA TS 25/2040, 196–201).

Freeland concluded that the Mixon had never been owned by the lord of the manor and that the stone, according to local tradition, had previously been removed by cart. Mixon had been much used as a building stone in the local area, but had not been recently worked. He dates the resuming of quarrying to about 1807, and says that ships had been specially built for the purpose. The witnesses were of differing views on the impact of the quarrying on the anchorage, but those from

Selsey asserted that the shelter had been damaged in the last three to four years.

By April the papers had reached the Attorney General Sir Charles Wetherell and the Solicitor General Sir Nicholas Tindal, who were:

> strongly of the opinion that the right and title to the same belongs to His Majesty and not to the Lords of the Manor … the demolition of this Reef would occasion injury to the Roadstead and Anchorage … We think the information may proceed on the double grounds of the property being in the Crown and of the Prerogative right to protect the Roadstead (TNA TS 25/2040, 201, 14 April 1827).

A copy of the Attorney's opinion was sent to the Admiralty, noting that the Lords of the Treasury have instructed their solicitor 'to take such measures, under the Advice of the Attorney and Solicitor General, as may be necessary for preventing any further destruction of this Rock' (TNA ADM 1/4303).

The Admiralty digest of 30 April 1827 noted the decision, and requested that Captain Mingaye be advised (TNA ADM 12/247, Section 68.1). The Treasury order has not yet been traced, but the *Hampshire Chronicle* reported on 18 June that

> Capt Mingay, of the Hyperion, has obtained a Treasury order to prevent any more of the rock from the Mixon Reef, near Selsey Bill, being removed, which proved so injurious to the anchorage called the Park. Notices to this effect have in consequence been forwarded to the towns adjacent to this part of the coast, for general information.

A note with Mingaye's letter of 28 October 1826 added that any removal would constitute a felony (Fig. 10; TNA ADM 7/49).

THE SECOND MEMORIAL (1827)

Appearance of the notices prompted local opposition. On 18 July 1827 the vicar of Sidlesham Edward Goddard and Clement Hoare, a local surveyor and land agent, raised a memorial in Chichester; Goddard counter-signed it on 23 August 1827 as agent for the Memorialists, stating that he had witnessed all 340 signatories (TNA T 1/2539, file 21092). As in 1823, the primary argument was that the cessation of the quarrying was causing hardship to the people as it is 'their only source of Income for the maintenance of

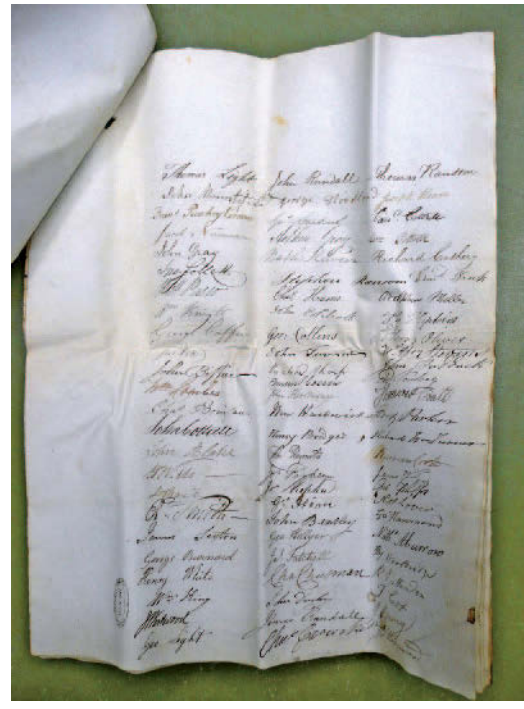


Fig. 11. One of the eight pages of signatories in the Memorial of 1826 (reproduced courtesy of The National Archives, T1/2539 file 21092).

themselves and their numerous Families as well as for many hundreds of others who have been engaged in the carrying, preparing and applying of these Rocks' (TNA T 1/2539, file 21092 and TNA ADM 1/2200).

The first signatory is the vicar of Sidlesham, and three of the men quarrying the Mixon in 1823 were his parishioners (TNA TS/25/2040, 193). The Rev'd Edward Goddard had a record of supporting smugglers amongst his flock, protesting when they were caught and according to Mingaye 'shows every disposition to encourage litigation in opposition to established laws laid down for the prevention of smuggling' (Philp 1999, 136).

