

Lyme's Battle with the Sea: Part 2: A Town on the Brink

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Lyme really was on the brink before the new sea walls were built

This is the second of two papers on the Lyme Regis sea defences:

- *Part 1 is about the Cobb, Lyme's principal breakwater and first line of defence.*
- *This paper is about the second line of defence: Sea Walls, Jetties, Shingle Beaches and Securing Unstable Coastal Slopes.*

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LRM means Lyme Regis Museum; numbers in the format LRM 2015/6 are accession numbers.
In footnotes DC/LR are papers in the Borough Archives at the Dorset Heritage Centre.

Introduction

Lyme would not exist in its present form without sea defences. Long before rising sea levels and increasing storminess became matters of fact based on scientific research, it was clear that Lyme was in trouble. Part of that trouble was the winning and working of minerals from the beach, ledges and cliffs at an industrial scale in the 19th century.

Trouble also stems from the inherent instability of the Charmouth Mudstones, in particular the Shales-with-Beef, which is prone to slip and slide over the underlying Blue Lias, a competent formation which, when eroded by the sea, forms vertical cliffs above resistant wave-cut platforms or ledges.

A warning: history is only as good as the sources and their interpretation. Research is only as good as what is available at the time it is done: new information can change everything. As far as sea defences are concerned, anything before 1600 is foggy: we cannot really say what Lyme was like or when things happened because nothing is recorded but legal events. Places are often not named or are ambiguously described. The first surveyed plan is a chart of 1787. The first photographs are mid-1850s. The Borough Records are almost complete, but expenditure gets lumped and plans were not prepared for constructions, such as sea walls, which remained vernacular until engineers and concrete appeared on the scene from 1900 - although works on the Cobb became professional from the middle of the 18th Century. The Museum has good records of modern works, but amazing gaps in the records of repairs and replacement exist in the 19-20th Centuries that can only be filled by examining postcards, photographs, artworks and maps.

Measurements and Conversions

Generally imperial measurements are used when describing historic structures. 1ft = 0.305 metres, 100ft = 30.5 metres, 1 yard = 3ft = 0.91 metres, 1 ton = 1 metric tonne. Convert by typing *what is 6ft 2in in metres* in the Google search box. Measurements of the length of structures quoted by different authorities, even the builders, differ, and it is never clear whether the length of the inside or outside curve of a sea wall is being given. Monetary conversions to modern values [shown in square brackets] were made using the Bank of England's on-line Inflation Calculator, which represents consumer buying power, not construction industry costs. Before 1750 no sensible conversion is possible. Difficulty arises in 17-19th century Borough accounts because spending is lumped in very general heads of expenditure such, as *Sea Walls and Cobb*.

Throughout this paper the word borough is used as short hand to mean the Mayor, Aldermen and Burgesses, the Corporation of Lyme Regis, and the land area of the Borough of Lyme Regis, which before 1835 was only 41 acres, only the town itself not the much larger Parish of Lyme Regis run by a Vestry. DC/LR are items in the Borough Archives at the Dorset Heritage Centre.

Great Storms

Lyme Bay is completely open from South-East through South to West and offers no shelter to weather from those sectors. Summer visitors generally see a calm sea at Lyme: this apparent calm hides the reality of winter, and particularly the hefty storms which occur at the equinoxes. Lyme has a history of great storms, which in the days before accurate weather forecasting appeared to sweep up the English Channel from nowhere. Daniel Defoe¹ reported the effect on Lyme of the Great Storm of 1703. Another Great Storm was that of 1824, when much of the Cobb was destroyed and many houses severely damaged. By contrast the worst of the Great Storm of 1987 passed Lyme offshore.

Lyme has no natural shelter from any storm which approaches from the Bay of Biscay through the narrow gap between Start Point and Cape Finisterre. There is 8,000km of ocean beyond the High Wall of the Cobb between bearings 208° and 230°, reaching to the mouth of the Amazon – plenty enough fetch for the occasional well-aimed storm to deliver very powerful waves to batter the town if the Cobb is breached, as in 1824. Yet South Devon and Britany provide relative shelter from other directions in the SW Approaches, mostly keeping other Atlantic swells away and giving calm seas for much of the year. Easterly gales are less of a problem for the town's defences, as the fetch is much less, although the Cobb provides no protection from that direction. Southerly gales are problematic for the sea walls, which can receive a direct battering from that quarter with a fetch of 210km.

Heading & bearing	Landfall	Length of Fetch
0-60	–	–
ENE 060	Charmouth	2km
E 090	Thorncombe Beacon	7.5km
ESE 125	Portland Bill	41km
SSE 145	Cherbourg Peninsula	150km
S 180	St Malo	210km
SSW 208	Finistere	260km
SSW 220	Belem, mouth of R Amazon	8000km
SSW 230	Start Point	85km
SW 240	Seven Rock Point	1.5km
240-360	–	–

¹ Daniel Defoe 1704 *The Storm* Ed Richard Hamblyn Penguin Classics London 2005

In addition the power of the sea is enhanced by high tides on a wide tidal range: 4.5m at maximum spring tides, 1.0m at slackest neaps. The coincidence of storm driven waves piling water into the bay and low barometric pressure results in storm surges which accentuate the effect of spring high tides, but, thanks to Lyme's sea defences the only area categorised by the Environment Agency as *liable to coastal flooding* is a strip of land at Cobb Hamlet, the bottom of Cobb Square and the Cobb causeway, roadway and quays.

Is there a Lost Lyme, Dunwich-like, under the waves?

It is hard to say, but it seems possible or even likely. Salt working in Saxon and early medieval times *may* have been carried out on now vanished salt marshes extending well seaward of the current shoreline. It seems more likely that salt working could have been taken place on salt marshes alongside a wider river mouth or estuary, before it was embanked and raised. The town of Lyme may well once have extended out over what is now sea bed, but the only evidence for significant loss of town to sea followed the storms of 1341-2 and 1397. The former is officially recorded as having *destroyed the greater part of the land and tenements of Lyme*, although no locations were given². The latter ripped asunder the centre of the town and destroyed its core, the shipping haven³.

Lyme lies to the east of the Tees-Exe axis. England is sinking SE of this axis relative to sea level, adding to any changes from global warming. During the Pleistocene glaciation, when sea level was up to 100m lower, the whole of the bed of Lyme Bay would have been dry, but in historic times it is only possible to say that there was a minor post-Roman rise in sea level and that on such an exposed shore, salt marshes do not seem likely, unless the shore was protected by a now vanished shingle bar, perhaps part of a longer Chesil Bank.

Lyme is very much on the edge: houses are crammed on high, walled brinks (there were more such houses before clearance from 1880 onwards). This suggests that the old sea walls mark the truncated edge of a settlement which once extended further south. No Saxon or medieval town, bridge or church would have been built so close to the sea, for fear of raiders and storms. Folk memory suggests that Broad Ledge was once covered with houses, but there is no evidence. Neither is there any folk memory of a really major, catastrophic inundation, such as persistent folk tales about *Cantre'r Gwaelod*, the lost land of Cardigan Bay, or even of the losses here in the 14th Century.

There are some clues in the layout of streets. Broad Street points straight out to Broad Ledge, before turning to join Bridge Street. The sharp bend at the other end of Bridge Street does suggest that the original road to Charmouth once carried on as a straight-line continuation through the site of Guildhall Cottage and on towards Charmouth over the now slumped cliffs. Bridge Street and its 14th century bridge arch are surprisingly near the sea. The bridge supported a bridge chapel, suggesting that it was an important crossing and it has at least two medieval arches, one with late Norman decoration, is now concealed. Since 1600, or well before, the river has been confined between vertical walls, holding back made-up ground in the bottom of the valley. Before the bridge would have appeared as a viaduct with two or more arches. This would have been a very exposed site to build a stone viaduct in medieval times, suggesting that the sea was once further away or the site was protected by a shingle bar, lost after the Cobb blocked longshore drift. Sea walls were built to protect the Buddle, or outfall, yet the remaining open arch is still open to southern storm waves sweeping right through, despite the actual outfall being moved further seaward in the 1990s. It may be that all the ground

² Roberts G 1834 *The History of the Borough of Lyme Regis and Charmouth* Reprinted by Lymelight Books and Lyme Regis Museum 1996, p 46 quoting the Ninth Rolls of Edward III, 1340

³ Roberts G 1834 *ibid* pp 52-5 quoting Patent Rolls of Richard II

between Bell Cliff and Gun Cliff was once marshes, the land artificially raised behind walls. In this gap rockhead (in uppermost Blue Lias) is at about low tide level.

Of artefact evidence for a lost town, there is none. No remains have been discovered from the inter-tidal area, despite two centuries of the ledges being scoured for fossil remains by eagle-eyed geologists. Whilst a cob and thatch settlement would little leave archaeology after marine destruction, metal artefacts are known to remain in a near-shore environment for a long time, yet none have been found apart from coins which could have been lost on the beach or thrown in as good-luck charms.

There is mapping evidence for the loss of some houses and a sea wall, such as Guise's Wall on the sea side of Guildhall Cottage. But Edward Drake, in his diary of the Civil War siege of Lyme in 1644, does not mention places or streets that cannot now be found which could have been lost to the sea – although Roberts⁴, without explanation, begs the question of the whereabouts of Cobb Street. However, the Eastern Walk, and the hill around which it wound, have gone, despite being clearly shown on Stukeley's engraving of 1723 and the Admiralty Chart of 1817. They were lost to accelerated erosion caused by stone quarrying on the sea shore, threatening St Michael's Church and causing the loss of part of the graveyard. This hill fell completely sometime between 1823 and 1854.

Appendix 1 to Part 1 is a chronology of great storms, surges and unlikely tsunamis.

Lyme is built on unstable ground

On the higher ground east and west of Lyme the overlying Upper Greensand is an aquifer and prone to liquefaction and mass movement, with the added problem of great height above sea level driving high pore water pressures and ensuring long slopes before stability can be achieved. Between the cliffs behind Monmouth Beach and towards Cobb Gate the strata dip in a broad syncline, so that the top of the Blue Lias dips towards the beach level, meaning that for this central section the protection of the competent Blue Lias is largely absent, reappearing to the east at low tide level at Bell Cliff and Gun Cliff. This means that the entire slope above Marine Parade is made up of the very unstable Shales-with-Beef overlain by Black Ven Marl.

Whilst the massive landslides either side of the town are some of the largest in Britain, they do not directly threaten Lyme itself, except on its eastern flank. Those to the west provide material which replenishes Lyme's beaches through the broadly easterly longshore drift. This provided a measure of protection until the Cobb breakwater was finally joined to the mainland by a sustained causeway in 1857⁵. Since 1756 shingle has accumulated to form the ever widening expanse of Monmouth Beach, although the once-quarried cliffs behind the beach will remain unstable until they slump and slip to a shallow, stable slope.

There are five main mechanisms of mass movement

1. Mudslides
2. Translational block slides
3. Deep-seated compound slides
4. Shallow rotational or translational failures
5. Cliff failures

Landslide systems extend over a kilometre inland and consist of numerous interrelated elements. They have formed as a result of marine erosion, prior to the construction of the coastal defences, reactivating ancient landslide systems as toe weight is removed. In addition, first-time failures develop on the lower coastal slopes. The basal shear surfaces of the principal landslide units occur above particular marker beds within the Lias. These

4 Roberts, G 1834 *ibid* p193

5 See Part 1. The first causeway in 1701 was destroyed in 1702

horizons impose strong control, giving a characteristic bench and scarp seaward slopes. The Lias has a gentle dip to the southeast, facilitating the seaward movement of landslide blocks, although local dip is variable with shallow folds and low throw N-S and E-W normal faults, which have considerable effect on the surface disposition of rock units. Some of these structures appear to be due to unloading (of the weight of super-incumbent strata), as much as tectonics. Near-hydrostatic groundwater pressures exist within the landslide debris of superficial deposits, whereas under-drainage occurs within the deeper Lias strata. Stability analyses indicate that many of the landslides are at or close to failure. Ground instrumentation has confirmed continuing widespread movement over most parts of the landslide systems. Movement tends to occur in cycles initiated by long periods of very wet weather or disturbance to drainage or support caused by excavations for building works. Major movements are often preceded by minor movements, which show in the formation of lines of small scarps or steps transverse to the slope, a process called *stepping* by John Fowles.

The eastern part of Lyme Regis may be under threat from the continuing long term westwards expansion of the Spittles/Black Ven landslide system⁶.

The mechanisms of destruction

The action of erosive force is relentless, and ultimately, unstoppable by human action. It proceeds by:

1. The rapid or gradual **mass movement downhill** of unstable coastal slopes and cliffs following the withdrawal of toe-weight support or lubrication by heavy rain,
2. **Wave action** undermining and battering cliffs and sea defences, transporting offshore and alongshore silt, sand and clay which slips onto the beaches,
3. Lowering of beaches through **longshore drift and gradual attrition**, as well as previous removal of sand and gravel for builders and quarrying for stone,
4. **Storm surges** bringing flooding and wave action to higher levels, and
5. **Biological activity** such as by *Pholas* (the boring mollusc Piddock) which honeycomb mudstones on the ledges, causing collapse of overlying limestone beds.

The first is a continual process exacerbated by periods of heavy rain, whereas 2-4 are much more potent during storms. Two further factors cannot be ruled out, which if they occurred, could kick-start or accelerate events, although there is only circumstantial evidence for them ever occurring here:

6. **Tsunami, so-called Tidal or Harbour Waves** – historical reports of the *tide flowing several times* could suggest such events have occurred, caused by earthquake or sea-floor subsidence out in the Atlantic, but there is no report of the Lisbon Earthquake of 1755 sending damaging waves. Local tidal events can cause sudden rises in water level at the Cobb, and
7. **Earthquake** – whilst there are two reports of earthquakes, in 1688⁷ and in 1863⁸, this is not a significant mechanism for mass movement in a normally stable area. There are several old deep-seated faults associated with the northern margin of the English Channel Basin in the area, and perhaps these move a little from time to time. In the most unlikely event of a serious earthquake, liquefaction and movement of old landslips is probable and would be catastrophic.

In addition:

⁶ Adapted from West, I Lyme Regis Seafront Geology web page accessed 26th November 2014 on www.southampton.ac.uk/~imw/Lyme-Regis-Seafront.htm

⁷ Rev Carew Cox undated 1950s *The History of the Church of St. Michael, Lyme Regis*, Gloucester. Contains records of earthquakes and unlikely tsunamis

⁸ Described as violent shaking of beds for 2 seconds and a rumbling sound in Rodney Legg *Bridport & Lyme Regis: The Story Of Dorset's Western Coast* Dorset Publishing 1999

8. **Human Activity**, which by design or chance exacerbates or restricts these natural forces.

Sea Defences – National Policy Considerations

Today public sea defence schemes are usually undertaken by local authorities with financial support from central government. Dispute reigns where public authority won't do the work because it fails a cost-benefit test, and private landowners perceive losing assets as a result. These have always been considerations in Lyme: Exchequer support, at least for the principal breakwater, the Cobb, has been handed down since the 13th Century, and disputes between the Borough and private landowners over responsibility for sea walls and the removal of stone and sand from beaches have resulted in protracted legal disputes reaching the highest courts. Nowadays conservation reasons may demand a special approach, or that the work not be done at all. Our local coastline is special because it lies entirely in confirmed Areas of Outstanding Natural Beauty and defined Heritage Coasts (Dorset and East Devon). Either side of Lyme the cliffs are within the Jurassic Coast World Heritage Site, a UNESCO listing as a natural site. In addition the principal breakwater is a Grade 1 Listed Building, the town is a Conservation Area with hundreds of listed buildings, mostly Grade 2 and 2*, including the vernacular sea walls and jetties.

Conserving these heritage assets means that **hold the line**⁹ is the general policy for Lyme, with **advance the line** where new sea walls have been built seaward of the existing walls, such as at Gun Cliff and East Cliff, to protect the built environment of the town and to provide space for utility works and public promenades. **No active intervention** allows nature to take its course – this is the only feasible objective below Black Ven and along the Undercliff, as the forces of mass movement are magnified by the great height and consequently, greater pore water pressures. There are no local examples of **managed re-alignment** or **planned retreat**. Ultimately, though **no active intervention** either side of the town, Lyme risks being outflanked by the sea as Black Ven and the Undercliff continue to slide, leaving the town as a defended island.

There is nothing new in these approaches – the Cobb is an example of *advance the line*, gaining land from the sea, as are the 18th Century sea walls at Cobb Hamlet, which allowed development to take place on what had been the beach. *Hold the line* has been attempted for at least 400 years between Bell Cliff and Gun Cliff, changing recently to *advance the line*, as that part of Lyme was too close to the brink. Yet to display the geological heritage, wasting cliffs either side of the town are a requirement which fits in with the impossibility of doing anything else.

The Problem - Examples of Storm and Extreme Rainfall Damage

The Great Storm of 22nd-23rd November 1824 was the worst Lyme had suffered, with the sea walls near the mouth of the river being beaten down and several houses damaged, but it was the Cobb and Cobb hamlet which took the worst of the storm. A Hurricane Force wind (force 12, above 75 mph) came roaring out of the South West, pushing the sea before it, resulting in what is known as a 'rogue tide'. A rogue tide is one which doesn't stop rising when predicted, rising for another five hours. The Cobb was wide open, as the High Wall was several courses short after the botched repair of the breaches of 1817. The sea wall protecting England's Hotel, now the Royal Standard, went down and buildings behind it were mostly reduced to rubble. Two coal yards were damaged, and when the Cobb Wall went down, Chard's shipyard was destroyed. A relief committee was set up to take subscriptions and make emergency payments to the needy.

⁹ Categories in bold official are Government policy heads, as set out in Richard Edmonds *Lyme's Eroding Coast* in All over the Town: Lyme Regis Society Newsletter Winter 2014

Roland Brown¹⁰ quotes Mary Anning:

We have gone through a scene of horror, during the gale at Lyme; a great part of the Cobb is demolished, every vessel and boat driven out of the harbour, and the greatest part destroyed; all the back part of Mrs England's houses and yards washed down, with the greater part of the hotel, and there is not one stone left of the next house; indeed, it is quite a miracle that the inhabitants saved their lives. Every bit of the walk [Marine Parade], from the [Assembly] rooms to the Cobb, is gone; and all the back part of the houses, from the fish-market to the gun-cliff, next the baths.¹¹

The Wet Sumer of 2012

Rainfall in July and August was significantly above average and caused widespread flooding elsewhere. In Lyme this water eventually caused the cliffs to become unstable above Monmouth Beach, resulting in material slipping over the Blue Lias cliffs to the west and damage to beach huts and cabins above the beach. Slipping continued in 2014. Significantly there was no movement in areas to the east recently stabilised.

The Storms of the winter of 2013-4

The winter was stormy, with spring high tides coinciding with low pressure events and Force 10 winds. Significant damage occurred on the western coasts of Britain, with the railway washed away at Dawlish, but Lyme's new defences held well, although the surface paving of the Cobb was scoured, and parts of the edge of the inner curve were washed into the harbour. In the past replacement of stones and mortar had been carried out quickly by the Borough's stonemason, Mr Jim Stone, but after West Dorset DC (WDDC) abolished the post in 1976, tarmac has been used to patch holes temporarily.