The initial signatories were members of the aristocracy and upper middle classes with influence in the Chichester area, such as the Duke of Richmond. The second signatory was the Honourable and Rev'd Edward Turnour, son of the Earl of Winterton, whose family's estate included lands at Easthampnett (where the local pub is still the Winterton Arms) and a farm in Almodington, near Earnley (WSRO Add Mss 4596–4601). Others

on the first page include the merchants and traders of Chichester (such as Henty and Florance) and the Rev'd J. J. Davison, vicar of Donnington. Thereafter there is a very wide range of names, some familiar from trade directories of 19th-century Chichester and some probably representing artisans (Fig. 11). A few are marks and some are barely legible.

The Memorial was sent to the Treasury, who forwarded a copy to the Admiralty (TNA ADM 1/4303) for the attention of HRH the Lord High Admiral (the Duke of Clarence, later William IV). The covering letter was annotated on 11 September 1827 that it should be sent to Captain Mingaye and 'direct him to report on all the points mentioned in the Memorial' (TNA ADM 1/4303).

The Memorial and Mingaye's investigations must have been known to other local residents. On 10 October 1827 Richard Dalby, clerk to the Bognor Commissioners, wrote to the Treasury asking them not to rescind the order banning the quarrying of the Mixon reef (TNA T 1/2539, file 21092). Dalby's letter was also placed before the Lord High Admiral (TNA ADM 1/4303). On 8 November Mingaye responded with a 14-page letter and a point-by-point rebuttal of the Memorial (TNA ADM 1/2200, Cap M 344).

THE SECOND MEMORIAL REBUTTED

Captain Mingaye divided the Memorial into 15 key statements why quarrying should be resumed, and presented clear evidence to demolish each (TNA ADM 1/2200, Cap M 344). Key to Mingaye's rebuttal is his note that:

> The Memorial having to my knowledge laid at the Swan Inn Chichester for several weeks for the indiscriminate perusal and signature of all classes of people, I cannot know who really attached the signatures to it in consequence of their own local knowledge, or otherwise, but I am satisfied, three hundred of the numbers must have done so without being in any way masters of the matter contained therein (TNA ADM 1/2200, Cap M 344).

Discussion by the Memorialists of an anchorage to the west of Selsey Bill (rather than 'the Park' area on the east) only further convinced Mingaye that they did not understand the maritime realities. Mingaye noted that the vessels engaged in the stone trade were not of the size or condition stated by the Memorial, and were often in very poor condition 'it being no unusual occurrence for one of them to founder with the stone on board from their decayed state'.

Mingaye challenged the Memorial on the statements that the amount of stone extracted was only equivalent to a square yard a day and that loss of the trade would have a major impact on local employment. Records (Appendix 2) indicate that the quantity of stone extracted was significant, and there must have been a number of people employed in the quarrying. However, this employment was seasonal, starting in late March (in 1827 at least). As the Petitions were issued in July 1823 and October 1826, it appears that extraction carried on throughout the summer and into the autumn. The business seems to be a mixture of speculative and planned working, as the Memorial refers to the banning order (assumed to be after April 1827) 'preventing the fulfilment of a vast number of Contracts entered into' (TNA ADM 1/4303). Mingaye argued that the effect on local employment and building projects need not be so severe, because the nearby 'Hounds Gate, and Bognor Rocks affording ample resources and to where they could so easily transfer the seat of their labours' (TNA ADM 1/2200, Cap M 344). He was also not convinced that the Mixon trade was as important in the local economy as the Memorial claimed, as several of the proponents had other businesses, Mr Hopkins being a butcher supplying the Navy, and others included a shoemaker and a victualler. According to Mingaye, the market for stone was not as strong as claimed and that 'the Mr Hopkins just alluded to, has several hundred tons of the Rock, for which he cannot get sale at three shillings and sixpence per ton' (TNA ADM 1/2200, Cap M 344). By this date, construction of the new Hayling Island bridge had been completed and this considerable market for the stone had disappeared.

Having considered Mingaye's rebuttal, the Admiralty's decision was added as a minute to a corner of the letter.

> 16 Nov Acquaint the Treasury that having caused an examination into this subject HRH is satisfied that great injury to the Shipping interest would be occasioned by allowing the Continuance of taking away the Reef and therefore cannot comply with the request of the Memorialists (TNA ADM 1/2200, Cap M 344).