Removal of material by human activity

A general power to the Borough to dig stones and rock for ever was given by Charles I. This was in part rescinded by James I, to forbid the removal of stone from the foreshore below St Michael's Church, a necessary measure which was ignored. Instead massive quantities of stone were removed from Lyme's rock ledges and cliffs through working for building stone, ship's ballast and for limestone for the manufacture in Lyme and elsewhere of hydraulic and Portland cement and lime for renders and stucco. The foreshore was virtually a quarry from 1750 or before. The vertical Blue Lias cliffs either side of town may be more worn-back quarry faces, rather than entirely natural! In addition sand and shingle were removed.

The HM Geological Survey's H B Woodward noted in 1885 that 10,000 tons of stone were removed in one year¹². Throughout the latter half of the 19th Century the trade directories speak of thousands of tons being removed every year, some of which was, perversely, being used to build sea walls, although salt-impregnated Lias is prone to rapid weathering.

By the 1830s erosion at Church Cliffs became a serious concern, but nothing was done to stop the removal of the ledges, even there, until much later in the century. By 1910 concrete was being poured to protect the church - very likely using Lyme Regis cement and beach shingle. There was a total collective mental lapse in the those who might have known better - for example in 1906, T E D Philpot, Mayor and builder of the Museum, licensed the removal of stone from the cliffs below Underhill Farm for 6d a ton, to which would be added harbour dues for removal and for unloading at the Cobb. The resulting removal resulted in the land sliding which eventually worked back to Underhill

¹⁰ *The Beauties of Lyme Regis* 2nd Edition 1859

¹¹ Letters of Miss Mary Anning in *Memoirs of Miss Bell* Vol 1, 1827

¹² H B Woodward Report on the erosion of the coast between Axmouth and Eype etc 1886 Rep Brit Assoc for 1885, pp 423-6

farmhouse, forcing John Fowles to move out in the 1980s. It was not until the Lyme Regis Cement Works closed in 1913 that the last stone was taken from the ledges and cliffs¹³. Even after that local builders and the Borough continued to take sand and gravel from the beaches in the 20th century¹⁴, directly lowering beach levels.

Defensive Structures

These include wall, jetties, groynes, natural and replenished shingle beaches and rock armour piles.

Sea Walls

In 1586 Sir Thomas Walsingham reported to Elizabeth I that an *exceeding number of great piles...* [were] set up to protect the ... town from the violence and fretting of the sea¹⁵. From then, if not earlier sea walls were built to stop the sea eroding the town, for example at Gun Cliff and either side of the Buddle. In early as 1680 the Corporation was fined for not repairing the wall at Bell Cliff¹⁶, whilst two years later Jane Read was ordered to rectify a *bad wall next the Buddle*¹⁷, implying that the Buddle was already walled by that date. The Corporation built some parts of the walls, landowners built other parts, while others were built by public subscription. The result was confusion over duties of the corrupt Fanite Borough, which had tried to escape the responsibilities imposed by Royal charters.

It is a paradox that the stone required to build the early walls was won from the cliffs and ledges, exacerbating the problem of erosion on the fringes of the town. The walls have needed constant repair and replacement by ever bigger structures since, so that the current concrete walls often encase or protect older concrete and even earlier stone walls. The older stone walls were often repaired piecemeal by patching breaches or by buttressing. They needed repair after major storms. In 1813 George Roberts sketched how loose fill behind a sea wall can be scooped out by the sea through a small hole. His suggested remedy was to build a low wall in front, *footing up*, as he calls it, the main wall. In 1962 such vernacular repair for the old walls around the Buddle continued; the Borough was still employing a mason and a labourer mainly for sea walls. The Foreman and the Mason inspected the stone walls every week and after storms, and the Borough Surveyor reported their findings to the Council. But the engineer-designed newer concrete walls have mainly been left without repair, to be encased in an even newer wall before failure.

Breakwaters, Groynes and Jetties

Lyme's principal sea defence is the Cobb High Wall, dealt with in Part I. It now has the effect of stopping the drift of shingle, meaning that to retain shingle and sand beaches, which are effective sea defences, groynes or jetties perpendicular to the shore are required to trap the remaining shingle and retain replenished shingle. In Lyme stone groynes are known as jetties and where they meet the land, walls. Here term groyne is restricted to 20th century wood and steel structures, of which none are left, other than those buried under the shingle of Main Beach.

Traditionally, Cobb apart, there were five main jetties: from west to east – Lucy's or De La Beche's Jetty, Cobb Gate Jetty or Wall, Gun Cliff Jetty, "Baths" or "Theatre" Jetty and the Eastern or Eastward Jetty or Wall, with others on Main Beach and at the Theatre. An extra main, but unnamed, jetty appeared in 1993-5 to separate sand from shingle on Main Beach. At the Museum we call it Kevin's Jetty, as a memorial to one of its builders.

¹³ Richard Bull *Industrial Lyme – Stone and Cement* papers on www.lymregismuseum.co.uk

¹⁴ Graham Davies, pers com, information from the books of Lyme builders A F Wiscombe lodged by LRM in DHC.

¹⁵ Roberts G 1834 *ibid* p 62-4 quoting Harleian MS vol 368 folio 124

¹⁶ Court Leet 4th October 1680 Calendars of Borough Records LRM and DHC

¹⁷ Court Leet 8th May 1682, Calendars of Borough Records LRM and DHC

Stone jetties often included timber sections as repairs or extensions. Cobb Gate Jetty and Wall has been used as landing quay. The building of jetties and groynes, and the joining of the Cobb to the shore, has been fraught with controversy over the resulting blocking of longshore drift, lowering of beach level to the east and consequent effects on property and the stability of the structures themselves.

Armour stone rockeries

Dumping large loose boulders to protect structures is not a new idea, but has become a significant means to break the force of the sea in a harmless way. The first boulder spreads were probably from the washed down remains of the Cobb's walls usefully left where they had fallen to remain as breakwaters. Stone of at least three tonnes in weight and angular in shape can resist wave pressure to a degree and in any case will not move far and can be re-arranged easily with modern machinery. Many of the stones are much heavier. The heap will be flexible under very heavy seas, but should settle back, remaining interlocked. Concrete tetrapods are even better than angular stones in this regard, but would be unsightly in a heritage town or listed harbour environment. Nowadays Larvikite¹⁸, an ultrabasic coarsely crystalline igneous rock, and Irish basalt are generally used in Lyme. Both are dark bluish grey and blend with Liassic greys and are readily available in angular blocks three or more tonnes weight delivered to the site by sea-going barge direct from the quarries at Larvik, near Oslo, and Arklow, south of Dublin. Large heaps of these stones protect the front the new sea walls outside the Museum and at Cobb Gate, together with some Carboniferous Limestone and Portland Roach left over from previous work.

Shingle Beaches and Bars

Natural and artificial shingle bars and beaches protect Lyme - from the great mass of Monmouth Beach held up by the Cobb - to the replenished sand and shingle of Main Beach and the smaller Back Beach. Some have suggested that a natural shingle bar may have protected the Buddle Mouth before the Cobb causeway was effective, the Buddle being directed eastwards by shingle impounding a foetid lake of sewage from the River Lim.

After hydraulic modelling in a scaled water tank at the Hydraulics Research Station, in the days before computer modelling, WDDC proposed in 1989 to build three boulder bars parallel to the shore to protect Main Beach and Marine Parade. After a town poll resulted in a resounding rejection of the whole environmental improvement scheme, including the bars, it was decided to rebuild the Southern Arm rockery at the Cobb and build new sea walls and jetties.

Sea Wall Maintenance – Borough or Landowner responsible?

In 1634 by charter Charles I required that the *structures, banks, sea shores and all other rampiers and ditches within the borough, and between the borough and the sea to be maintained*¹⁹. Two centuries later this vague drafting gave rise to lawsuits as to who should maintain sea walls.

The first, a protracted dispute, was started in 1825 by major Lyme landowner, Henry Henley, who asserted that the Borough was responsible, having accepted the Royal Charter provisions imposing responsibilities on it to maintain buildings, ditches, mounds, seashores and the Cobb, for failing to maintain sea walls supporting his properties. Henley had lost properties in the Gun Cliff area in the 1824 storm, as reported by resident Mary Anning (for details see above). After appealing the original decision for Henley in the Dorchester Assizes in 1828 and after several further appeals by the Borough the case of Corporation of Lyme v Henley was decided in the House of

¹⁸ See Glossary of Rock Types used in Lyme Sea Defences at Appendix 2

¹⁹ Roberts G 1834 *ibid* p 75 quoting charter of Charles I of 1634

Lords in favour of the plaintiff in 1834²⁰, who by this time was deceased. Henley won £100 [£11,610] damages from the impoverished Borough, whose costs were claimed to be estimated at £3,000 [£34,900]²¹. Usefully for us, a complete plan and section of the sea walls, with buildings superimposed, was prepared for the case and the Museum has an original.

In 1856 in *Corporation of Lyme v Overton* the arguments arose again as the Borough was still ducking its responsibilities. Another set of Elevations of the Seafront at Lyme Regis was drawn up, and most usefully for us the Museum has an original.

New Sea Walls 1995-2014

From the 1970s there was much discussion about the need for new and strengthened sea defences and, without stabilisation works on the slopes above the walls, the consequences of major landslides. The reorganisation of local government and the water industry in 1974, coupled with increasing Government interest in development and unstable land, awareness-raising research by the Institute of Geological Sciences/British Geological Survey at Lyme, the publication of the Government's Planning Guidance Note 16 *Unstable Land* and the availability of grants all provided spearheads for action. Greater expertise and resources were now available than the Borough could ever have mustered. The new work was divided into phases:

- Phase 1 Combined coast protection and sewage scheme, Cobb Gate to Back Beach, 1993-5
- Phase 2 and 3 Marine Parade, Town Beach and Cobb rockeries and the stabilisation of slopes behind Marine Parade, 2005-7
- Phase 4 Church Cliffs New Sea Wall, 2013-4
- Phase 5 The Cobb, studies under way in 2014-5

Whilst a lot of technical reports and publicity newsletters are available on WDDC's website www.dorsetforyou.gov.uk the Museum holds a lot survey material, including geophysical plots, sea wall plans, landslip analyses etc from the British Geological Survey and WDDC and engineering consultants as well as photographs of the work under way. It also holds copies of historic material on older sea walls, although the record is not complete.

Defensive structures from West to East

These are described in the general direction of the longshore drift, that is, west to east, although the tombolo joining the land to the Cobb North Wall indicates a local east-west cell, created by the Cobb. The structures comprise breakwaters, jetties, groynes, sea walls, and natural and replenished sand and shingle beaches.

Monmouth Beach and the Cement Works Sea Wall (1902)

In 1787 Monmouth Beach was narrow and high water came up to the position of the later Ozone Terrace. On Pickering's map of 1813 (below), shingle was still equal either side of the Cobb, with a bridge to let swash and shingle through the Cobb, although the growth of Monmouth Beach was well underway. In 1857 the Cobb was finally closed to longshore drift by a low parapet wall, later raised, although storms do still allow some shingle to spill over time to time, which has to be shovelled back. By 1987 high water was not even reaching the steps at the start of the High Wall of the Cobb, and today it barely reaches the Gin Shop.

²⁰ *Lyme Regis Corpn. v Henley* All England Law Reports Reprint [HL] p503-8 Copy in LRM 1800-1850 chronological file

²¹ *Anon Henry v The Corporation of Lyme Regis* Handbill dated 30th June 1834 LRM Accession No.2004/45-18



The top of the 1902 Cement Works Sea Wall on Monmouth Beach

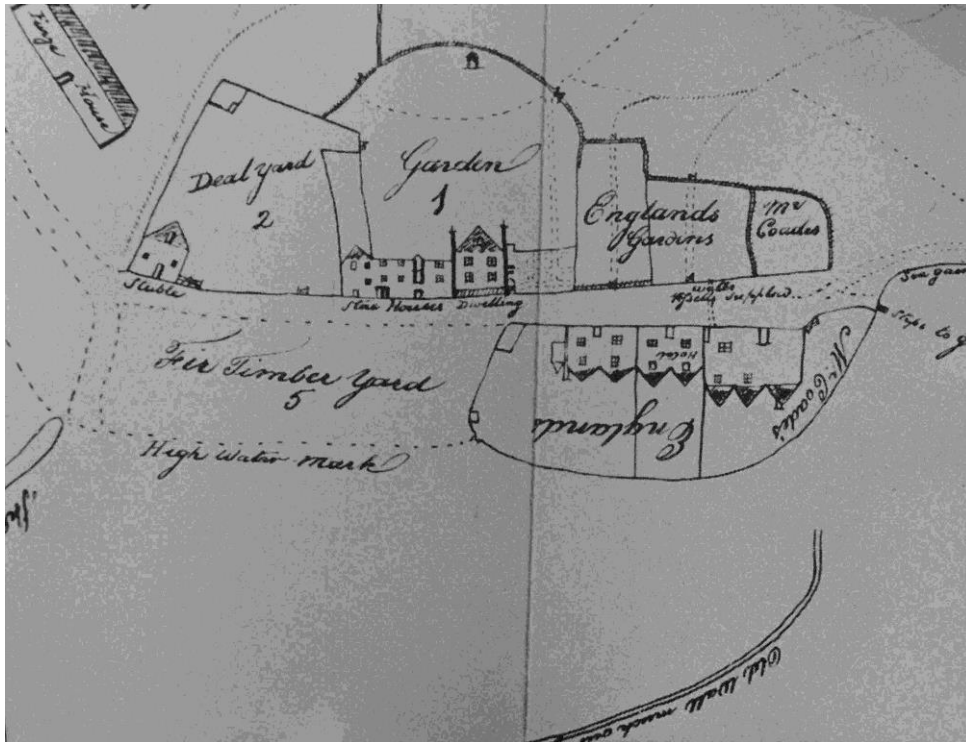
Cobb Breakwater, Piers, Rockeries and Ledges – see Part 1

Coade's Wall, Cobb Hamlet (1787-1796)

Between 1787 and c.1796 Samuel Coade built a wall enclosing a tongue of shingle beach at Cobb Hamlet, on which he built four houses and a hotel²³. This tongue appears on Pickering's 1813 (above), marked *Coade's First Buildings on the Beach*. The western end of Marine Parade, not then so named, marks the base of the old cliff line. The enclosure was done in two stages, with the eastern part last, since a high wall separates the two parts. In the Great Storm of 1824 the eastern part was washed down with its buildings, leaving the western part intact.

In 1824 the eastern most house was Mr Peter Walker's – his long case clock was washed away, recovered and restored to working order and is in the Museum. England's Hotel moved next door into the still houses. Further west the Fir Timber Yard had become two coal yards; these were damaged, but Chard's shipyard beyond said to be destroyed.

²³ Cyril Wanklyn *Lyme Regis: A Retrospect* 1927



Plan of c.1796 showing Coade's development. England's Hotel is in pictogram form, shown upside down. The Fir Timber Yard to the west was enclosed later (see Pickering's map above), but an old retaining/sea wall runs along the back of this area today, separating the Yacht Club from Marine Parade. The area of the timber yard, from west to east, is occupied by the Cobb Arms, Public Toilets, the Sailing Club, with take-away kiosks in front and the Harbour Inn. It is not protected from sea flooding and is classed as Lyme's only maritime flood risk zone.



The Great Storm of 1824 in progress. The waves have already washed away three houses on Coade's Wall. The Cobb was breached and the Cobb Buildings are shown "washed down".
LRM 1938/1



In 1825 England's Hotel looks complete, but only because it removed up the street into the undamaged houses next door, behind a remaining subdivision in Coad's Wall. The collapsed outer wall is marked by the arc of rubble and posts. Repairs seem to be underway to this and to the replacement hotel, but repairs to breached Cobb High Wall may only just be starting (they started on 19th April 1825). Poor John Walker, his house is just a hole in the ground in the centre of the drawing, with just parts of the wall along the lane still standing. Chard's Shipyard must be back in business: the ribs of a ship being built can be seen at the end of Marine Parade.



The rebuilt Coad's Wall in 1940, giving an idea of its full height, with a modern supporting concrete apron in front. The tar-painted wall to the right went down in 1824. The tall house on the right is the replacement for John Walker's house, with two more replacements to its left. The Royal Standard Inn is further to the left. The substantial wall between the Inn and the other houses is marked by a white post. It saved the houses to its left from being lost in 1824. The low jetty of spare stones from was an attempt to sand flow back into the Cobb. LRM Neg 2003/74-03

The rebuilt wall, of rubble Lias and some Cowstone, still exists, enclosing the house which replaced Mr Walker's, now Jane's Takeaway and the Lime Tree Restaurant and two other houses, including the Captain's House. The old wall continues around the back of the replacement England's Hotel, now the Royal Standard Inn, where it is breached by an opening to access the beer garden. The wall returns between the beer garden and the Harbour Inn to Marine Parade.

Quoted from the 1974 Department of the Environment Listing document:

Coade's Wall Grade 2:

Sea defence wall. Circa late C18 or early C19th. Stone rubble, painted with tar. L-shaped on plan with curved corner. Slightly battered revetment, retaining higher ground on landward side and with shingle beach built up and covering lower levels on seaward side. Maximum height of about 6 metres, but only about 2 metres at top is exposed above the shingle.

The area is now protected by the Phase II sea wall built in 2005, which runs outside the old walls and supports the extended Cart Road. Because of the height of sand replenishment, only the coping stones of the new wall are visible. The new wall and the Cart Road covers the concrete apron which supports Coade's Walls, shown in the 1940s image above.

In 1989 the Hydraulics Research Station, modelling for WDDC, proposed a new Cobb wall here to link the North Wall with Coade's Wall. It concluded that the sand tombolo hereabouts indicates a meeting of opposing longshore drifts at this point, resulting in siltation of the harbour. The proposed wall would stop the westward drift of sand into the Cobb, allowing Main Beach to hold any replenishment. WDDC consulted the public, but the scheme also involved boulder piles on Main Beach, attracting a lot of criticism as a result, through which it failed. Instead, in 2005-7 the North Wall boulder pile was moved to point eastwards to increase scour, so that when the beach was replenished the sand would not drift westwards, but the tombolo remained. In recent years it has been necessary to move sand annually during early March spring lows from the Cobb. In past, until the supply of shingle stopped, the tombolo was a shingle spit.

Main Beach - Marine Parade Walls, The Walk, Shingle, Groynes, Jetties and holding back the Langmoor-Lister Gardens

The story of this area is difficult to tell because its sea defences are intimately bound up with stabilising the slippery slopes above: whilst it is possible to build sea walls and retaining buttresses, they are of little use if the slope above continues to slide over the top, surcharging any structures designed to add toe weight or strength to the lower part of the slope. Works at several levels make the story more complicated. I will tell it by partly by chronology and partly by feature protected.

The Cart Track and Road

A word first about the Cart Road to avoid confusion. In 1816 there was no Cart Road, carts to the Cobb simply trundled along the beach, descending below high tide level at a ramp at Cobb Gate. This is still under the beach shingle and was exposed by a storm in the mid-1950s. It consists of cobbled pitching held in place by transverse oak ribs. Later the Cart Road was built on a low sea wall as far as De La Beche's Jetty, later still taken over the Jetty on an extended wall as far as a ramp well short of Coade's Wall. Since 2005 it has been a complete through route from Cobb Gate to the bottom of Cobb Square, below and parallel to Marine Parade, albeit only open to cars at the eastern end. **This means that there are now two sets of walls, the Cart Road Sea Wall below and the Marine Parade Wall above.** The latter was only a true sea wall at its western end, and now, not at all.