A letter to that effect was sent to the Treasury on 16 November 1827 (TNA T 1/2539, file 21092). The Treasury minutes record that the Lords of the Treasury will write to the Memorialists as they 'therefore cannot comply with the prayer of their Memorial' (TNA T2/117, 307–8).

DISCUSSION

The historical account of the quarrying and its cessation highlights the key role of one individual, Captain William Mingaye (Appendix 3), and the 'hardy race of useful men', the Selsey fishermen (Appendix 4). Mingaye had already had experience of both the Mixon Reef and the Selsey fishermen before the 1826 petition, as he 'when in Command of the Camelion rode out heavy gales from the Southward and Westward' which, in the context of the letter, suggests that he had taken shelter in or near the Mixon (TNA ADM 1/2198, Cap M 380).

Mingaye had previously championed the fishermen's cause with Trinity House for improved navigational aids in the area (TNA ADM 1/2198, Cap M 380). He had a clear understanding of the size of the fishing fleet at Selsey and noted that 'the Reef affords protection to about forty Fishing Vessels; wherein one hundred and fifty persons are employed' (TNA ADM 1/2200, Cap M 344). As a professional seafarer Mingaye respects the Selsey fishermen and says that:

> The Pilots, and Fishermen of Selsea are well known to the Officers of His Majesty's Dockyard at Portsmouth, as having on various occasions, when Men of War have been on or nearly getting on the Owers Rocks, shown great skill and intrepidity in affording assistance when in such danger. To Merchant Vessels no winter passes without this repeatedly happening.

At a time when the Royal Navy still had significant difficulty in recruiting seamen (Friel 2003, 142), Mingaye made the point that the seagoing skills of the Selsey fishermen were also an opportunity, for 'this little nest of Fishermen has been known to send many young expert Seamen into His Majesty's Navy' (TNA ADM 1/2200, Cap M 344).

CONCLUSION

This investigation of the Mixon Reef allows a more informed consideration of some of the oft-repeated but unsubstantiated stories about the reef and its quarrying. The removal of considerable quantities of stone in the early 19th century makes the survival of any earlier quarries or structures, even had they existed, extremely unlikely. The Roman fort and ballista balls proposed by Wallace, or an 'old city', are all without evidence – as hypotheses they were all ideas to be tested, but have now been found considerably wanting. Other authors such as Richardson, who relied on Wallace's hypothesis, now need to be reappraised. Salzman (1953) had correctly stated that there was no evidence for the myth of a lost city, but unfortunately the romanticism of myth is very long-lived and still requires rebuttal.

The evidence for the prohibition of the quarrying has been demonstrated, and Heron-Allen's reference to the Admiralty can be updated to an order of the Treasury issued in 1827. The authors have not been able to trace a copy of the actual order in the *London Gazette* or in documents held in The National Archives, naval archives in Portsmouth or county record offices. Clearly, by the 1820s quarrying of the Mixon Reef was a significant activity that must have been highly visible from the shore. Lord Selsey, as lord of the manor, was apparently not happy about the quarrying but does not seem to have made any effort to stop it. The opinion of the Attorney General that the reef was the property of the Crown rather than the lord of the manor allowed the Attorney-General to make a definitive decision on the quarrying. The importance of maritime considerations led the Crown's officials to decide that the over-riding issue in this case was the survival of the anchorage and the welfare of the Selsey fishermen, rather than the business interests of a group of local entrepreneurs, even though these were supported by the local aristocracy and middle classes of Chichester. The considerable efforts of Captain Mingaye to investigate the trade and to counter the arguments of the stone merchants and their supporters were key to the 1827 decision to ban the quarrying.

Patronage and family connections were still very important in the Royal Navy, and the extent of Mingaye's influence at the Admiralty seems to have been considerable, both as a career officer in the Royal Navy and perhaps because of his previous service on the royal yacht. If there are heroes in this story they are that 'hardy race of useful men', the Selsey fishermen and pilots supported by Captain

Mingaye and the Blockade, and those hard-working clerks of the Admiralty and Treasury (succeeded now by the staff of The National Archives) whose efforts allowed us to investigate this story and finally answer Heron-Allen's fruitless enquiries to the Board of Trade in 1910.