Thomas Hollis' Walk (from 1772) (now part of Marine Parade)

The eastern part of The Walk was first created by Thomas Hollis²⁴ in 1772 as an amenity linking Cobb Gate to the West or Stone²⁵ Fort, some 100 yards to the west, which still had 5 cannon in 1723. The fort was located in front of Molly's lock-up tea bar west of The Alcove, projecting forward onto the beach where the Cart Road now runs. Buying the fort, he lowered it and provided it with a gate and steps into it and to the beach²⁶. In the style of the libertarian which Hollis was the area of then undeveloped hill slope behind the present tea bar was marked as Liberty Square on a 1796 sketch map, but nothing seems to have been done to justify the name. He built a wider, rectangular stone-walled enclosure just beyond the fort as a termination for his walk, which would lie under the Cart Road in front of Madeira Cottages. It is possible that this may have started out as another fort - authorities sometimes refer vaguely to two forts, but the second one may have been east of the River Lim at Gun Cliff. His path was narrow past the seaward side of the Bell Cliff Wall, as he was anxious not to hinder the passage of carts on the beach by reclaiming too much. It was separated from the cart ramp by a low wall.

This short Walk was a replacement for the one along the River Lim behind the Pilot Boat Inn and a longer one around Church Cliffs, which was going over the cliff at the time. It was meant for members of polite society in their finery, who would parade up and down, but who did not want to venture onto the slipping mud further west. The 1856 *Section and Plan*, used in a legal case on wall repair (see later), labelled this wall *Subscription Walls*, so maybe Hollis raised additional money from the public for its construction - or to secure its maintenance after he died in 1774.

The Walk was supported by an irregular, low sea wall linking his amenity enclosure to the lowered fort and from there to Cobb Gate. The beach level then was relatively high, as it is now. Although his sea wall provided virtually no protection from the sea, one by one buildings appeared at the foot of the gardens of houses in Broad Street, narrowing The Walk. Maybe first, around 1771-3, was The Alcove, a glazed shelter for polite socialising and dancing below Bell Cliff House, just across from the Assembly Rooms, which effectively replaced it in 1775. It was a lean-to built at the return of the Bell Cliff wall, which towered above. The Bell Cliff Wall is a massive early sea and retaining wall and may date from 1600 or before. Alcove Cottage, just beyond The Alcove, was built by the 1820s, but not apparently by the date of 1815 oil painting of the Assembly Rooms which hangs in the Museum. The Alcove shelter was replaced by the narrow building known as The Boathouse; the return of the Bell Cliff wall can be seen through at least one of its easternmost windows, the wall passing behind Alcove Cottage. The thatched group known as Madeira Cottage appeared in 1815-18, opposite the lowered Fort. The plots from Little Madeira (1934-5) to Alcove Cottage were filed up later.

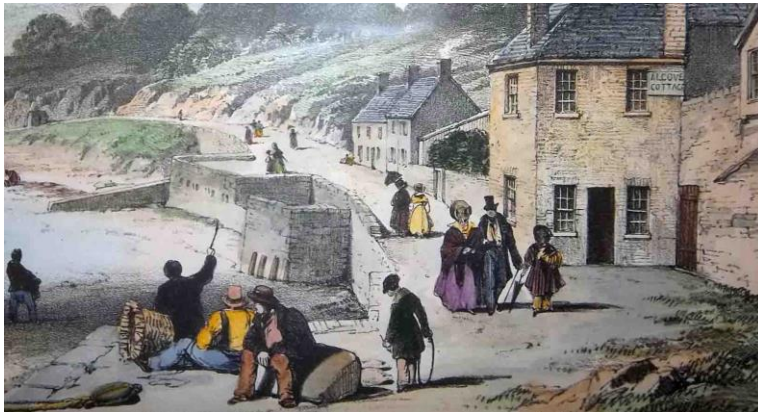
The protection which Hollis' low wall and narrow walk provided for development behind must have been meagre during storms - development in front of the Bell Cliff sea wall seems foolish. At that time shingle was still getting past the Cobb, so shingle protected Hollis' sea wall to an extent. Cobb Gate Jetty curved around to the west before 1838, but it provided little protection for The Alcove. At this time the Southern Arm of the Cobb was much diminished - 200ft was lost in 1736 and not replaced in full until 2005 and then as an armour stone rockery. Security of shelter may have seemed assured after the Board of Ordnance's 1746 repair of the remaining length of the Cobb, but this was lost in 1762, replaced, lost again and not stabilised until 1795. In 1817 the High Wall of the Cobb was breached and not fully repaired until 1826, allowing the Great Storm of 1824 through to wreak havoc from the West Fort to Gun Cliff. That these houses must have

²⁴ Thomas Hollis (1720-1774) was a philosopher, reformer, landowner, libertarian and benefactor of Harvard University and Lyme Regis, who lodged at the Three Cups. He spent part of his fortune on improvements in Lyme to develop tourism, including the Assembly Rooms, The Alcove and The Walk.

²⁵ As it was called in 1660, according to Roberts Album No.1 in the Museum. It was built in 1627

²⁶ Wanklyn, *C Lyme Leaflets* p.122

been damaged in that storm is almost certain, but wave-thrown shingle would have damaged un-boarded windows on a regular basis besides.



The Walk/Marine Parade from Cobb Gate in the 1840s (top), around 1910 (middle) and in 2015 (bottom).

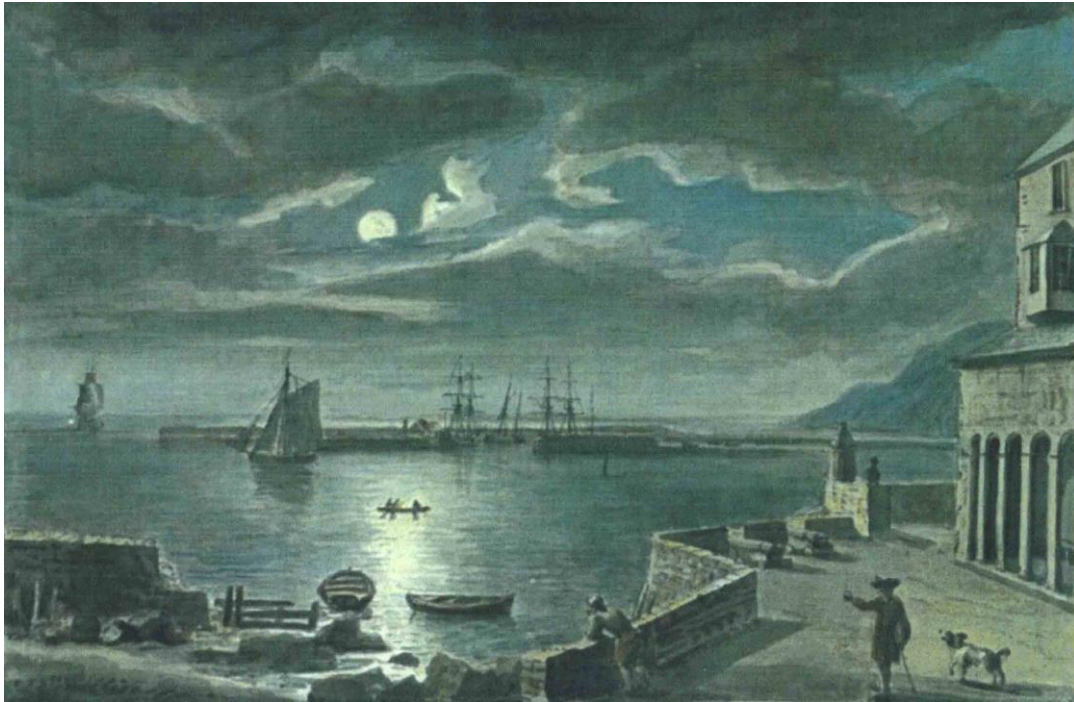


In the 1840s engraving people in finery are parading on Hollis' 1771 Walk, while Dorset folk look on from the cart ramp to the beach. Hollis' sea wall joins Cobb Gate with the cut-down West Fort and the walled area further on. Here the further structure looks more like a fort and the nearer structure a lime kiln. A gravelled path crosses the slippery slope beyond to join Coad's Wall in the distance, off frame on the left. Alcove Cottage is on the right, and beyond, Madeira Cottages.



The c. 1910 postcard shows the 1862-3 replacement for Hollis' sea wall, the forts or kilns cleared and the formalised Cart Road on its own sea wall. Concrete buttresses hold the slippery slopes. The shingle level is still high. Alcove Cottage has been extended and given a Regency feel, although the original vernacular was Regency in date!

In the modern image Marine Parade is still narrow, the shingle has been replenished and shelters replace the slippery slopes.



The Start of Hollis' Walk at Cobb Gate, by CW Bampfylde 1784. A rather Italianate scene, but less confusing than other Lyme watercolours by this artist. It shows the separation of The Walk by a wall from the cart ramp to the beach and the end of Cobb Gate Wall obscuring the jetty behind it. The Alcove shelter stands on the right against Bell Cliff Wall, with Bell Cliff House above. The canon and stone lantern are nice features, but may not have existed.

The Subscription Walls – Cobb Hamlet to The Walk, 1811

Beyond Hollis' amenity enclosure there was no path until the short-lived Subscription Walls and Walk to Cobb Hamlet were built in 1811. To achieve this aim a subscription was raised by Captain Moriarty to extend Hollis' Walk to Cobb Hamlet, where it would link with the other end of what is now called Marine Parade. The end-on junction of the walls would be near De la Beche's Jetty (see later), which lies under the replenished beach by the present Sundial House. The objects were to provide a longer easy walk for finely-dressed members of Lyme society, to save Lyme from the sea and possibly to enable development, since the slopes, now the public gardens, were already showing signs of slipping.

However, as no work was done to drain or retain these slopes at the time, complete stability was not achieved until 2007. Despite this slippery ground, the Lyme Regis Improvement Act of 1845 authorised a road from Broad Street to Cobb Road for the construction of villas. Needless to say, this road was never attempted.

To complete the subscription this advertisement appeared in the Sherborne Mercury on 6th November 1809, headed *Lyme Regis and Cobb Subscription Walls and Walk*:

The sliding of the cliffs, and the inroads made by the sea between Lyme Regis and the Cobb, the damage it has done, and would do to the town, unless measures were adopted to prevent it, has induced part of the inhabitants to propose to the town and neighbourhood as well as the nobility, gentry, &c. who occasionally visit the place, and the public in general to enter into a subscription for building a wall for the purpose, of sufficient strength, to make and preserve to the inhabitants and its numerous visitors a walk between the two places.

The proposals have been so warmly accepted by the inhabitants, and promise such future and permanent advantage to them, as well as to the visitors to the place, that the following subscriptions have been entered into, and more than half the wall already completed.

*The whole expense of building the said wall from the town to the Cobb, along the shore, from **ten to twelve feet high**, and from **six to four feet thick**, and **about 1300 feet long**, is estimated to be about £2,000 [£144,286 in 2014 prices], leaving a deficiency of about £450 [£32,465], which it is hoped will be raised without difficulty, when the advantages arising from such an undertaking are duly appreciated, involving and promoting as they do the interests of the landowners and tradesmen, and conducing at the same time to the convenience and pleasure of its visitors. A book is now open at the bank of W Burridge, Sons and Drayton to receive the names of all those who feel desirous of promoting so considerable an object for the public welfare which, when completed, will be found equal, if not superior to, the Esplanade at Weymouth, or any other watering place in England.*

£1,550 14s 6d [£118,822] had already been pledged by the date of the advertisement, with three sums of £100 [£7,214] each, from the Earl of Westmoreland, the Borough, H H Henley and General Powell, £50 [£3,607] from Lady Poulett (the major landowners concerned) and two sums of £200 [£14,428] from Robert Clarke and Burridge and Drayton (bankers and businessmen involved at Cobb Hamlet). The wall and walk were built in 1811, £2,500 [£175,348 in 2014] having been raised.

The Subscription Walls breached (1811-1813)

By 1811-3 parts of the Subscription Walls had been destroyed. Pickering's map of 1813 shows the new wall fretted with incursions by the sea in five places, severing the walk. It is marked *new wall and walk partly destroyed by the tides*. With hindsight George Roberts²⁷ complained that the walk was only a little above the beach, retained by only a small wall.

After the Subscription Wall breached, a new gravelled walk was provided at a higher level joining The Walk from Cobb Gate at De la Beche's Jetty. This became the alignment of the current Marine Parade, and the subscription sea wall was rebuilt to support the lower, western end of this new walk about 1816, although at the time no sea wall was built to retain the higher, central part, and nothing was done to retain the slope above.

The Walk extended (1826)

In 1826 the sea wall and The Walk were extended to De la Beche's Jetty, the opening coincided with the completion of repairs to the Cobb²⁸. Two houses were built west of the Madeira Cottages, Argyle House in 1832 (deeds seen by John Fowles), which offered public baths, and Library Cottage, built in the 1839 (deeds also seen by John Fowles), which housed the Marine Circulating Library.

There was an inconclusive discussion about repairs to The Walk after Lyme Regis Vestry (the council for the parish, not the Borough) proposed in 1850 that the path should be a public highway, but decided to request Borough to share half the cost of repairs, £75 [£9,017]. The Borough declined to consider until it was known if it was public highway. No action was taken and winter storms created a breach. In March the Vestry directed the waywardens to repair the breach so that people could get past. Without a budget, it was decided to raise a public subscription to avoid costly litigation between the two authorities²⁹. In the following winter storms broke up the beach cart track from Cobb

²⁷ Roberts *ibid* 1834 p 173

²⁸ Cyril Wanklyn *Lyme Retrospect* 1927

²⁹ Ted Street *Marine Parade Lyme Regis: Deliberation and Destruction 1850/1* Pamphlet no date LRM 1999/8-3

Gate³⁰, leading to a need to provide a better solution. This did not come until in 1859, when the cart track was formalised as the Cart Road (see below).

The Walk rebuilt (1862-3), gradually becoming known as Marine Parade

In 1862-3, the wall supporting The Walk was rebuilt, which involved demolition or burial of the remains of the West Fort, the amenity enclosure and the old, irregular wall itself. It was replaced by the smoothly curved wall of today, which follows the gentle curve of the Bay, but still leaves Marine Parade as a narrow path past The Alcove. This wall was built of rubble Lias. It is now patched and deeply weathered, coped with cement in poor imitation of Portland Roach, but has lengths of better quality work, which might be original or repairs. It still carries its original wrought-iron railings, the decorated posts of which can be seen in early 20th Century postcards

Development followed the new wall westwards, with Sundial House in 1901 and finally the Bay Hotel in 1924. Inherent slope instability thwarted further private development west of the Bay Hotel until the Bay Hotel Annexe was built in the 1960s, rebuilt as Largigi House in 2010.



Marine Parade and the Cart Road about 1880 – the Cart Road ramp is in place, with walls above and below, but Marine Parade above is still an unfenced, gravelled path breaking away at the edge, with muddy slopes above. Sometime later this wall was raised in concrete, retaining Marine Parade more effectively. The Cart Road is supported by its own sea wall throughout, and Marine Parade is supported by a retaining wall, which becomes a sea wall at this point and joins Coades Wall behind the camera. Development has reached as far as Library Cottage. De la Beche's Jetty is clear, but all that remains of the jetty in the foreground is just three of its piles. LRM Photo Box 36

³⁰ Cyril Wanklyn *Lyme Regis: A Retrospect* 1927 p233



A somewhat foreshortened view of The Walk and Cobb Gate in the 1880s, with the Assembly Rooms on Cobb Gate Quay. The Jetty is behind the sailing dingy. The Cart Road is formalised, protected by a low sea wall, and new walls support The Walk, although breached in the foreground outside Library Cottage. The shingle level is still high.

The Cart Road Sea Wall (from 1859)

In 1859 the cart track on the beach was formalised as a Cart Road from Cobb Gate almost as far as De la Beche's Jetty³¹. It was built below The Walk and raised from the beach by sea wall. Carts still had to negotiate a ramp to the beach and veer around the Jetty at low tide and continue to the Cobb on the beach. Later the Cart Road and supporting wall were raised and extended over De la Beche's Jetty to ramp down to the beach some way short of the start of Coad's Wall, whilst at the Jetty another ramp went up from the Cart Road to Marine Parade/The Walk, as it does now.

In 1974 a breach occurred which led to new sea walls from Cobb Gate to Coad's Wall. The breach took place outside No.9 Marine Parade, the western most cottage of the Madeira Cottage terrace and saw the loss of the Cart Road sea wall, the Cart Road and the Marine Parade wall above. An image in the LRM collection shows the wall which held up the Cart Road to have been made of sea-worn Lias ashlar masonry with Portland coping blocks. This is in the area of Hollis' amenity area and ought to have exposed its foundations, but no archaeological survey was undertaken. The replacement Cart Road wall of 1978-9 is mass concrete, stone faced below, uniform with the whole length along the road, but currently only the concrete wave-return coping can be seen. The replacement Marine Parade wall is described in a section below.

³¹ Cyril Wanklyn *Lyme Regis: A Retrospect* 1927 p133



Marine Parade and Cart Road about 1910, showing the ramp to the beach which was replaced in 2005-7. Marine Parade is now railed and surfaced. This section of the Marine Parade wall collapsed in 1939. Concrete buttresses built in 1903 are holding the slope above Marine Parade. De La Beche's Jetty is visible, with the Cart Road going over its head. Development has reached Sundial House, but the Bay Hotel is yet to be built and the Assembly Rooms are still intact. LRM 1989/11-23



Marine Parade and the Cart Road late 1950s. Substantially the same as the picture above, but for the repair of the 1939 collapse and the Corporation Shelter and toilet blocks in place on Marine Parade. The open shelters were not built until 1960. Notice that the beach level remains low. LRM Postcard Collection

Lucy's or De La Beche's Jetty (1820)

This jetty was built in 1820 to the design of, and with a subscription raised by, Lyme geologist Sir Henry De la Beche. The idea was to raise the beach level and thereby protect the sea walls from undercutting and allow the waves to dissipate their energy on the accumulated shingle, rather than on the wall. The alternative name of Lucy's Jetty comes from nearby Lucy's Ledge. Lucy was the daughter of Town Clerk Henry Waring who had named his yacht after his daughter before it struck the ledge. De la Beche's plan, preserved in his journals³², shows a substantial wall of Blue Lias ashlar at right angles to the sea wall, capped by large blocks of Portland Roach bound by oak dovetails, sloping seawards with the Roach blocks turned down below beach level at the termination so that the end the full force of the waves would have less effect. At the landward end the jetty splayed out to meet the sea wall, but raising the Cart Road over the jetty buried these curves.



De la Beche's or Lucy's Jetty in the late 1970s. It still lies directly opposite Sundial House under the replenished shingle beach, by the steps, of which the top one or two are exposed. The Jetty will reappear if beach levels are allowed to fall. The original jetty was short, as can be seen above, although the head is buried under the Cart Road. It is built of Lias blocks capped with Portland Roach blocks, curving down at the seaward end and splayed out at the head. It was short because carts had to go around the tip before the Cart Road was raised over it. When the Cart Road was built, carts no longer had to go around the Jetty, so it was lengthened in Portland Roach ashlar blocks, as seen here in a worn state.

Soon after it was built the jetty was damaged by a storm, with keyed blocks torn off the top and Lias torn out from below, as shown by George Roberts in a notebook sketch³³. It was also a subject of controversy and false accusations. Joseph England, who owned Argyle House and Library Cottage (grey and pink houses in the photo above) was

³² McCartney & Sharpe, Correspondence of Sir H T de la Beche, National Museum of Wales, Cardiff 1998

³³ George Roberts MS Notebook in LRM

incorrectly accused by Captain Moriarty³⁴ of having the structure destroyed by men with crowbars during the night in order to let the shingle through to protect his property. Controversy arose again in 1840 after further damage, it being suggested that the end should be removed to let the beach around, but the jetty was lengthened. It was damaged in 1927 but endured until restored in 1978-9³⁵, when other, wooden groynes were built on Main Beach.

Kevin's Jetty 2005-7

In 2005 a new sea wall was built from the Cart Road ramp to Cobb Hamlet, running outside Coade's Wall, supporting an extended Cart Road. From this wall springs a new jetty, known by some as Kevin's Jetty after Kevin Wyle, a worker on the sea defences who was unfortunately killed in a motorcycle accident on his way home the night before the first part of an 18ft ichthyosaur was found in the foundations: the fossil is also known as Kevin and hangs in the Museum³⁶. The words *This stone is laid in Memory of Kevin Wyle 1980-2005* are inscribed on a coping stone on the sea wall at the head of the jetty.



Kevin's Jetty being built on 27th April 2006. The new sea wall in the foreground and sand and shingle delivery ship is in the distance. Kevin's Jetty will hold back the sand to be delivered to the right from mixing with the shingle to be delivered to the left.

The jetty is built of very precisely cut grey dolerite granite blocks slotted on to stainless steel dowel and coped with massive pale buff granite coping stones. It slopes down the beach in steps and contains a drainage pipe which takes seepage from the drained gardens above Marine Parade. There always was a spring coming to the beach in this

³⁴ Moriarty promoted the subscription for the construction of the 1811 Subscription Walls and maybe this jetty as well.

³⁵ A F Chapman 1982 *Some history of the Cobb Structures and Sea Walls at Lyme Regis* Appendix to an unpublished report to the Borough of Lyme Regis LRM 1984/215.

³⁶ Paddy Howe *The Black Ven Ichthyosaur and the Ichthyosaur known as "Kevin"* History of Lyme in Museum Objects 2013 on www.lymeregismuseum.co.uk accessed April 2015

area, the water which was most likely the cause of all the instability in the slope above on the Shales-with-Beef and Black Ven Marls.

Other Jetties on Main Beach (early 19th century)

Other jetties appear on old maps and engravings between Cobb Gate Jetty and De la Beche's, and two more appear to the west of it. Not all maps show all the jetties. Their remains can be seen on early photographs, often used as mooring posts, but all have disappeared. These are not to be confused with the groynes installed in 1978-9.

Marine Parade Wall (from the 1820s)

Soon after the failure of the Subscription Walls in 1811-1813 a reasonably sustainable sea wall was rebuilt at the western end of Marine Parade in about 1816, linking to Coad's Wall. The seeming security it provided, together with a small retaining wall above the Marine Parade, allowed the development of a house called Wings, cut into the slope sometime between 1813 and 1825. No attempt was made until 1862-3 to complete the wall around the bottom of the central slippery section of Marine Parade to link up with Hollis's sea wall. Even the linking section, when built, failed or was overtopped by landslides at several places over the years, and the Parade remained a path from which mud had to be cleared periodically.

Cox & Davies 1854 Chart shows that lack of any wall to support Marine Parade in its central section, but it may have been the severe gale of 8th October 1857 that forced change. The like of the trail of damage it left had not been since that of the Great Storm of 1824. Six vessels were torn from their moorings, four of which were stranded on the beach under Marine Parade and wrecked³⁷. In 1862-3 a continuous wall was built to support Marine Parade right through to Cobb Gate, above the Cart Road. This was raised from the beach to run on its own sea wall, but only as far west as the modern position of Kevin's Jetty, where it was ramped down to the beach. The wall that supported Marine Parade is not built high enough to support the soil that accumulated on the Parade, nor was there any fencing or railings at the edge. Nevertheless, at its western end the apparent security created enabled of one more house, to be built, Cobb Cliff, between 1903 and 1925. In the end, Cobb Cliff and Wings, and the two houses west of it, all succumbed to landslips and/or ground pressure and had to be demolished.

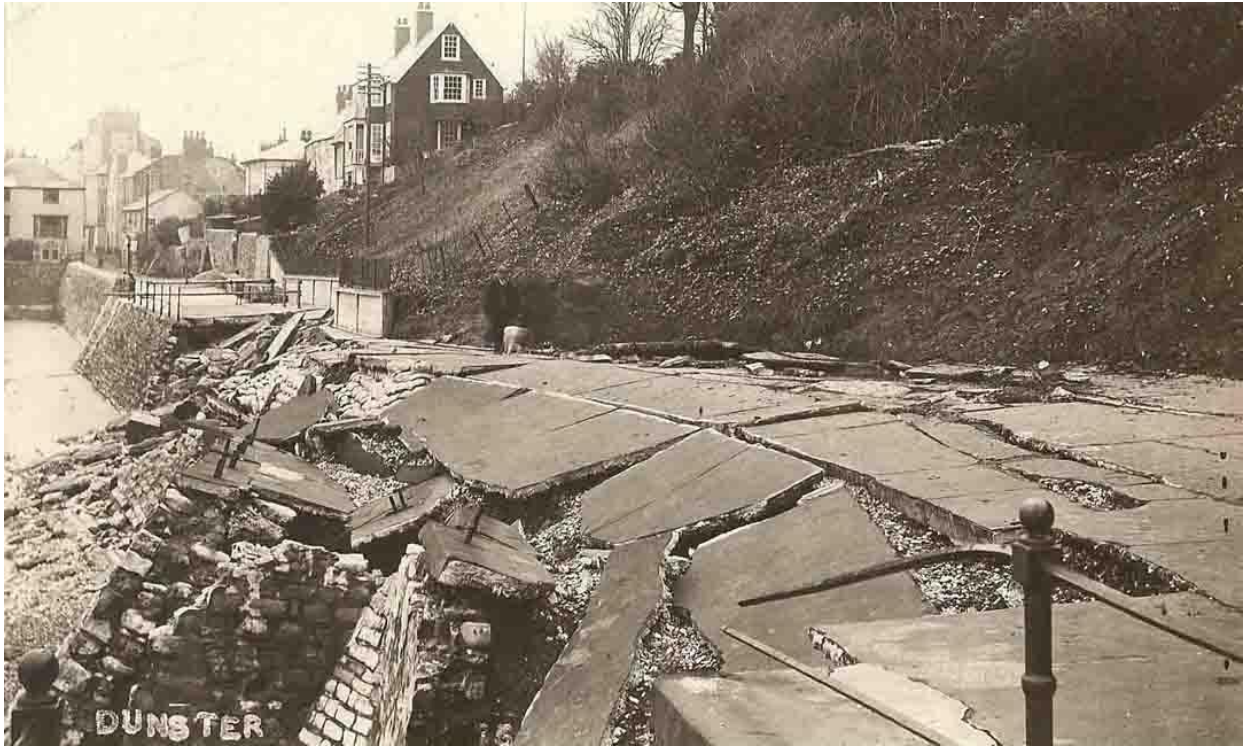
The 1862-3 wall also succumbed to ground pressure from the weight of material above Marine Parade pushing it forward. By November 1925 200ft towards the western end of collapsed forward in a storm, caused by failure of the facing, leading to rapid washing-out of the fill behind. A month later, the cliff above fell, pushing the dwarf wall retaining wall above Marine Parade 15ft forward, part blocking the path. On December 5th 1926 another part of this sea wall and a section of Marine Parade collapsed. The wall rotated backwards after its foundation had been undermined by storm waves. At first concrete blocks were tipped as a temporary toe weight and repair (see lower photo on the next page).

The sea wall was rebuilt in 1927-8³⁸ as a stone-faced slightly backwards sloping mass concrete wall. It was 7ft thick at the base, tapering to the top and built on a foundation tied back to a firm footing set into limestone beds of the Blue Lias beneath it, below the level of the slippery Shales-with-Beef. There wall had no wave-return curve at the top. Two new flights of steps, one was distinctively semi-circular in shape, which locates the repair on postcards. The slope above was secured by mass concrete units³⁹.

³⁷ Pulmans Weekly News Monday October 13, 1857

³⁸ Three drawings of the proposed repair by Gower Pimm, Chartered Civil Engineer, Bristol, dated July 1927 in LRM Collection.

³⁹ Frederick Henry Clark *The Survey and Reconstruction of the Lyme Regis Sea Defences* Inst Civil Eng Selected Engineering Papers no. 177, 1935



The 1925 collapse of the Marine Parade wall looking west. The wall was been undermined and fell backwards as material washed out from behind. Subsequent relief of toe weighting has allowed the slope on the right to push forward. Cobb Cliff is the prominent balconied house, now vanished.



Partial Repair of the 1925 breach by tipping concrete blocks in 1926.

A further section of the sea wall collapsed onto the Cart Road ramp, without stress of weather, in June 1939. There was no warning. Some of the concrete units used to buttress the slope above Marine Parade in 1926 gave way and ended up resting on the Cart Road ramp. After repair, the new wall stood firm when the 1962 Cliff House landslip went over the top of it and piled up on the beach.

Further damage occurred during the 1974 storm, resulting in total revamp of the defences. But for the 1862-3 wall between Cobb Gate and Sundial House, which still supports that section of Marine Parade, the present stone-faced re-enforced concrete walls, built in 1978-9⁴⁰ still run the entire length of Marine Parade and the Cart Road. They encase the older walls, and are mostly faced with cream randomly-laid Purbeck Stone, but the western end, where Marine Parade ramps down, the walls are with faced with grey granite in random pattern, with obvious drill marks. The change from Purbeck to Granite facing is some 87 yards east of the base of the ramp. This granite wall lowers westwards and continues as a low wall to link with Coadé's Wall, with gaps cut in 2005. At its maximum it stands 20ft above the Cart Road sea wall, but owing to beach replenishment in 2005, only the top concrete wave-return coping of the Cart Road wall beneath remains visible today.



The Marine Parade and the Cart Road ramp in 1939 showing the collapse of wall. The wall of the Cart Road ramp was made of Lias blocks. Above Marine Parade the shelters are still incomplete, with chalets sitting in the butress alcoves. The large concrete block in the foreground is one of the buttress units from 1926 used to support the slope – clearly less succesful than the buttresses used to the east.

⁴⁰ Evidence can be found in the Marine Parade photo box in LRM and in Chapman



Marine Parade – the new Cart Road (far right) and Marine Parade walls being built in 1978-9. Note the two sets of shelters with the linking footbridge, and landslip resting on the roofs of the shelters to the right. The western shelters are fairly new in this picture.



Marine Parade and the Cart Road Ramp in late 2005/early 2006 looking east. The 1978-9 walls supporting Marine Parade, the Cart Road and its ramp are in evidence. Foundations are being dug for a new Cart Road Wall in the foreground to join up with that beyond the barricade. The beach level is low, despite some replenishment and groynes, but soon a new beach will be delivered. Close study reveals De La Beche's Jetty. In the distance a Norwegian barge stands off Cobb Gate Jetty with Larvikite boulders for the armour stone rockery at Cobb Gate. The central shelters are in place, shortly to be re-vamped.



Marine Parade and the Cart Road, looking the other way (west) on 2 April 2006. The Cart Road ramp is buried, with the new Cart Road wall, of pre-cast blocks, taking shape. The western shelters, dating from the recovery after the 1962 Cliff House slip, are prominent.

Main Beach Replenishment and Protection (1987-2007)

The key to protecting the Cart Road and Marine Parade sea walls is a high shingle beach, but this is at odds with tourist demand for a sandy beach. Retaining the shingle by jetty construction was an old trick, pre-dating even the attention of geologist Sir Henry De la Beche in the 1820s. Retaining sand is more difficult, but after the Cobb Causeway closure Main Beach became depleted of shingle and sand, so much so that the sea walls stood ever higher out of the shingle, allowing waves to hit the structures directly, rather than spend their energy moving shingle around, and opening up their foundations to wave action.

The 1987-9 sea walls were therefore augmented by replenishing the beach with 15,000 tonnes of shingle and the installation of wooden groynes to hold it in place. These were installed between Cobb Gate and the Cart Road ramp. A further 6,500 tonnes of shingle came from Monmouth Beach in the 1990s. The groynes were considered unsightly by the Town Council, but remain buried under the 2005-7 replenishment. It is now difficult to remember how they cut up the beach into cells, each of which required access steps from the Cart Road. But two problems remained: the beach shrank further and sand was silting up the Cobb.

In 1989 the Hydraulics Research Station constructed a scale model at Wallingford of the coastal cell between the Cobb outer breakwater and the Eastern Jetty to help understand sediment dynamics. The specific brief from WDDC was *to investigate encroachment of sand into the harbour and the loss of material from eastern town beaches, and to advise on changes to the [Cobb] slipway or a new slipway*. This was in the days before

computer modelling when actual models were built in a large shallow tank of water with a wave machine that could direct waves of scale height at the required frequency and direction towards a model harbour, jetty, wall or groyne structures. Modelled beaches were made of clean materials ground to scale, such as anthracite. Boulders, shingle and coarse sand could be scale-modelled, but silt and mud was clearly impossible. The whole model was several metres across and complex equations governed the understanding of those properties which could not be scaled down, mainly the viscosity of sea water and the effect of wind driving breaking waves forward and transporting dry sand grains.

The report⁴¹ proposed:

- a new Cobb wall to link the North Wall to Coade's Wall behind the Royal Standard Inn to stop sand migrating into the Cobb on the local westward longshore drift cell which the harbour creates,
- Three armour stone breakwater bars off Main Beach, and
- Training walls to the Lim outfall at the Buddle and at the Eastern Jetty.
- It also reported on an armour stone rockery extension to the Southern Arm which would have curved around in an arc to enclose The Pool, to provide an additional harbour for marina pontoons.

WDDC consulted on the report's findings, which created a furore in the town, mainly at the thought of ugly boulder mounds off Main Beach, principally required to protect the shoreline so that a large sewage storage tank and headworks could be built off Gun Cliff. An action group, COBB, Committee Opposing the Breakwaters, sought an alternative proposal from Wallingford on the hydraulics of removing all or part of the Cobb low parapet wall to let shingle through. The hydraulic model of the Cobb and Main Beach had been destroyed by this time. Only a desk exercise, informed by a grain-size distribution study of Monmouth Beach, could be done at reasonable cost, £8,000 [£17,778]⁴², but was not pursued because a Forum was set up to bring all the parties together, including South West Water. Breakwater bars were rejected. SWW and WDDC worked on a comprehensive joint sewerage and sea defence scheme for Cobb Gate, Gun Cliff and Back Beach to the Eastern Jetty. This became WDDC's Phase 1 Environmental Improvements and part of SWW's Clean Sweep Campaign (see later).

Another scheme was developed to deal with the issues of Main Beach and Marine Parade, but this had to include dealing with issues above Marine Parade as well as below, taking into account work by the British Geological Survey (BGS), as well as Hydraulics Research. BGS (formerly GSM, then IGS) had an interest in Lyme stemming from three factors: the resurvey of the Lyme Regis and Sidmouth 1:50,000 sheet 326/340 (originally mapped by Sir Henry de la Beche) between 1987-2000 (R Gallois and others), its engineering geology interest in the mechanisms of land slipping affecting the town and Black Ven as wider exemplars for national planning guidance (B Conway) and its offshore geological mapping and sea-bed resources programmes (C D R Evans). The WDDC engineers worked closely with BGS geologists in identifying the issues causing the slippages in the gardens above Marine Parade and around the town in general, as well as providing a full understand of the individual rock units and their distribution, slip planes, local faulting, folding and the detailed dip and strike of the rock, which in shallow dipping rocks can produce complex outcrop positions and affect springs and seepages. These springs and seepages serve to lubricate latent slides or turn hitherto apparently stable to liquid mud or running sand. The Museum holds many of the various BGS and WDDC plans and some reports, but listing them here would take up too much space. Some can

⁴¹ Hydraulics Research Report EX1823 *Lyme Regis Harbour: A random wave physical model investigation: A report to West Dorset District Council* Wallingford April 1989 LRM Cobb Files

⁴² Hydraulics Research *Lyme Regis, Dorset: Studies for an alternative coast protection scheme to investigate the effect of the 1954 raising of the Cobb breakwater, a proposal for the Campaign Opposing the Breakwaters* Wallingford July 1989. LRM Cobb Files

be found on the WDDC web site, www.dorsetforyou.co.uk , as well as all the consultation documents and publicity leaflets.

The scheme, which was implemented as Phase 2-3 of the Lyme Regis Environmental Improvements involved:

- extending the Southern Arm of the Cobb to the length it had been in the 17th Century, then unsustainably, to reduce wave action on Main Beach, using 36,000 tonnes of rock armour,
- to move the North Wall rockery to help scour the Cobb of silt (rather than build a new wall),
- to build 110 metres of new jetties (Cobb Gate and Kevin's) to hold a massive replenishment of the beach,
- to extend the Cart Road on a new sea wall to Cobb Hamlet, and
- to pile, rock nail and grout all areas which could be accessed, from Marine Parade up through the gardens and in every yard and alley up and across Cobb Road and to pile and support Cobb Road itself.

To Main Beach were added 40,000 tonnes of sand dredged from off the French coast and 60,000 tonnes of shingle from off the Isle of Wight. These loads were delivered by flat-bottomed ship directly to the beach from a dredge ship offshore. Rockery stone came direct from Larvik Quarries, near Oslo, in two enormous barge loads. Kevin's Jetty holds the high-tide sand from moving east onto the more exposed stretch of shingle and Cobb Gate Jetty holds the shingle from moving east into the rockeries around the Buddle.

The effect of the scheme was to raise the beach level by several metres, burying much of the new and old walls and groynes. The sea quickly sorted the material, beach level settling almost up to the top of the Cart Road sea wall. Despite protests from disabled drivers who park on the Cart Road, the sea shaped the new shingle into a ridge which forms during each storm and serves as the principal wave defence for the Marine Parade area. Annually this is flattened by excavators as the base for marquees for summer festivals, events that could not be held before for lack of space. Others lamented the wide expanse of shingle created, but the sea arranged it into a naturally shelving profile, above low-tide sand. Separately a new, wide slipway was commissioned at the Cobb, concreting over the shingle beach that had functioned before.



Where do you want your new beach sir? Is here OK? French sand being delivered on 22nd April 2006 direct by MS *Ville* (owner: Sillanpää Shipping Co of Finland, dimensions: 49.65m LOA, Beam 9.8m, Draught 2.2m, 495 GRT, Load 500 tons, Speed 7kts), tripped from a larger suction dredge-ship offshore by MS *Ville* and an identical sister ship.