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Authors: David and Anne Bone, 4 Kensington Road, Chichester, West Sussex, PO19 7XR, david@dajbone.plus.com

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ADM 1/2199, Cap M 84. 25 March 1827 from Mingaye to J. W. Croker enclosing Carr's letter of 20 March 1827.
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APPENDIX 1. USE OF MIXON ROCK

Mixon Rock is to be found in walls and buildings throughout the area around Selsey and Chichester, and has been identified in contexts from Iron Age to 19th century as noted below.

A quern fragment from an unpublished excavation at Selhurst Park, Eartham, of tentative late Iron Age date was identified as Mixon Rock by the authors. Definite quern fragments, both Roman (Cunliffe *et al*. 1996) and Saxon (Holden 1976 and White 1934) have also been recorded. Roman use as a building stone is recorded at a number of sites, frequently as waterworn blocks. In Chichester, the stone has been found as foundation stones and well linings (Down and Rule 1971; Down 1974; Kenny 2006). Several waterworn stones were also seen by the authors in the 2010 excavations of the Avenue de Chartres Roman bastion on the Chichester city wall. Outside Chichester, the stone is used as trimmed, waterworn facing blocks for the West Wing of Fishbourne Roman Palace (Fig. 12) (Cunliffe 1971a, 81–2; 1971b, 2) and construction rubble (Bone 2003, 91; 2006, 81–2). It has also been found in a bath house at Sidlesham (Collins et al. 1973) and a well-lining in Selsey (McKee 1968).

Mixon Rock of presumed early Saxon date is used as a building stone at Barton Farm, Nyetimber (Guermonprez and Johnston 1903) and as a facing stone at St Thomas in Pagham (Freke 1980). It also appears in the footings of the 11th-century tower on 'The Mound' at Church Norton, Selsey (Aldsworth and Garnett 1981) and the 12th-century bailey at Tote Copse, Aldingbourne (Brewster and Brewster 1969). The latter included waterworn and barnacle encrusted pieces.

Fig. 12. Lower wall of the West Wing of Fishbourne Roman Palace where Mixon rock is used as the facing stone (photograph: David & Anne Bone).

Medieval (11–14th century) and possibly later use has been recorded by the authors in 27 churches, ranging from Warblington in the west to Aldingbourne in the east and on the Manhood peninsula (Table 1).

Mixon Rock also occurs in other medieval buildings such as the late 13th-/early 14th-century guest house at Boxgrove Priory (Bone 2010b). Many of the stones are again waterworn and show evidence of marine activity, for example at Bosham (Worssam 2006), and may also include re-used Roman material. Further afield, two small pieces have been found in the church of St Nicholas in Old Shoreham. They may be re-used ship's ballast.

Possible 17th-century use in walls and buildings of Selsey is noted by Salzman (1953, 206–7) and late 17th/early 18th century work in houses in Chichester (Green 2007, 24). Use continued into the early 19th century in Chichester (Green 2007, 139) whilst St Peter's church (Fig. 13) in Selsey (1865) re-used stone from the former 13th-century church at Church Norton (Salzman 1953, 208–10; Mee 1988, 27–33). Interestingly, the vestry or north chapel (built 1880) at South Bersted church is constructed of Mixon Rock. Was this stockpiled stone, re-used stone, or was some unauthorised quarrying still in progress at that time? Mixon can still be seen in many farm buildings and walls in the Manhood area south of Chichester, as well as in Bognor (Venables and Outen, 1969). This is undoubtedly a consequence of the early

Table 1. Churches with Mixon Rock.

Mixon Rock used in abundance Aldingbourne, Appledram, Birdham, Bosham, Donnington, Earnley, Fishbourne, Hunston, Merston, North Mundham, Pagham, Selsey, Sidlesham, South Bersted.
Mixon Rock in common use Chichester All Saints, Chichester Greyfriars, Chidham, East Wittering, West Itchenor, Westhampnett.
Mixon Rock occurs as only a few pieces Chichester St Olave, Chichester St Pancras, Church Norton (mostly rendered), Oving, West Thorney, Westbourne, Warblington.

19th-century working of the Mixon as noted in the 1823 Memorial (TNA TS 25/2040, 194)

> that the greatest part of the entire Buildings of the Neighbourhood consisting of Drains, Fence Walls, Barns Outhouses Cottages and a great number of private houses together with the Parish Churches of Selsea and Sidlesham is built entirely of them.