Retaining the slopes above Marine Parade

The story of the slopes that now form the public gardens above Marine Parade, Lister Gardens to the west of Kevin's Jetty and Langmoor Gardens to the east, is a long one of public good triumphing over unstable geology and private greed. The 1903 25" Ordnance Survey Map shows three obvious arc-shaped wooded cliff-like slopes below the houses that line Pound Street. Apparently stable terraces of previously land slipped material had formed in these arcs, but all 19th century images show muddy slopes below the eastern terrace under Poulett House (now the Alexandra Hotel) down to Marine Parade. Effectively these structures were dormant, fossil landslips waiting to be reactivated. Maybe digging for the Subscription Walls in 1811 or the cutting of Marine Parade from 1813 had been the catalyst. With lower elevation to the east, the seaward end of Broad Street was more stable, propped up by the Bell Cliff Wall. Development occurred successfully along the eastern part of Marine Parade from 1772. To the west development occurred in Cobb Hamlet with relative success.



The Langmoor-Lister Gardens area on the 1903 OS Map, with three fossil landslip scars shown by the hachures, the central one around Cliff House, here called Cliff Cottage. Buttresses along Marine Parade were installed soon after the survey of this map - whilst they were quickly overwhelmed with mud, they held fast. It looks stable on the map, but only until toe weight is removed, heavy rains occur or drains fail. In the event, all happened in 1926 and 1962. De la Beche's Jetty can be seen, and Sundial House and Wings mark the limits of development along Marine Parade in 1903.

The arcs represent the back-scars of fossilised landslip systems, possibly active a few hundred to a few thousand years ago, maybe during periglacial conditions at the end of the Ice Age, when everything around Lyme would have been treacherous and un-vegetated. These fossil landslips can be relative stable, as long as nothing is changed.

Cliff House (once Cliff Cottage), a mansion with extensive grounds, was successfully developed in the 1830s on an innocuous looking terrace with a wooded cliff behind. After its sudden collapse, in the Cliff House Landslip of 1962, the terrace was made into Putting Green in the Lister Gardens. In 1845 the area below Cliff House was earmarked for development. Later steps were taken to market the land below Poulett House as building plots. For these things to have been contemplated the area must have seemed stable, to some at least, despite contemporary photographic evidence. This ground is in the Shales-with-Beef and Black Ven Marls, which, as in the Spittles east of Lyme, can be very a treacherous material. It is inconceivable that Lyme's early geologists did not point out the folly of attempts at development.

The Western Slopes above Marine Parade, the 1962 Cliff House landslip, now the Lister Gardens

The 1841 Tithe Map and 1903 OS Map shows this area looking relatively stable, but in 1926-7 attempts at building works sent mud streaming onto the western part of Marine Parade. This followed the 200ft-long collapse of the sea wall supporting the Parade, already described. A dwarf retaining wall that had sufficed before was pushed forward across the Parade. Trial holes and a drain were dug up-slope, but no slip plane could be found. Henry Smith, the Borough Surveyor⁴³, working with Gower Pimm, the engineer of the sea wall repair, considered whilst that deeper drains were required, the slip plane was higher and not responsible for the failure of the sea wall, which had been due to poor construction. In 1939 another section of the sea wall collapsed without warning, perhaps due to ground pressure.

During the winter of 1961-2 a property developer, Edward Keen, excavated land at the bottom of the grounds of Cliff House, just above Marine Parade, to build 20 bungalows, houses and flats. Hitherto the bottom of this slope had always given some trouble with slips, but not much had been done to retain the slope above the Parade other than the dwarf retaining walls already mentioned, some drainage and clearing away surcharging mud. Site investigation of the area, before work started, had identified some shallow failures. These were relatively small and on the lower slopes above Marine Parade, so it was proposed to re-profile these lower slopes to a gradient of 33% and install under-drainage⁴⁴. This was expected to cure the persistent slippage of mud onto Marine Parade and 50,000 tons of material was removed. Unfortunately this unloaded the toe of the whole slope, releasing the slip plane that Henry Smith had correctly assumed in 1927, from his Scarborough experience, to be further up the slope.

On the morning of the 12th February 1962, only a few days after the excavation was completed, movement was noticed, with cracking and heaving in some nearby houses. Movements continued through the evening and by 9 pm the whole slope failed. Cliff House, which was standing empty, moved 3.2m nearer the sea and was back-tilted and ruined. Sunnysdene Guest House caved in, and three other houses were left at crazy angles. Other houses were extensively damaged and 14 people made homeless. Above Cliff House a large back-scar appeared at the top of the slip plane or shear, cutting Stile Lane. Several houses had to be demolished, but not the brick and thatch lodge to Cliff House, now known as Cliff Cottage, which still stands. It was miraculously jacked up back to true from a drunken angle, leaning into the landslip scar, using dozens of hydraulic car jacks and quickly concreted in after use. This lean indicated a rotational landslip on a deep, curving slip plane. The lower part of the slip was mainly a mudslide. This poured down on to Marine Parade and then onto the beach, over the sea wall near the Cart Road ramp. The sea wall, the one rebuilt in 1926-7, stood firm.

⁴³ Henry Smith wrote to the Mayor, Aldermen and Councillors in March 1927 on paper headed *Borough of Lyme Regis Surveyor's Office*, but gave his address as Town Hall, Scarborough. He constantly refers to his experience with landslips and public gardens in that town, which he was working on at the time. Letter in LRM Landslip Files.

⁴⁴ Lee, E.M. 1992. Urban landslides impact and management. In: Allison, R.J. (Ed.) 1992. *The Coastal Landforms of West Dorset*. Geologists' Association Guide No. 47. pp. 80-93.

The excavation had altered ground water flow. Despite a valid planning consent, the development had to be aborted, although the Town Clerk Harry Williams was reported in the Daily Sketch as saying, immediately after the slip, that the development project will eventually completely stabilise ... the site...and, as far as the Borough Council knew, work could continue to excavate soil from the site⁴⁵.

After the slip had taken place, the ground between the site of the now demolished Cliff House and Marine Parade was again re-graded to 33% and a number of trench drains were installed. A 5m concrete retaining wall was constructed along Marine Parade. A 3m to 4m deep perimeter drain and 150m long sheet-piling retaining structure were put down to support Cobb Road, which also had been affected⁴⁶. The Borough acquired the area, naming it the Lister Gardens after Lord Lister of Lyme Regis, the pioneer of antiseptic surgery. Concrete shelters were built to hold back any further slips, which they have done successfully. Currently these provide toilets, an amusement arcade, an antiques market and a restaurant. However, slippage and ground movement continued further west, resulting in controversial demolition of properties on Marine Parade and Cobb Road, the last not coming down until early this century.

The slopes above central Marine Parade – the Langmoor Gardens (1901-1960)

That nothing was done to stabilise the slopes above Marine Parade in the 19th Century as can be seen from early postcards in the LRM collection. In the 1880s the central section of the Parade was becoming formalised, with a typical Victorian free-standing cast-iron and glass seaside shelter, but mud was simply cleared as it fell. More serious problems followed an attempt by Mrs Talbot of Poulett House (the Alexandra Hotel) to develop the slopes and by 1902 mud was threatening to engulf the central section of the Parade, the precursor of a major landslip in 1903. The ground was bought by the Borough, using a bequest of James Moly of Langmoor House, Charmouth. It had to be stabilised before it could be put to public use. A line of mass concrete buttresses was built along the uphill side of Marine Parade to add toe weight and to retain the slope above. These armchair shaped masses stood at the edge of the Parade, but mud continued to overtop them. Nevertheless things settled, so much so that public gardens could be laid out, opened as the Langmoor Gardens in 1913.



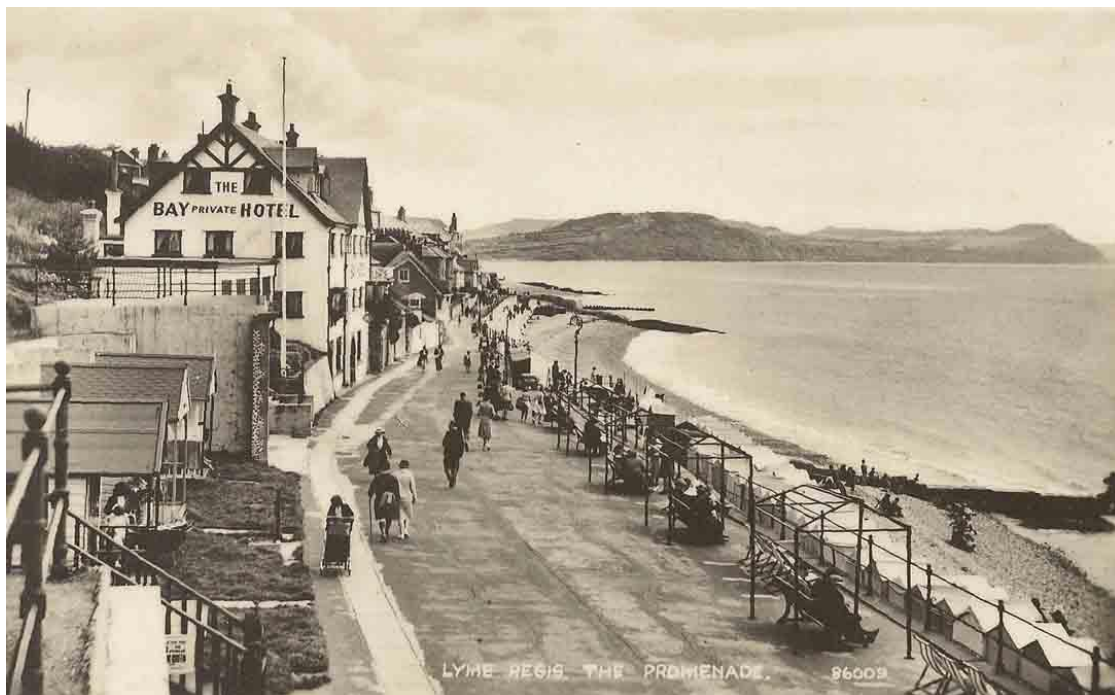
The 1903 buttresses being overwhelmed by landslip in 1925.

⁴⁵ Daily Sketch 14 February 1962

⁴⁶ Adapted Ian West's Lyme Regis and Charmouth web site accessed in February 2015 at <http://www.southampton.ac.uk/~imw/lymebib.htm#Lee>

However, the 1903 buttresses were overwhelmed in 1925. Henry Smith, the Borough Surveyor, remarked in 1927 that the 1903 buttresses had withstood ground pressure well, with very little sign of rupture and would continue to form a toe against which to stabilise the ground above, so that the gardens could be restored. To ensure stabilisation of the garden slopes he thought that as little of the slipped material as possible should be moved around, that his drainage proposals would dry out the slopes and that stability would be aided by using rough larch poles as piles and by building dwarf retaining walls. He suggested that five of the buttress alcoves could be stiffened with roofs of re-enforced concrete as day *beach bungalows* and that toilets, a café and shelters could be provided on top as their stability became more assured. On the terraces higher up Smith suggested a putting green to the west and formal gardens to the east.

Following Smith's advice the slope above was stabilised, but there is no evidence as to whether the buttresses forming the curved backs of the present shelters are the original 1903 structures. They could be newer ones cast in front of the old. An attractive curvy pavilion, the Corporation Shelter, was built in front of the central buttresses by building a strong roof over the wing walls of the buttresses. On top a roof terrace, edged with a balustrade, provided access to the restored gardens. The pavilion appears to have been built from some time from 1924 to just before the landslips in 1927⁴⁷. Ladies and gents toilet blocks were provided, one after the other, at each end of the buttressed section, faced with a pebble decoration reflecting aspects of the pavilion, but without its fine detailing⁴⁸. The pavilion, however, remains pleasantly decorated in buff faience tiles, columns, balusters and details, such as the Borough shields, although the wrought iron gates have not been restored. The central clock was added as a WWII memorial. The buttresses between toilets and pavilion were intended to be roofed as shelters, but this did not happen for thirty years; meantime their gaunt appearance was softened slightly, if not incongruously, by placing wooden beach chalets placed in the alcoves.



From the roof of the Corporation Shelter looking east in the late 1950s. The buttress alcoves hold chalets, and more sit on the Cart Road. The eastern toilet block can be seen beyond the third chalet. More chalets sit on the Cart Road.

⁴⁷ Judging from negatives by Hubert Hirst dated 1927-8 LRM 2002/29

⁴⁸ Drawing *Proposed Gents Lavatory...* signed off 19/2/1931 by Borough Surveyor E Prescott in LRM collection

In 1945 steps were added by the toilet blocks and centrally, just east of the Corporation Shelter. These led to the gardens. Owing to landslides these later steps led nowhere, as the terrace became overwhelmed by mud. A plaque carved in buff reconstituted stone, once by the central steps, now moved to the new eastern steps, reads:

Borough of Lyme Regis

These steps were erected 1945

Alderman W.J.Emmett.

Mayor 1937-45.

G.Atterbury. Town Clerk.

E.Prescott. Borough Surveyor.

It was not until the 1960 that extra support was provided so that concrete beams could be laid across the buttresses to flat roof over, and extend out from, the remaining open alcoves. This provided an extension to the public shelters, in addition to the central pavilion⁴⁹. However, in 1962 a landslide settled onto part of the roof deck, after which there was continued slippage. The Langmoor Gardens continued gently distorting and moving through the rest of the 20th century: paths that had been even became uneven and lumpy, their tarmac was full cracks and repairs. Fear of collapse from the weight of surcharged landslip material pressing down on the roofs resulted in the closure of the toilets, pavilion and shelters to the public, but the propped roofs remained intact. In fact, no major slip occurred, but the lower part of the Langmoor Gardens was out of commission, grown over with butterbur. Moreover, although unlikely without human interference, such as excavations or blocked drains, another big and damaging slip could have occurred at any time, taking out Marine Parade and some of the houses along Pound Street. Clearly a comprehensive scheme was needed to drain and stabilise the gardens once-and-for-all.

Stabilising the Langmoor and Lister Gardens (2005-7)

The opportunity to finally stabilise both gardens came as part of Phase 2-3 of the Lyme Regis Environmental Improvements. The buttresses holding both sets of shelters were deemed sufficient, what was required was an extensive programme of deep bored piles, soil nailing, soil buttressing and drainage works throughout both gardens and in all the undeveloped spaces and private house gardens and yards as far as Cobb Road and beyond, designed to prevent a repetition of the 1962 slips. Re-enforced concrete piles, some up 50ft deep, were secured in firm Blue Lias well below any slip planes or unstable material, such as weathered Shales-with-Beef. Piles were even inserted along Marine Parade in front of the eastern shelters and along the Cart Road from the Bay Hotel to Little Madeira to stop the Parade being pushed forward. The gardens were re-instated with new terraces, paths (one on a wooden viaduct around a slip-scar), steps, a shelter after the earlier one designed by Sir Lawrence Whistler, a new putting green on the site of Cliff House and hardy, ecologically-friendly planting. Fixed survey points and permanent access has been provided to pore-water pressure monitoring wells. A zig-zag ramp and steps were provided between the Eastern and Western Shelters, where there had been a sloping footbridge before. The main drainage arrangements pass this way and outfall through Kevin's Jetty. In addition Cobb Road, which had showed signs of rupture for years where it crossed the landslip back scars, was supported on a piled wall and re-graded to an even surface.

⁴⁹ *Bill of quantities for Extension of Public Shelters Borough of Lyme Regis* March 1960 Document in LRM Shelters file



The Corporation Shelter and Eastern Open Shelters in November 2006, before refurbishment. The central pavilion is closed, but the roof is accessible again, now cleared of mud. It was restored as the Jubilee Pavilion. Through the shelters can be seen the 1903 concrete buttresses holding up the slope, painted pale greenish-blue.

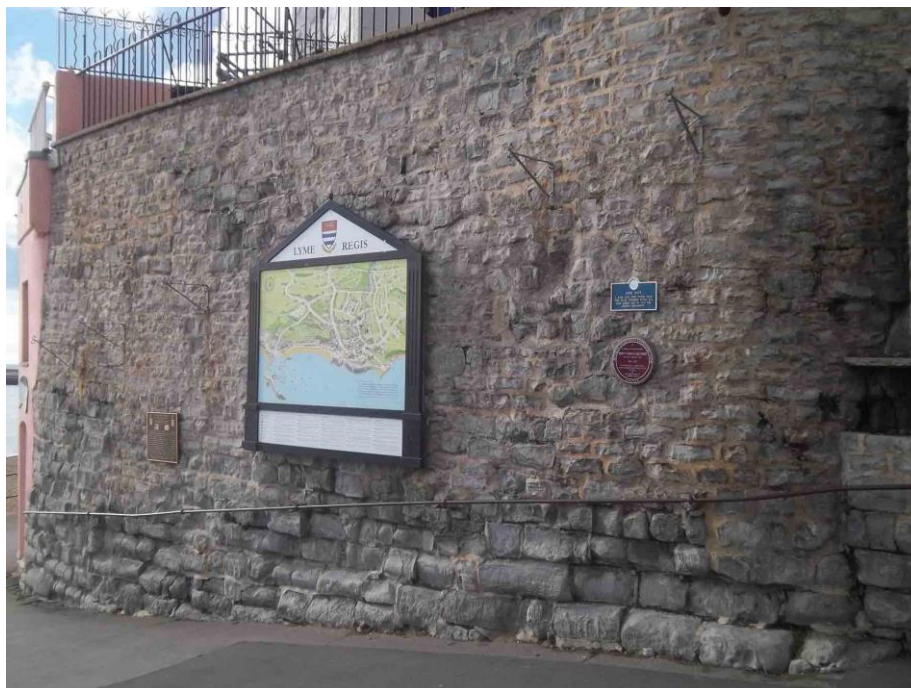
The Town Council, guided by the Lyme Regis Society, was finally able to refurbish the eastern shelters. In 2002-3 consulting engineers Graham Garner & Partners prepared a report for WDDC to identify and assess any structural defects in the structures and to consider the suitability of the shelters for refurbishment after the gardens had been stabilised. It concluded that, unless major action was taken, the structures would suffer further deterioration, so the Town Council decided to demolish them and raise funding to carry out a complete regeneration scheme. But it was in a Conservation Area, so in 2005 the WDDC Conservation Officer produced a project brief for the Town Council which envisaged a landmark building, substantially improving the present appearance of the area. When stabilisation of the gardens was complete in 2007 the Town Council made proposals for the shelters⁵⁰. Because of its appearance, and by public demand, the Corporation Shelter was restored as The Jubilee Pavilion and is now a visitor centre, but the 1960 shelters and the toilet blocks, long out of use and with no popular appeal, were demolished. The faithful buttresses, 107 years old, were roofed over again in 2010 to provide open shelters either side of the pavilion, as before, except that a canopy has been provided for the western shelter extending over Marine Parade. Two flagship retail units under two meeting rooms, with one access lift, have also been provided.

⁵⁰ Much of this paragraph is from research by LRM Research Team



The new restored shelters looking west in 2015, with the Jubilee Pavilion flanked by open shelters in the butress alcoves, in turn flanked by shop units. Plant room and steps on the right, meeting rooms above both shop units.

The Bell Cliff Wall (before 1600?)