Windsor (1995; 2012) believes that the Mixon Reef was 'inundated' in the 11th century and that subsequent use of the stone is re-used material, a theory not supported by the evidence presented in this paper. Windsor additionally suggests that Mixon Rock from Fishbourne Roman Palace was re-used in the building of the nearby church of St Peter and St Mary. The present authors have measured the stones at both the Palace and the church and there is no significant difference in their sizes. However, Mixon Rock readily breaks into standard sizes, and was similarly used in many other churches throughout the area and for the Hayling Island bridge. There is no visible evidence of other re-used Roman materials in Fishbourne church, and the Mixon Rock is neatly interspaced with similar sized pieces of Purbeck Stone, probably from the reconstruction of 1821 (Fig. 14). This was during the peak of the 19th-century working of the reef. There is no evidence for Fishbourne church being constructed of re-used Roman stone.

Fig. 13. St Peter's church, Selsey, constructed of Mixon Rock (photograph: David & Anne Bone).

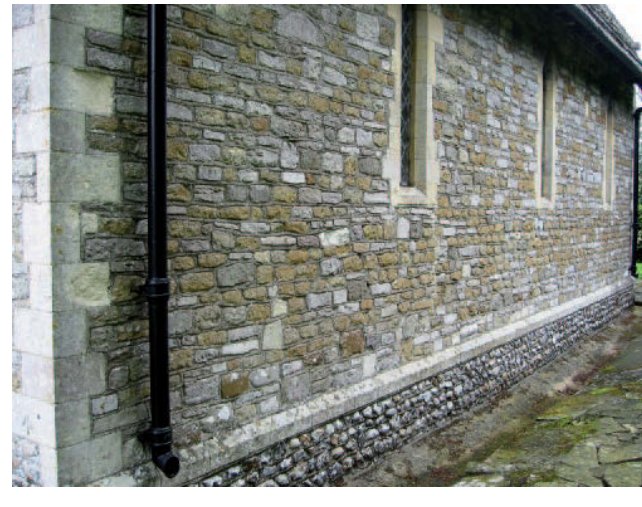

Fig. 14. South wall of St Peter & St Mary's church, Fishbourne constructed of Purbeck Stone and Mixon Rock (photograph: David & Anne Bone).

APPENDIX 2. CALCULATIONS

The 19th-century records enable some rough estimates to be made of the amount of stone quarried from the Mixon Reef, using figures given in the petitions, memorials and estimates of stone used in the construction of the Hayling Island bridge.

Key statements in the petitions and memorials on the amount of stone removed and, in each case, a calculated estimate on the volume are given in Table 2.

Together with other statements in the petitions and memorials, it is clear that the reef was reduced in height by between 0.7 and 1.5m over an area up to 12,000 square metres. This gives an estimate of the volume of stone removed as between 5000 and 9000 cubic metres, mostly in the years between 1821 and 1827. At the maximum figure, this equates to around 18,000 tonnes of stone.

An estimate can also be made of the amount of stone used in the construction of the Hayling Island bridge, which must have been a significant

Table 2. Calculation on use of Mixon Rock from documentary sources.

Reference	Estimated volume
'*… it appears on surveying the same that about 1½ acre in extent and 2½ feet in depth comprises the whole extent that has ever been carried away*' (TNA TS 25/2040, 194).	4625m^3
'*Rock is ½ mile east to west. About ⅔ of that distance taken away, 20 to 30 yards wide to a depth of 2 feet*' (TNA TS 25/2040, 198).	7400m^3
'*… the Quantity broken up … is about Thirty inches in depth, and in superficial extent somewhat less than Seven thousand square yards*' (TNA ADM 1/4303).	4625m^3
'*That the Quantity of Rocks annually removed from the Mixon Reef amounts to upwards of Three thousand Tons*' (TNA ADM 1/4303).	3000 tons pa = 1500 m^3 pa or about 9000 m^3 in 6 years

driver for the quarrying operations. Although it is unknown how much additional stone may have been used as general fill for the causeways, Skelton (1826, 10) notes that their sides, north and south of the timber bridge 'slope diagonally, six feet horizontal to one foot perpendicular … faced with stone, placed at right angles to prevent the materials washing away'. This description matches the remnants of Mixon Rock still visible on the foreshore in the vicinity of the old bridge and, it can therefore be assumed, reflects the original construction.

From design drawings of the Hayling Island bridge (Hampshire Record Office DP/37/1, fig. 6), the total surface area illustrated as potentially faced with stone is approximately 19,000 square metres. This includes the revetments forming a sea wall either side of the south end of the bridge where Mixon Rock is still visible today. With blocks of Mixon Rock set in as facing stone (Fig. 7) and, taking an average stone depth of 200mm over the whole surface area, this gives an estimated volume of 3800 cubic metres or around 7600 tonnes.

Considering that Mixon Rock would have been used for more than just facing the causeways of the Hayling Island bridge, there is reasonable correlation between the 7600 tonnes of facing stone and the 18,000 tonnes from the quarrying estimate. There is no reason to disbelieve the higher figure and that large quantities of stone were removed from the Mixon Reef, particularly in the early 1820s.

APPENDIX 3. BIOGRAPHY OF WILLIAM JAMES MINGAYE (1784–1865)

The Mingayes were a prosperous East Anglian family who moved out of the yeoman class after purchasing property at the dissolution of the monasteries. William Mingaye was born on 20 January 1784, the eldest son of William Robert Mingaye, a naval surgeon of Thetford and his wife Mary (née Harvey of Fakenham). He always used the form Mingaye with a final 'e', although most of his family did not. His father's older brother James was a successful King's Counsel and MP for Thetford from 1806 to 1807. In 1812 Mingaye inherited this uncle's estates at Shottesham and at St Peter, Thetford (Mingay n.d.). His family had naval links in addition to his father's service, for one of his sisters-in-law was Mary Webb Giraud (married 1818), an admiral's daughter. Mingaye's career is representative of the tradition of 'navy families'.

William Mingaye's naval career is recorded on the Memorandum of Service (TNA ADM 196/5/312), although not all these entries are totally reliable – for instance Jervis is give as captain of the *Tonnant* in 1803 but Pellew was still that ship's Captain in March 1804 (*London Gazette*, 10 July 1804). The document seems to be written in one hand until July 1817, with later commissions added in another hand. The memorandum is signed by Mingaye himself as a Lieutenant on the *Royal George* yacht in August 1817, and perhaps the record was compiled then from his recollections. His career spanned from 1798 to 1865 and is summarised in Table 3.

Mingaye entered the Royal Navy as a volunteer aged 14, becoming a midshipman in 1802. Achieving the rank of lieutenant relied on success in the examinations, and then guaranteed future promotion by seniority to the rank of admiral, if sufficiently long–lived, which Mingaye was (Friel 2003, 141). Service on HMS *Tonnant* from 1803 to 1804 was one of the few occasions when Mingaye was involved in battles, as the vessel was part of the fleet at the Blockade of Ferrol and then at Cape Ortega in the Napoleonic Wars.

One of the most prestigious parts of Mingaye's service was on the *Royal George* yacht, which

Table 3. Naval career of William James Mingaye.

From	To	Ship	Rank	Served under	Location
16 Sep 1798	1801	*Anson*	Volunteer	Capt. P C Durham	Bay of Biscay and the Mediterranean
1801	1802	*Endymion*	Volunteer	Capt. P C Durham	Bay of Biscay and the Mediterranean
1802	1802	*Alarm*	Midshipman	Capt. William Parker	Holland
1802	1803	*Amazon*	Midshipman	Capt. William Parker	Gibraltar
1803	1803	*Magnificent*	Midshipman	Capt. William H Jervis	Ireland and the Channel
1803	1804	*Tonnant*	Midshipman	Capt. William H Jervis	Spain and the Channel
5 Apr 1805	14 Jul 1805	*Tickler*	Sub-lieutenant	Lieut. Skinner	Boulogne
3 Aug 1805	9 Jun 1806	*Belligueux*	Lieutenant		On passage to join *Salsette* in the East Indies
10 Jun 1806	10 Aug 1809	"Bombay after Ceylon" *sic*	Lieutenant	William Jones Lye	East Indies
Aug 1809	1812	Not on active service			
27 Mar 1812	22 Dec 1812	*Cossack*	Lieutenant	William King	Mediterranean
23 Dec 1812	5 Jul 1813	*Druid*	Lieutenant	William King	Mediterranean
16 Mar 1816	25 Jun 1817	*Eridanus*	Lieutenant	William King	Channel
20 Jul 1817		*Royal George* yacht	Lieutenant	Hon. Charles Paget	Channel out of Portsmouth
10 Oct 1820		*Camelion*, revenue cutter	Commander		Channel out of Portsmouth
23 Jul 1822	22 Jan 1822	*Royal George* yacht	Acting Captain		
22 Jan 1822		*Royal George* yacht	Captain		
24 Jul 1824		*Romney* (a fourth rate 50 gun troop ship)	Captain		Chatham
1 Jan 1825		*Hyperion*, Blockade	Captain		Newhaven
1831	Oct 1852	Captain, not on active service			
Oct 1852	Rear-Admiral of the White, by seniority				
1857	Vice-Admiral of the White, by seniority				
1859	Vice-Admiral of the White, pensioned on half-pay				