Cyril Wanklyn⁵¹ mentioned that before 1646, Bell Cliff was called Beaufront, a name he found as far back as 1423-4. It was defended with guns in the Civil War Siege, although the gun displayed there now is from a wreck. The name appears to have nothing to do with a physical bell, although an alarm bell was once stationed here. Rather Wanklyn thought that *bell* (*e*) was an alteration in speech from *beau*, with the same meaning of beautiful, as in *belview*, for its sea views over the Chobham

⁵¹ Cyril Wanklyn 1944 *Lyme Leaflets* Privately published

Warehouses that used to sit below, tucked into the hill on Cobb Gate Quay. The warehouses were replaced by the Assembly Rooms in 1775 and by a car park in 1927. As already mentioned Bell Cliff is retained by a massive wall holding up the houses, path and viewing terrace at the bottom of Cornhill. It was probably built before 1600, but there is no evidence for the date of construction. The Borough was fined for not repairing in 1680. The wall returns at 90° on the seaward corner behind The Boathouse, supporting Bell Cliff House above. The lowest part still exposed is built of massive, eroded blocks of Blue Lias

Before The Walk/Marine Parade was built this part of Bell Cliff Wall would have stood at the top of the beach and is therefore a sea wall (see the watercolour on p 42). It may conceal a cliff, but if so this would be in the treacherous Shales-with-Beef weakened by the Cobb Gate Faults, which run North-South through the area and have easterly downthrows of a few metres⁵². Such a cliff in the Shales, capped by Head Deposits, would be unstable, so it is more likely that the wall conceals either stable fill and was originally piled with oaks, or more likely, a massive toe-weight of stone holding up the lower area of Broad Street. Whatever its construction, it is a successful, early buttress and very important as a structure ensuring the stability of this area.

At the landward end the wall returns in a curve running around towards Cornhill, railed at the top and with steps down. A further section was added to this corner of the wall in 1836, according to Wanklyn (map evidence supports a date between 1827 and 1854), so that the original steps could be turned at right angles to allow more room for the Walk/Marine Parade. A curious stone shelf sits in this return, perhaps to hold a lantern.

Listing Extract - Bell Cliff Retaining Wall Listed Grade 2: (inaccuracies in italics): Late *C18* probably. High wall of *colourwashed* stone *rubble* with capping extends north-east and then west from premises occupied by the *Information Bureau*, Marine Parade. The wall is surmounted by *C19* railings which are looped in pairs. A lower wall extends further north-east from the north-east corner and encloses an L-shaped flight of steps leading up to higher ground before 7 and 8 Broad Street. *Painted* brick *gate* piers with capping flank the bottom of the steps; steps partly of *blue lias*⁵³. *C19* railings also flank innermost angle of steps.

Cobb Gate Quay and Wall – probably first built before 1250.

The status of the early Cobb as a harbour of refuge and transshipment is shown by the 1539 drawing included in Part 1. It shows no landing quay, nor is the Cobb pier fit for carts. There was no road access. Ships would have been loaded or unloaded over the side with carts at low water, or into smaller boats for discharge at Cobb Gate Quay or up the River Lim. Such a quay, nearer the town centre than the Cobb, was much used in Elizabethan times for small vessels⁵⁴ in fair weather. This may explain why the Custom House was removed in 1576 from the Cobb to a site near Cobb Gate⁵⁵. It could even be that the Cobb harbour was first sited here or nearby.

Cobb Gate Quay was originally a quayside wall which started by the River Lim, returning around the quayside, and curving back to run out to sea as the stone and wooden Cobb Gate Jetty. It appears to fit the description of *a tongue of land with warehouses and 70 houses* destroyed by storm in 1377⁵⁶. However, this tongue of land could have been elsewhere or further out. It could have been a shingle spit. The official report is detailed, with a list of people and merchants lost by name, but carries no locational information at

⁵² Deductions by the author from the work of Gallois Consulting and the British Geological Survey – see Gallois, R. W. 2006. *Report on the geology of the area between Devonshire Head and the River Lim, Lyme Regis, Dorset West Dorset* District Council Technical Services Report No. 06/01. CD in Lyme Regis Museum

⁵³ Actually Staffordshire blue paviments

⁵⁴ Peter Lacey – pers com

⁵⁵ In 1697 an agreement was signed between the Borough and Peter Southwick, Collector of HM Customs in the Port for the construction of a the Custom House at Cobb Gate, detailing the balconied building – LRM Landslip Files

⁵⁶ Roberts, 1834 *ibid* and John Fowles, *Medieval Lyme Regis*, Friends of LRM 1984 p 22

all. It suggests that this may be landing quay, dry at low water, but working in tandem with the Cobb, which had no quayside until 1547, no warehousing until 1697 and no roadway to the its quay or inland until 1834. Lord Cobham's Warehouses and the Custom House were right by the town centre at Cobb Gate, and from here the Cobb was reached by carts through the Cobb Gate, a substantial gate at the pinch of the Bell Cliff Wall, which closed off the access ramp for carts to the beach. The Gate was both defensive, sealing off the town, and a customs point. But once the Cobb had gained its own facilities Cobb Gate Quay became unimportant and the gate unnecessary, so that in 1775 the site of the quay was used to construct the erstwhile Assembly Rooms. Today, Cobb Gate is just recognisable as a former quay and the old jetty was used by trip boats until 2005.

In 1591 £101 7s 8d [not convertible, but maybe £100,000] was expended on building and associated works at Cobb Gate, with more significant masonry works in 1596-8⁵⁷ and in 1662⁵⁸. These efforts may refer to the jetty, the quay, the Gate or the warehouse. At the Siege in 1644 Cobb Gate Quay saved Lyme, allowing food, munitions and re-enforcements to be landed away from the Cobb, which was bombarded from Holmbush. In 1692 the *key without the Cobb Gate* measured 72ft on the east side, 99ft on the west, 27ft broad at the north and 63ft at the south end, bounded by "Whetcomb's Warehouse" to the west, according to Hutchins⁵⁹. This exactly fits the eastern half of Cobb Gate Car Park, leaving room for the warehouse in the west.

In 1698 the Custom House moved from *the key in the middle of town* subject to *the break of waves*⁶⁰ to a site where Cobb Gate toilets now are. This confirms the continued importance of Cobb Gate Quay and its warehouses for cargoes – and the Cobb Gate Wall and Jetty to protect the site. By the time the William III Custom House was destroyed in the Great Fire of 1844, Cobb Gate was irrelevant to trade and the Custom House was rebuilt at the Cobb.

In 1745 a copy letter⁶¹, the original probably from Robert Henley, Mayor, to an unnamed consulting civil engineer, indicated that repairs to Cobb Gate Wall were contemplated. It was understood that it was a Borough responsibility; any use of funds from the Board of Ordnance meant for the repair of the Cobb being *ultra vires*:

Sir

We haveing contracted with Robert Smith for the Rebuilding of the Cobb Gate Wall. Before you came down from London would have had him to have begun about it long ago(o). It being absolutely necessary to be built in the summer on account of its being to be done with Lyme and Sand - But your son being apprehensive it might be done out of the Ordnance money would not permit Smith to set about it untill he had been had been down to Plymouth to represent it to you for your approbation. Since his return he hath acquainted us that the hon^{ble} the Board of Ordnance granted the money for Reparation of the Cobb only And that therefore it cannot be done with that money But if done at all must be done at our own Expense Which we do agree to(o) and as we employed Smith in this jobb we do expect to pay him...

*We are ever your most obliged and most hble Serv^{ts}
Lyme 26th August 1745.*

In 1775 the site would have been much altered when the warehouses were demolished and replaced by the Assembly Rooms. The old quay walls were probably built up at this

⁵⁷ DC/LR G7/2 quoted by Keystone

⁵⁸ DC/LR G1/3 Sam Hoyte & Co

⁵⁹ John Hutchins 1861 *The History and Antiquities of the County of Dorset* Third Edition

⁶⁰ See footnote above re agreement for building the Custom House

⁶¹ DC/LR/N/23/4 in *Fugitive Pieces*

stage to exclude the tides and protect the Assembly Rooms, the style of construction fits with the appearance of other contemporary jetties and renewal work at the Cobb, with the introduction of Portland Roach, here as coping blocks, although the walls below are mainly Blue Lias, heavily repaired and now obscured by armour stone rocks. When exposed to low tide level during the construction of the foundations for the new jetty, the lower levels of the wall contained much ashlar work in Portland Roach blocks, indicating that the Quay was soundly built at high cost⁶². Today only the much rebuilt tops of the old walls are accessible. But nothing can be certain, as there is no plan which shows Cobb Gate in detail before 1824 and no written description of what was there before 1775. No archaeological work has been undertaken. The Cruikshank-Maryatt of 1819 print shows area protected by rather low walls made of huge stone blocks.

The Quay had always been a costly structure to maintain, at the expense of harbour dues. Upon its integrity depended the safety of the lower part of the town and the Assembly Rooms, so that when the sea made a serious breach in 1927 the foundations of the wall were affected and the Assembly Rooms rendered unsafe. It is surprising that the Rooms stood for so long, often hidden by huge seas and exposed to the fury of SW gales. Although protected by the Quay, such exposure has slowly worn away the soft lias of its masonry, weakened its walls, and at last got at its insecure foundations⁶³.

Compared with more exposed Gun Cliff Walls to the east, no later buttressing or piling of the foundations or lower parts was ever needed, so the original groundwork must have been of high quality. Armour stone boulders were placed at the foot of Cobb Gate Wall towards Buddle Mouth in 1987. This area is now entirely covered by the new roadway to Gun Cliff made in 1998, when a huge spread of armour stone boulders was placed against Cobb Gate Wall between the Buddle Mouth wall and Cobb Gate Jetty. At the surface, these boulders consist mainly of Carboniferous Limestone recovered from the 1987 drop, with Larvikite towards the Jetty.



The hook-shaped Cobb Gate Jetty leaving the end of Cobb Gate Wall (above the carter), before the 1830 rebuild. It consists of Portland blocks, timber and a pile of rocks. The cart is descending to the cart track on the beach to the Cobb down the ramp. On the left is the Bell Cliff Sea Wall standing from the beach, supporting houses. The termination of Cobb Gate Wall, above the carter's head is still there, at the corner of Cobb Gate Car Park. Hollis has yet to build The Walk at the foot of the Bell Cliff Sea Wall, so this means that the painting is pre-1771.

⁶² In the Museum collection by Mike Donno, reproduced in monochrome with a 1920s photograph from the same viewpoint in Jo Draper's *Lyme Regis Past and Present* page 13 Sutton Publishing 2006

⁶³ Wyatt Wingrave *Lyme Regis Assembly Rooms (Their History and Associations)* Pulmans Weekly 20th March 1928 transcribed by Graham Davies from cutting in Museum's landslip files

Cobb Gate Jetty

As explained above, this is the extension of the Cobb Gate Quayside Wall out to sea as a stone jetty. It is marked on the 1787 Chart merely as a tick at 45° to the shore, although it curved around to the west at its seaward end to join a pile of rocks. It was a composite structure of stone and timber, probably the result of many repairs, but the form of construction is only known from artwork - the above watercolour and an annotated drawing in one of George Roberts' notebooks, now in the Museum.

The Great Storm of 1824 destroyed the jetty: it was rebuilt in 1830 at a cost of £500 [£49,510]. It was straight, although it is shown on some plans with a kick back to the west at its end. It was 128ft 6" long, 17ft high and 4ft wide in 1856⁶⁴. The new jetty gave rise to controversy since Lyme had depended, Cobb apart, almost entirely on shingle-banking for its sea-defences, and the new jetty was thought to be more efficient at trapping shingle than the old, ruinous structure. It was claimed that the extended Cobb Gate Jetty would starve the beaches of shingle from Buddle to Gun Cliff. The rock or pile of rocks, no longer at the end of the jetty, survived until it was removed in 1838. It appears to have been a pile of large Cowstones. Storms damaged the structure, for example in 1838, and for this Roberts was critical of the low height of the new structure in relation to storm waves - he considering that the old piled structure was more secure. Successive repairs heavily modified the structure, with Portland Roach blockwork and a concrete toe to prevent undermining. 1950s photographs show much of the western side of Cobb Gate Jetty lost, and other shows a gaping hole in Cobb Gate Wall just before its termination at the head of the jetty. All this damage was rebuilt, leaving the jetty much as before.



A storm in 1955 removed the shingle beside Cobb Gate Jetty and revealed the surface of the much older cart ramp below. A photograph (left) shows this surfaced with stone blocks held by transverse oak timbers, some 3 metres below the current level of the concrete ramp to the beach.

Fitted with railings, Cobb Gate Jetty was used for trip boat landings until 2005, when the old jetty was demolished to make way for a new larger jetty. This holds the shingle of main beach from running into the rock armour that protects the new mouth of the Buddle. The new Jetty is made from a finely tooled dark igneous rock in regular coursed blocks capped by pale buff granite blocks resembling Portland Roach from a distance. These blocks were made to fit with fine joints and are slotted to accept vertical stainless steel rodding

set into the foundations onto which subsequent blocks were carefully lowered. Its construction matches Kevin's Jetty. The new jetty springs from the old Portland Roach-capped Cobb Gate Wall one metre east of the old Cobb Gate Jetty. The termination of the old wall has the indentation where a plaque was once located which can be seen in 1900s photograph. It locates the start of the old jetty. The new jetty does not have railings and cannot be used for landing - a change regretted by Lyme boatmen at the time.

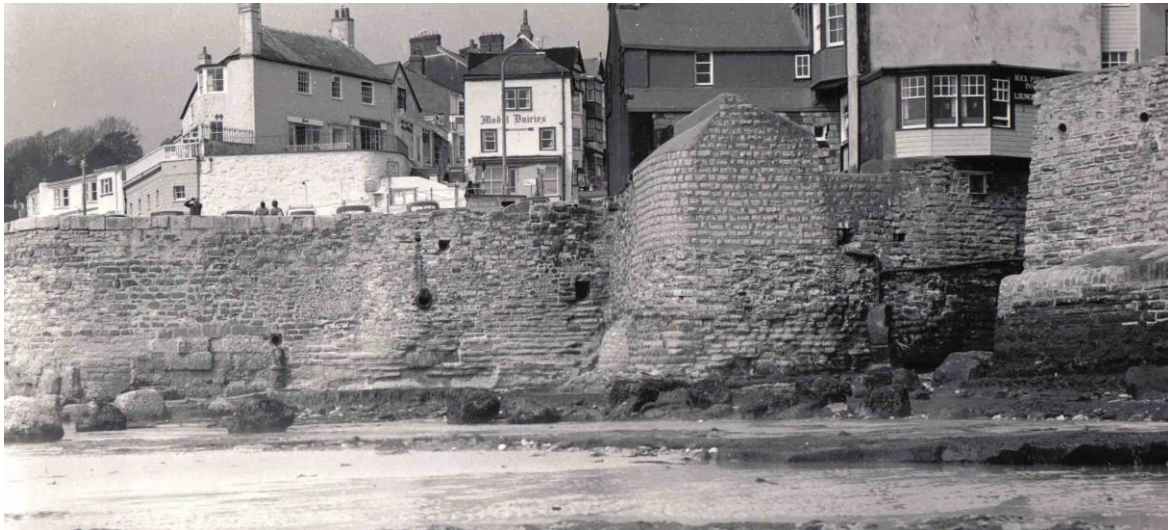
⁶⁴ Length measured from Henry Osborn's 1856 plan in LRM, height and width from Chapman *ibid*



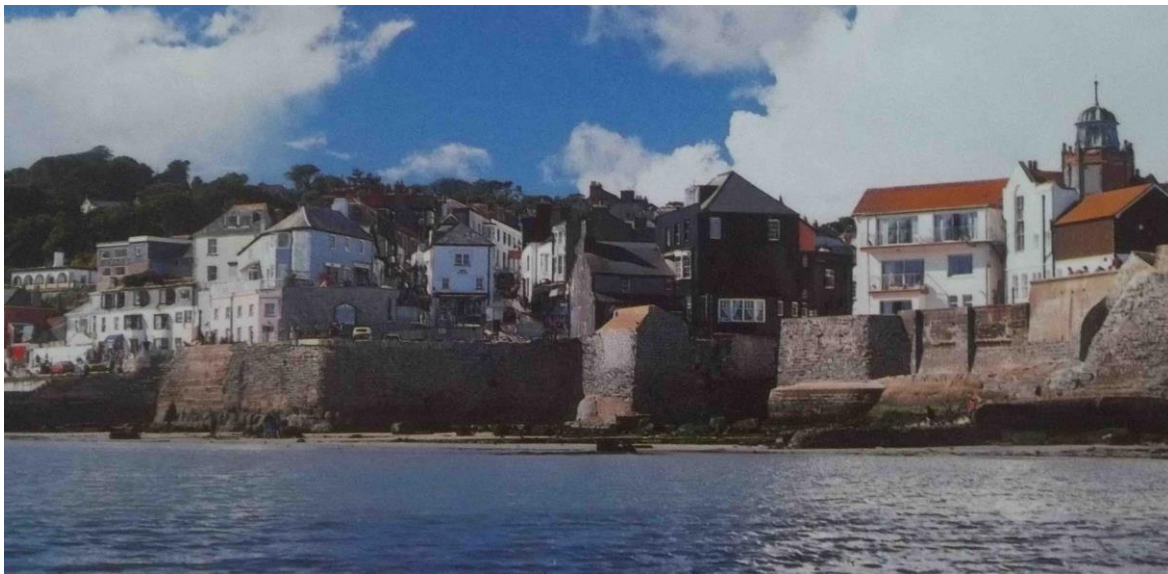
The termination of Cobb Gate Wall in 2014 – compare with the watercolour above. The old ramp to the beach lies under the tarmac and shingle. The old jetty continued from this termination, but the new jetty lies to the right. Cobb Gate Wall consists of Lias blocks under Portland Roach copings, but excavation of the beach to the right in 2005-7 revealed a host of repairs and old work of massive Portland blocks. The Lias work behind the start of the new jetty was put in after a major breach in the 1950s.



Part of Henry Osborn's 1856 Plan for the Overton v. Corporation of Lyme legal case on wall maintenance responsibilities. Cobb Gate Wall curved around to meet the rebuilt jetty, with the beach slipway before the formalised Cart Road was built. Zoom in on this plan to get a better view. Also shown are Gun Cliff Jetty, Theatre Jetty and the Eastern Jetty.
LRM 1981/92



Cobb Gate Wall and, to the right, the Buddle Mouth (which lies in the gap below the bay window of the rear of the Rock Point Inn), about 1950. A view which cannot now be had because new walls, roadway and bridge, mock fortifications, a sewage tank and rock armour have filled up the foreground. Cobb Gate Wall is essentially the fair-weather drying quayside, but the wall has been repaired so many times and raised so that it hardly looks suitable for going putting a vessel alongside. The visible holes may be the outfalls for the Broad Street pot water channels, abandoned by 1850, or street drains. In this view stone buttresses sit at the foot of the walls; concrete had yet to be poured.



A lost view – the town on the brink - the listed walls of Lyme before the 1993-5 sea walls and rock armour. Underneath the walls are still there! Cobb Gate Jetty on the left.

Listing Extract - The Cobb Gate – Gun Cliff- Theatre Sea Walls: Listed Grade 2: *One of the most easterly sea forts in Lyme Regis stood on Gun Cliff throughout Blake's defence of Lyme in the English Civil War, until early C19. The walls themselves are of stone rubble laid in regular courses; irregular height; in places with ledges. One wall extends north from Cobb Gate Jetty, eastwards round rear of Nos. 1 and 2 Broad Street and northwards again as far as the Buddle Bridge; another wall returns southward from the other side of the Bridge and then eastwards round Gun Cliff; it then returns north following a curve in the land and then eastward as far as the jetty at the east end of the Marine Theatre. Craftsmen from Lyme Regis were well known in mediaeval and late mediaeval times for their skill in constructing piers and sea defences; these walls like the older parts of the walls of the Cobb are an example of this skill⁶⁵.*

⁶⁵ Their famous skill was in timber and boulder construction, not stone.

The Walls of the Buddle Mouth, Museum and Gun Cliff (1600 or earlier?)

This is a complex area, with much patching and rebuilding. Today, other than the upper works and the returns into the Buddle, much of the height of these walls is obscured behind the new sea walls which contain the storm water storage tank, within the new esplanade. The old walls are not exposed in the sewage tank and therefore cannot be studied, except from old, relatively distant, oblique photographs and artworks. Unbelievably, no detailed archaeological drawings or high-resolution images seem to have been made of the old walls before they were covered up.

John Fowles thought that before 1750 the mouth of the Buddle was protected by an offshore shingle bank, rather than walls⁶⁶, but the earliest chart, 1787, shows no sign of shingle, only sand and ledges, jetties and hard lines around the Buddle, exactly as it all was until 1995. Roberts⁶⁷, in his MS notebook, describes the mouth of the Buddle as protected by rocks, possibly placed or brought down by floods. He says that this shingle bar deflected the river eastwards and caused a build-up of filth in the river behind it that it had to be periodically broken down to release foetid masses pent up behind it.

It seems to me that as sea walls were in place at Bell Cliff and Gun Cliff by 1600, the Buddle Mouth is bound to have been walled earlier, if only to protect the medieval bridge and the flank of Cobb Gate Quay. The bridge is remarkably close to the sea, suggesting that the sea was less close when it was built. In a congested town centre, pressed by the sea on one side, the need to use every inch of land, including plots gained by sea walls, is bound to mean that the Buddle walls, or their forerunners, predate 1750 and are likely to be at least as old as the walls on either side.

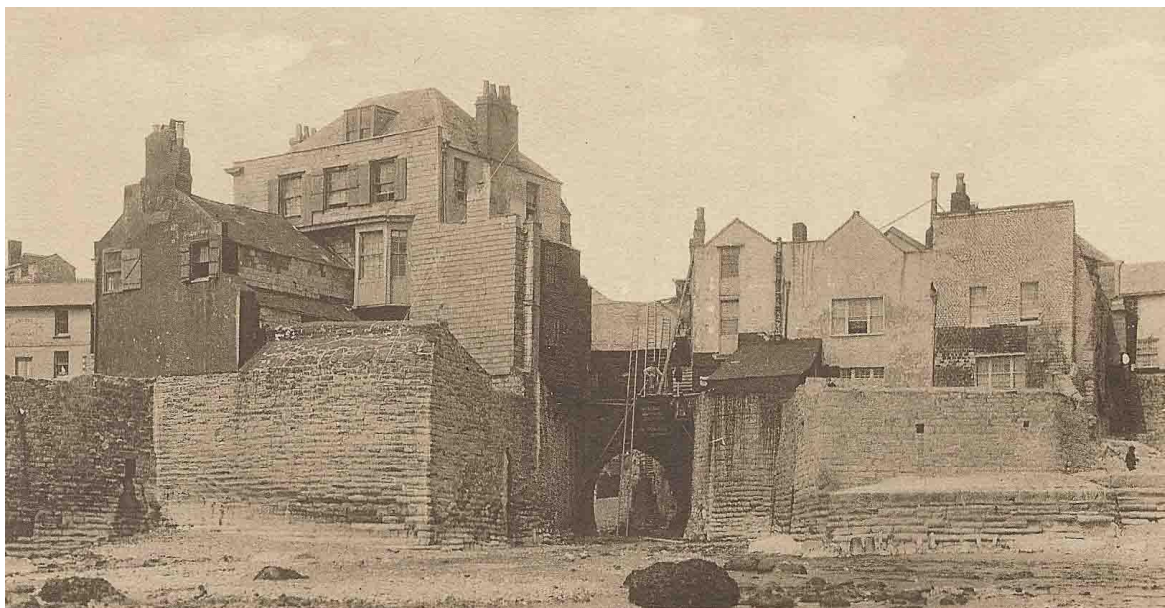
It is not clear when these walls were first built, how the walls became fixed in this position or what lies behind them. At the Buddle Mouth, rock head, on the top most beds of the Blue Lias, is at about the level of ordinary low tides, subject to effect of a belt of shallow throw faults. Above, within the walls, could lie Shales-with-Beef, alluvium, head, marine deposits, shingle banks or made ground. Originally the mouth of the River Lim was probably much wider than today – its estuary could have stretched from the foot of Bell Cliff to Gun Cliff. The situation at Charmouth today is probably more like Lyme was originally. Here a shingle bar forms from time to time and diverts the mouth of the River Char eastwards. A similar natural offshore shingle bar to that at Charmouth may have protected the Buddle Mouth area in medieval times, but there is no direct evidence for it. At the lower Lim the banks of the river are confined between high walls, yet originally the bridge was longer, with at least two arches, the earlier, hidden arch having late Norman features. If infilling behind these walls provided additional land for development, then made ground is all that is concealed. Alternatively, when the sea cut back into the settlement, oak piles and boulder-filled timber revetments, built like the first Cobb, and later, stone walls, would have been needed to secure the brink, retaining archaeological or geological deposits intact unless excavated for cellars. Made ground may be merely former filled-in cellars and remaining foundation walls. Many houses were cleared after storm damage and slum clearance, and as the sea walls have been breached from time to time, any archaeology may have been washed out by the sea and replaced by any available rubble or rubbish when the wall was repaired.

The 1824 storm was the root cause of the law case *Henley v. Corporation of Lyme*, concerning liability for sea wall repair. As mentioned above, the action started in 1825, but it was not settled until the House of Lords decided that the Borough was liable in 1834. Despite this case becoming a text-book case on sea wall liability, even quoted in the Bombay Court, the *Henley* decision did not prevent a further burst of litigation over wall liability in 1856, in *Overton v Corporation of Lyme*. A plan of the walls dated 1827

⁶⁶ John Fowles 1982 *A Short History of Lyme Regis* p 2

⁶⁷ George Roberts MS Notebook in LRM

in the Museum shows these walls and sets out parcel ownerships and tenancies (LRM 1943/41-4).



The Buddle Mouth Walls around 1890 – the top parts are still exposed, all the buildings on the left are still present, but all those on the bridge and on the right have been cleared and re-developed. Stone aprons on the right may be concrete filled, or conceal wooden piles. On the left the walls do not yet require additional support. Compare this view with the frontispiece image, would you sleep happy in a storm behind those shutters at Cobb Gate?

In 1843 there was so much damage to the walls in this area that that a memorial to HM Treasury from the Town Clerk stated that *one of the most important of the sea defences at the back of Bridge Street ... was in a ruinous and dilapidated condition from its constant exposure to the violence of the sea* and that the Borough had constructed *an expressive and substantial buttress or sea-wall forming an efficient sea-defence not only of the adjacent private property ... but also a necessary protection and safeguard to the public street*, spending nearly £300 [£34,045]⁶⁸. This is the apron on the right at the foot of the wall.

In 1867 were two bad storms, in January and March. The *Dorset County Chronicle* reported (28th March 1867) *at one time it seemed that the sea would make a complete irruption into the lower part of the town, as the sea wall at the back of Bridge Street was beaten down, and the Waves were dashing against the walls of a house*. Ships were driven out of the Cobb and wrecked on main beach, with cargoes of coal split and picked by townspeople. The Lamp on Victoria Pier was washed away.

Buddle Mouth to Gun Cliff - The Museum Walls (1600 or earlier?)

The Museum seawall had a chequered history of breaching and repair, gleaned during an archaeological assessment for proposed extension of the Museum in 2006⁶⁹. The date of first construction is unknown, as the detailed story starts with John Bennett, who repaired the wall when he took over tenancy of one of the sea front houses backing on the houses in Cockmoile Square houses in 1802, but his house and public baths were very severely damaged in the Great Storm of 1824. He did not replace the baths, but he did fill the fresh breach in the sea wall with a line of timber piles and planking by 1827 and rebuilt in stone sometime before 1840. His eastern neighbour Mr Blackmore (a

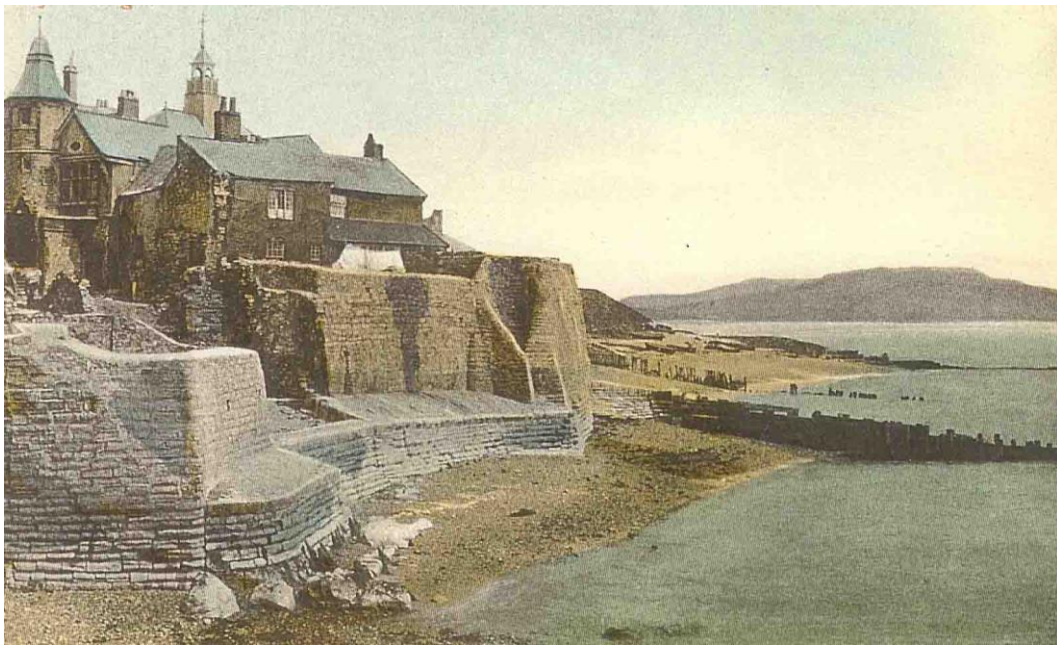
⁶⁸ Notes on Hallet deeds, Lyme Regis Museum.

⁶⁹ Jo Draper *Draft Archaeological Assessment for Museum Extension 2005-6* LRM Files

Henley tenant) lost his garden in the 1824 storm, where the Borough had repaired the sea wall in 1817⁷⁰.

Charles Marshall's 1832 fanciful print of this area is the earliest apparently detailed representation. It shows a complex of walls constructed piecemeal, but Marshall was a skilled stage scene painter and much of the drawing appears as if done for effect.

George Roberts writing in about 1840 noted that around 1795 a shipbuilder called Slaughter *built a vessel and could not launch it for the old sea wall: he obtained permission to take down a certain space for the launch ways upon promise to rebuild. He meditated removing from Lyme so broke his word to the Corporation and never rebuilt (it)*⁷¹.



East of the Buddle Mouth with Gun Cliff Jetty and steps in the middle ground, about 1895. The top of the steps is still exposed, but the new storm water tank lies seaward of the buttresses, the top of which mark the level of the roadway. The Museum and its sea wall have yet to be built: the site is marked by a gaping hole, but footings for the new wall have been cut in the apron. The Guildhall has been built. The cottages on Gun Cliff are all now cleared. Massive toe aprons have been built to support these walls, even across the gap on the Museum site. The large stones in the river mouth were reported by Roberts in his MS Notebooks: he thought that they had been placed to protect the river mouth or that they had been brought down the river by floods.

In July 1867 the Town Clerk wrote to Mrs H.T. Lee to say that the Borough was finishing the rebuilding of the wall at the back of her premises, formerly Bennetts, and that if she should neglect to rebuild her own wall destroyed in January, she would be held liable⁷², and that if any injury should accrue to Corporate property through her neglect to rebuild her own wall which was destroyed in January last, the Corporation would hold her responsible for the same. Maybe "her wall" means the upper parts, and the apron buttresses were the Corporation's responsibility?

The houses behind the Museum sea wall were demolished sometime before 1888, but the sea wall was breached a few years later and not repaired straight away. It seems

⁷⁰ Roberts Notebook No.1 (at LRM)

⁷¹ Roberts *Notebook No.1* (at LRM)

⁷² DC/LR/D5/5

very dangerous to leave such a gaping hole, but the Museum wall was built for the new Museum in 1901-2 in mass concrete with re-enforcing buttresses. To the east, the rest of the breach was rebuilt in stone. At some time after 1927⁷³ this wall was rebuilt in concrete, with a wave return curve at the top. It now protects the Guildhall car park. Both concrete walls are supported by vernacular stone aprons, as in the image above, although these could be rebuilds in mass concrete faced with stone⁷⁴. All is now covered by the storm water storage tank and new roadways. Inside the tank a walkway rests on the concreted-over top of the aprons, leading to steps into the pumping station by the prominent ventilation flue

Of the walled yard between the Museum and Buddle Mouth, little is known. It varies little from image to image, but still notable are its seaward sloping earthenware drain pipes to allow overtopping waves to drain back, and its circular steps, which before the new sea walls only lead to the buttress tops. The walls were low in 1900, but have been built up higher since then.

Gun Cliff Walls (1600 or earlier)

These sea walls must date from 1600 or earlier, as the Borough records confirm work was underway at Gun Cliff in 1660/1, but it is not clear whether this is repair or new work⁷⁵. By 1644, during the Civil War Siege of Lyme, Gun Cliff was adapted as fort, described as *the third battery by the sea, which washes the base of it*. By George Roberts' time the gun embrasures had been walled up, but were still visible⁷⁶.

In 1841 Borough sea wall reports record *considerable damage* to the Gun Cliff wall in March and November 1841, with the wall being repaired in June 1842⁷⁷. Another repair was needed in March and April 1852⁷⁸. Most of the Gun Cliff was built over with cottages, which were cleared in the early 20th century, but a small area was left open for gun mounting if need be, and was used to site a pillbox in World War II. This area still leads to the circular steps, a feature of which steps is the clockwise upper section, which leads to an anti-clockwise lower section, the latter now covered by the new sea walls.

Before 1946 the eastern wall of Gun Cliff was rebuilt in roughly shuttered concrete almost to beach level, where a section of Lias ashlar walling was retained as a footing. At the top a low parapet wall was provided, secured by a wire fence. There was no pathway in front of Guildhall Cottage, although the building was "protected" by a thin wall perched precariously across the corner of the bay on a concrete lintel, as in the image below.

Today the Gun Cliff terrace has been, in effect, extended over the roof of the sewerage pumping station, giving a false impression of the size of the original Gun Cliff, which can be seen in the 1993 image below. The eastern wall of Gun Cliff has been completely obscured.

⁷³ Stone built wall with separate stone-built pedestrian guard wall at top in Muriel Arber negative taken in 1927 LRM 2005/50-20 and 29

⁷⁴ This information is mostly from postcards and OS 25" maps

⁷⁵ DC/LR/ G1-3 quoted by Keystone *ibid*

⁷⁶ Roberts, G 1834 p 197

⁷⁷ DC/LR/F8/4

⁷⁸ DC/LR/F8/6



Gun Cliff cleared of housing, seen in 1993, with the Gun Cliff Sewage Pumping Station under construction on the beach in front. A coffer dam holds back the sea. Gaiche's Wall once sprung from the corner of Gun Cliff.

Gun Cliff, Sea Baths or Bennett's Jetty

This jetty ran due south from the corner of Gun Cliff at the point where Guise's Wall once continued the line of sea walls eastwards. "Sea Baths" in the name refers to Bennett's on the Museum site, not the baths Davie built in 1805. This later became Jefford's Baths, to be replaced by a Drill Hall that was converted into the Marine Theatre. The jetty is marked on the 1787 chart, although Guise's Wall had already succumbed by that time.

John Fowles thought that Gun Cliff Jetty was originally built mainly of wooden piles. On the 1856 legal case plan it is given as 150ft long. Its purpose must have been to hold shingle in the Buddle Mouth area – maybe that elusive shingle bar – but it appears to have been not very successful at anything, least of all holding itself up, for photographs from 1880 show it in varying states of disrepair and reconstruction, often as a line of timber piles, planked on both sides with the space filled with concrete, as described by Chapman⁷⁹. In 1951 this was 60ft long, but the last 20ft was derelict. The proposal⁸⁰ was to save the 40ft by putting in two parallel rows of old railway rails either side of the timber piles and pouring a massive hump of concrete over the lot, without shuttering and smoothing over to make a solid jetty 8ft 6in wide at the base. The remaining 20ft would be left to its fate. It seems that this was done by 1957. Such work smacks of expediency by a small local authority with very limited resources that did not give a care about what the work looked like – or even how long it may last. Cheap and nasty.

Guise's or Gaiche's Wall

Guise's Wall ran 196ft in a straight line from the corner of Gun Cliff and was built to secure the land which formerly separated Guildhall Cottage from the sea and which became an embayment of the sea after it was washed away just before the 1787 Chart was surveyed, possibly in the 1775 storm. Samuel Courtney's Account Book of 1719-

⁷⁹ Chapman *ibid*

⁸⁰ *Proposed reconstruction of Gun Cliff Groyne* In-house drawing by D Boalch for E Prescott, Borough Surveyor of Lyme Regis 1951 in LRM plans collection

1726⁸¹ has a glued-in entry, signed by William Jefford, stating that Guise occupied the fine house behind the eponymous wall which, in part, was lost to the sea, although part became the site of Davie's Baths. The loss, he claimed, was due to the failure of the wall which the Borough would not repair, which at first might have only cost five shillings. He claimed that the Borough wanted to do-down Guise because he was a Tory. However the Borough maintained the remaining end of the wall against Gun Cliff to prop-up Henley's property, following the Law Lords decision against it in 1835. The end was shown on a plan of 1827 as a bulge in the corner of Gun Cliff, which could be seen until recently.

The Theatre Wall

On the 1827, 1856/7 legal case plans the wall around the embayment formed after the loss of Guise's Wall is depicted as if derelict, which is likely because case was about the landowners trying to force the Borough to do repairs. This wall ran from the end of the Gun Cliff wall curving around under the Baths as far as the pump house at its eastern end. Here sprang a jetty, later called the Theatre Jetty, whilst the wall returned inland at 90° marking the eastern end of the continuous stretch of ancient sea walls from Cobb Gate Jetty. The Pump House still stands as a small, but distinctive brick tower.