carried the Prince Regent, later William IV, to Leith, Scotland in 1822. This visit is also captured in sketches by J. M. W. Turner (Ardill 2008). According to family tradition, William presented the young Mingaye with the glass used to drink whisky with Sir Walter Scott (Mingay n.d.). Mingaye served twice on the royal yacht, becoming its captain in 1822.

Mingaye's naval service included two periods with the anti-smuggling part of the Navy, first as Captain of HMS *Camelion* (a 10-gun Cherokee class brig sloop) which served as a revenue service cutter (Philp 1999, 123). After serving as captain of a troopship (HMS *Romney*) he returned to anti-smuggling work with the Blockade service, making a number of changes to improve its effectiveness (Philp 1999, 123–52). This period saw him running operations along the coast of Sussex, managing his men and pursuing smugglers, who were often treated leniently by the local magistrates – a source of frustration to Mingaye and his men. At the dissolution of the Blockade service in 1831, Mingaye spent 20 years with the rank of Captain but apparently with no ship and on half-pay, a not unusual situation; it was fortunate that he had family money (Friel 2003, 141).

From 1857 Mingaye lived at a house called 'Hyperion' in Rosherville, a suburb of Gravesend developed as pleasure gardens and later becoming a popular centre for entertainment (Smith n.d.). He died on 20 December 1865, and a memorial survives in Gravesend cemetery (Anon. 2008).

Mingaye married Cornelia Meurer at Penang in the Straits Settlements (now Malaysia),allegedly at the age of about 20 (Mingay n.d.). His service in the East Indies was between 1805 and 1809 and this is presumably the period when they met and married. Whilst she is said to have been born in Leicestershire, her family name is from the Low Countries and it is possible that she was part of the merchant community in Georgetown. They had two children, a son, Parker Fuller Mingay born c.1817 at Thetford, and a daughter, Cornelia Ann Mingay, born c.1821 at Beacondale, Norfolk. In 1851 both Parker and Cornelia were living in Lewisham. In 1881 his daughter was enumerated as a resident of Lewisham, a fundholder (that is, living off investments) who was deaf and blind. She could easily have been of mixed race – are there any pictures of her or the children?

APPENDIX 4. THE FISHERMEN OF SELSEY

Inshore fishing at Selsey has been well-known for many centuries although, in 1653, its most-noted produce is recorded by Izaak Walton as cockles, which were gathered in Pagham Harbour (Mee 1988, 39). Oysters were also a considerable business, being dredged in Chichester Harbour. In the 1841 census 12 of the 20 men living in Fish Lane, Selsey were fishermen, and a considerable part of the male population from boys of 15 to men of 80 was engaged in fishing (Mee 1988, 41). It is reported that in March 1818 a gale destroyed the entire fishing fleet of Selsey and there were so many families in distress that a public subscription was created to raise money to replace the vessels (Mee 1988, 41, based on an article by S. H. Day in the *Chichester Post*, June 1934).

Analysis of the baptism records of Selsey from 1813 to 1827 shows the importance of fishing and other marine occupations in the local population at the time of this study. It excludes nonconformist or Catholic residents, but they are likely to be few in number (Mee 1988, 33, 35). In this period there were 135 baptisms where the father's occupation is associated with the sea out of a total of 397 baptisms. An analysis of individual fathers, irrespective of the number of children, gives the following results:

Father's occupation	**No. of baptisms 1813–27**
Fishermen	87
Fish carrier/carrier	6
Pilot	1
Revenue boat 1818–21	8
Preventive boat 1821–4	12
Blockade service 1825–7	7
Mariner	3
Lieut. RN	2