Presumably this 1857 legal case followed the damage these walls sustained in the storm of that year⁸², at about the time the Baths went out of use. Today the high wall below the Theatre is mostly exposed, but the foot is obscured within the underground gallery which runs from the Pumping Station to the Eastern Jetty. The visible wall, which slopes slightly backwards, consists of Blue Lias blocks, with a horizontal band of Devonian Limestone now half-way up. At the Theatre it is a skin resting on an older wall, presumably that damaged in 1857. Behind the inner skin is another sea wall, some 15ft behind, consisting, in the visible part at least, of massive Blue Lias ashlar blocks. Between the two walls were the bath chambers, four in number, which originally had arched openings through the inner skin of the outer sea wall. The brick vaults of the chambers supported a terraced walk around the Baths building, which had other facilities such as a reading room. Some chambers were left with a grille, rather than an arched opening, when the outer skin was built. These grilles can still be seen, high up on the outer face of the Theatre Wall. The only access to these chambers is through the floor of the Theatre's sea-side gallery, which stands on the former terraced walk.

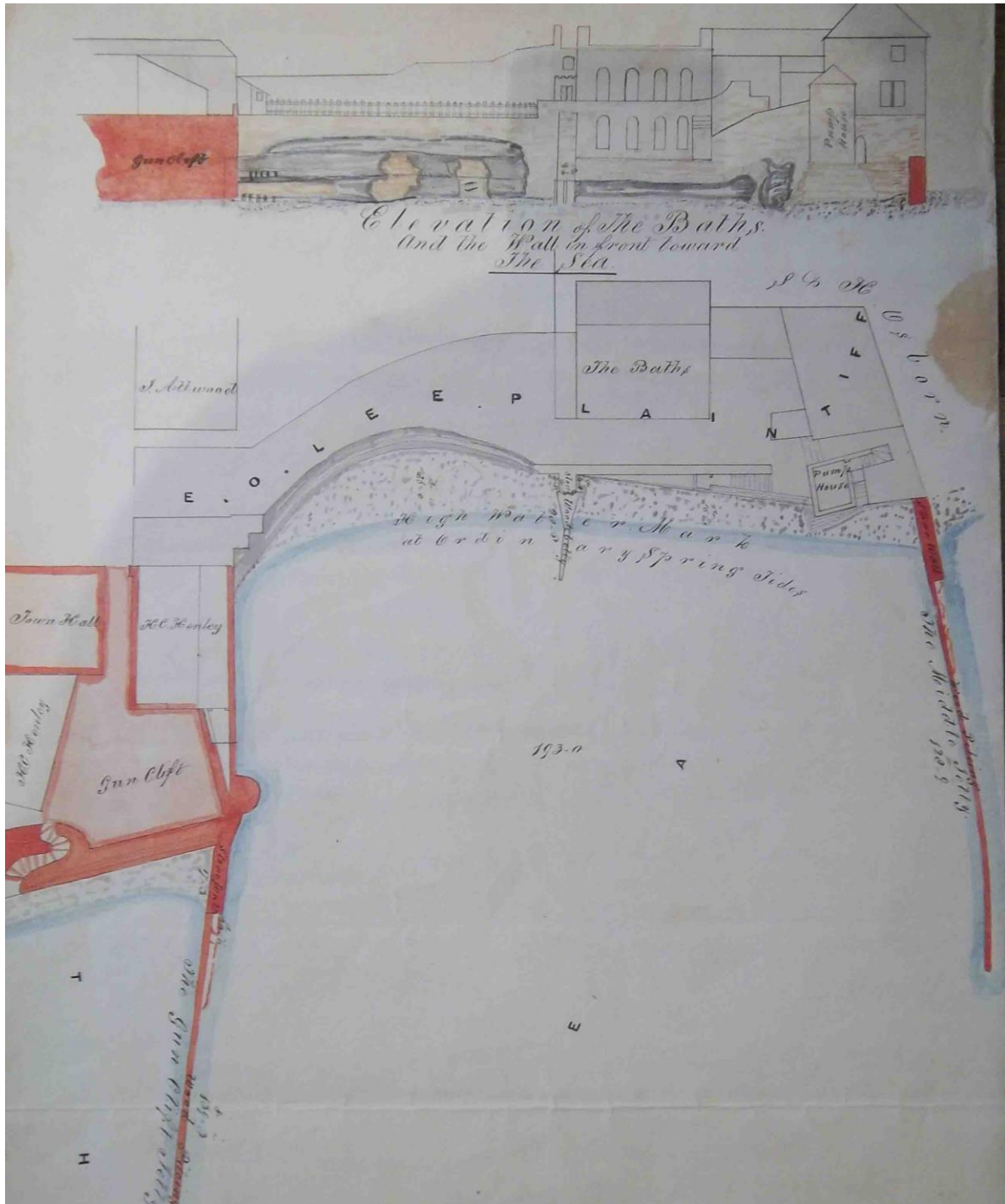
By the 1980s the base of the Theatre Sea Wall was heavily buttressed by concrete and stone aprons. It is now covered by the roadway in front of the Gun Cliff Pumping Station.

Theatre Jetties

There were two jetties near the Baths or Theatre, a very short one beneath the front of the building, and a longer one which ran south from the end of the Theatre Sea Wall, where it had met the eastern end of Guise's Wall. The longer jetty appears on the 1787 chart. On 1856 legal case plan it was 140ft long. This stone jetty is not now visible, and was probably removed when the new sea wall was built in 1993-5. Photographs show that it was made of Blue Lias, capped with Portland Roach and fitted with a timber extension. It joined up with the wall that ran up the slope to Long Entry at the back of the Theatre, which marked the end of the town's vernacular sea walls.

⁸¹ photocopy in LRM, original at DHC

⁸² Pulman's Weekly News Monday 13th October 1857



The 1856 legal case plan, showing the embayment formed when Guise's Wall went down. It ran from the bulge left to support Gun Clift (left) to the Pump Room marked on the plan near the jetty on the right, known later at Theatre Jetty. Under the word Lee, of E.O.Lee Plaintiff, can be seen broken down walls, with the cliff eating back. A small jetty, owned by the Plaintiff, can be seen half way around the embayment. LRM 1991/83



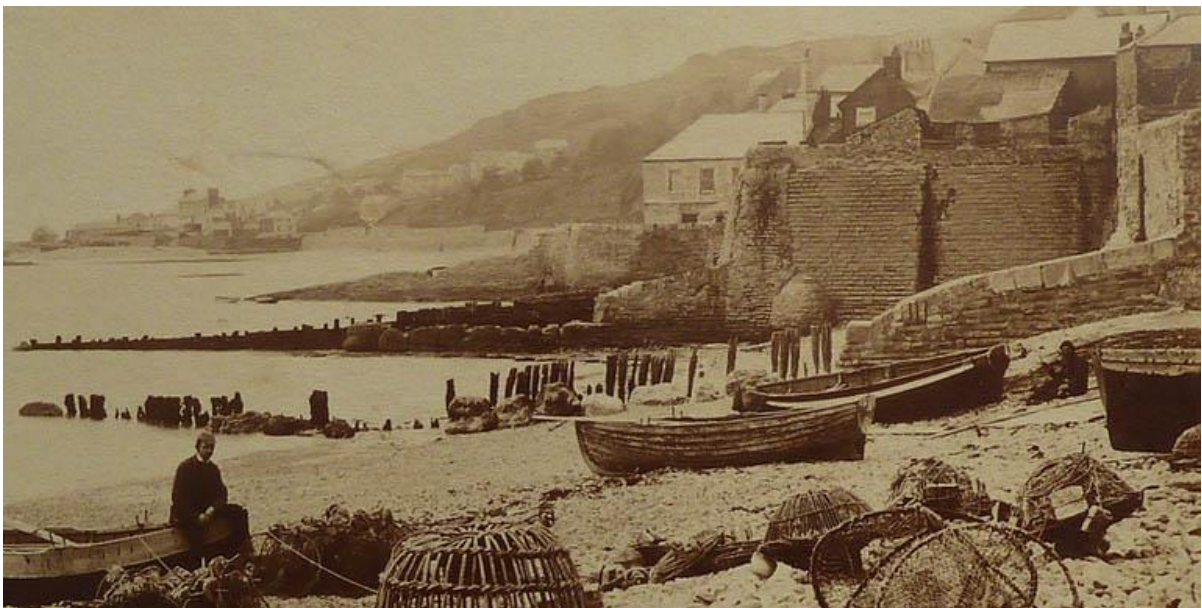
The upper part of the Theatre Sea Wall in 2012. The grille and a pipe hole are in front of two of the bath chambers between the inner and outer sea walls. The pipe was a flue from a boiler put in to heat the building. A new skin has been built onto the outer sea wall covering the chamber openings. The lighter band half way-up is in Devonian Limestone, the rest is Blue Lias. To the right is the old sea water pump house for the baths: Theatre Jetty lay below this structure. On the right the new esplanade conceals a dry, well-lit gallery containing the outfall pipes, which run the tarmac at the foot of the Theatre Wall.



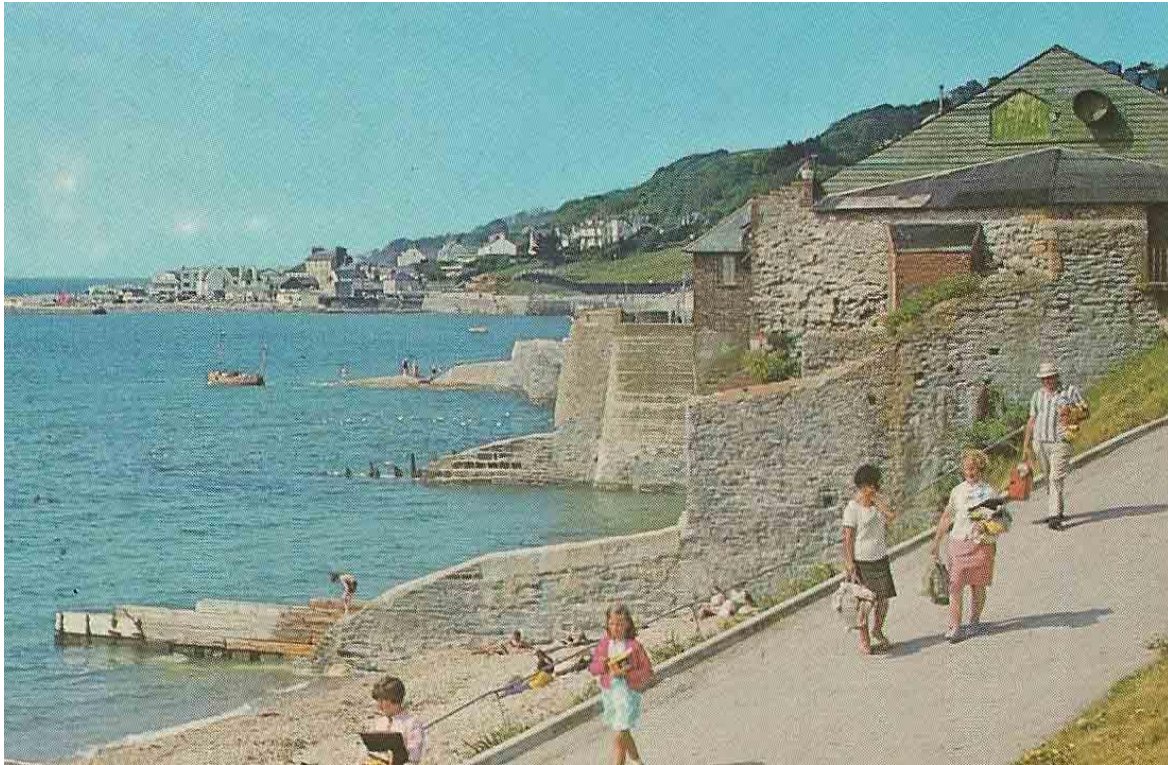
Inside one of the bath chambers between the inner and outer sea walls, beneath the Theatre's sea-side gallery. This is the inner sea wall, made of very substantial Lias ashlar showing few signs of outdoor weathering, as if it was quickly made redundant as a sea wall when the baths were built in 1805.



Back Beach to Gun Cliff in 1825, with the Baths, today rebuilt as the Theatre on the right, with Theatre Jetty in the foreground, Gun Cliff and Cobb Gate jetties beyond. The bath chamber openings in the sea wall can be seen, now covered over by a later skin when the sea walls around the embayment were repaired – here, apart from Gun Cliff, they look broken down by the 1824 storm. Guise’s Wall is not shown, as it was lost 30 years before this sketch. Guildhall Cottage is on the brink and looks precarious, although there is a post and railing fence along the walk up to the Baths.



Back Beach about 1885, with jetties prominent. Theatre Jetty in the foreground has a derelict wooded extension to a sound Portland Roach on Blue Lias structure, Gun Cliff Jetty similar, but Cobb Gate Jetty is not clear to call, although is a prominent structure nevertheless, standing in front of the Assembly Rooms. Gun Cliff shows the bulge where Guise’s Wall started, and also shows that the east face was built in Blue Lias in two sections. Comparison with a previous image shows that these sections were replaced by concrete, perhaps after a breach.



A similar view around 1980, Back Beach below, Theatre on the right. The Theatre sea wall terminates at the head of Theatre Jetty, which has a shorter wooden or concrete block extension, and some alteration to its Portland Roach coping. The sea wall returns into the hillside at the back of the Theatre. Gun Cliff Jetty can be seen: its extension looks derelict. A trip boat is going ahead from Cobb Gate Jetty, having just dropped holidaymakers. At high tide there was no access around these walls. It looks here as if the eastern end of Back Beach is still without sea walls.

Back Beach

Back Beach used to extend from Gun Cliff to the Eastern Jetty or Wall and included the two Theatre jetties. Since the new sea walls and sewerage installations of 1993-5, the beach was reduced in length as the western end was reclaimed for the Gun Cliff Pumping Station, the new sea walls and aprons of rock armour. The 19th century sea walls stopped at the Theatre and the wall returned inland to Long Entry. The rest of the beach was backed only by a grassy cliff on which the Curtis family, who lived in the house above, hauled out their fishing boats and dried their nets. As the cliffs were formed of Blue Lias at the base, they were relatively stable.

Sometime around 1980 a sea wall was built around the back of the beach, in two sections. The western third abutted the Theatre Jetty and the back wall of the Theatre mentioned above. It was built in the form of a railed, dead-end and narrow esplanade and used to site beach huts. It had a stepped front to break up the waves, like the sea wall at Charmouth, and was probably made of mass or reinforced concrete.

The eastern part sloped forward, and was separated from the western part by steps to the beach. It was faced with masonry in a similar way to retaining sloping masonry on the service ramp from Long Entry above, which it intercepted near the point where it met the 18th century Eastern Wall. The Museum has a good photograph of these walls, which cannot be shown here for copyright reasons (LRM 2006/64). These walls are now encased by the galleried sea wall built in 1993-5.

The New Sea Walls from Cobb Gate to the Eastern Jetty (1993-5)

As part of Phase 1 of WDDC's Lyme Regis Environmental Improvement Scheme, combined with South West Water's Clean Sweep Sewerage Scheme, completely new sea walls were built in front of the existing walls and jetties in 1993-5, totally transforming the old walls, which now largely only manage to peep out above the new works. Although many people have given albums of photographs of the works in progress, it appears that no archaeological drawings or high resolution panoramic images were taken of the listed walls before they were covered for good with concrete. If you know better, please let the Museum know. Full details of the works are contained in my paper *Industrial Lyme: Paper 16 – Sewerage in the Lim Valley* on www.lymeregismuseum.co.uk. In May 1991 a model of a proposed new combined sewerage and coast protection scheme was shown in Lyme: it is now on display in the Museum. This proposal was accepted by the community after many years of protest at several different sets of unacceptable proposals.



The new sea walls conceal a storm water tank leading to the Sewerage Pumping Station built on the beach beyond Gun Cliff, with the prominent vent stack. The new Buddle Mouth is to the left. The concrete sea walls on the Museum site and on the adjacent car park are prominent. These walls are faced in grey Portuguese granite, which looks like Blue Lias from a distance, capped with Portland Roach and brushed concrete. The armour stone blocks here are blue Irish basalt from Arklow.



The new sea walls from Bell Cliff, with the new Buddle Bridge (being approached by a person in yellow). The wall tops are coped in Portland Roach to match the top of Cobb Gate Wall, visible in the right foreground. To the left the white wall is the end of Cobb Gate Chip Shop, the building being battered by a storm wave in the Frontispiece, with the eroded top of the old sea wall showing.

The sewerage pumping station was built as a mock fort-like structure and a storm water tank was built into the new sea walls, which support a service road. A 5m wide stone-faced reinforced concrete bridge was built across the River Lim, with 18m of new reinforced concrete sea wall to link it with Cobb Gate, including a mock gun platform complete with recovered canon and a seating area around a recovered anchor given by Portland Navy Base. At the east of the bridge 125m of new reinforced concrete sea wall was built to overlap the existing short esplanade east of the Marine Theatre. Between new Gun Cliff Pumping Station and the Eastern Jetty the new sea wall conceals a well-lit gallery which contains two outfall pipes, a big one for storm water overflow in emergency conditions to the otherwise Broad Ledge outfall, the other a small pipe for treated effluent for disposal by a long sea outfall. The concrete walls were faced with natural stone, grey Portuguese Granite on the sea side, Blue Lias on the land side and capped by massive blocks of Portland Roach, brushed concrete and a grey-hearted buff weathering calcareous sandstone⁸³.

⁸³ Detail from leaflets provided by SWW Clean Sweep, a notice in the London Gazette of 20th September 1991 page 14358 and personal observation

In all 15,000 tons of bluish Irish Basalt from Arklow and a small amount of Mendip Carboniferous Limestone rock armour protects the works, which contain 20,000 tons of concrete. The basalt came by sea in a handful of barge loads, the latter had to come by road. There is some Syenite, but out of sight, and some blocks of Larvikite, both from Larvik in Norway. The new Buddle Bridge has polished Carboniferous Limestone parapet copings on Lias walls inside, faced with grey Portuguese Porphyritic Granite on the sea side and Buddle side. These Voissoir arches are turned sparingly in rather under-sized granite springers and keystones. Purbeck Stone is used for paving setts, steps and some other coping stones. Where exposed some of the old walls have been restored with chert and brushed concrete coping, used *like for like*, as parts of the listed walls contain those materials. Restoration was light and some of the walls, such as the old Lias sea wall at Cobb Gate Chip Shop and the Museum's concrete wall, are not in perfect condition. The scheme removed the threat that the sea made to the Rock Point Inn, Museum, Guildhall Cottage and the Marine Theatre - storm waves used to break right over these buildings.

Eastern or Eastward Wall and Jetty, also called Church Cliffs Jetty (1662 or earlier)

This wall, originally not connected to Lyme's sea walls, protects the headland at the eastern end of Back Beach. It wraps around the headland under more recent concrete walls and joins the new galleried wall that runs around Back Beach. From there it extends out to sea as a jetty to retain Back Beach. The main wall forms a massive bastion, although after it was built the sea, helped by stone quarrymen, cut in behind it to form the embayment of Church Cliffs, threatening St. Michael's Church.

Whilst the jetty effectively secures the shingle of Back Beach, its construction probably accelerated the loss of land around the point by cutting off the shingle supply. Without the two structures the point would have been removed and the sea would have taken much of the property along Church Street, including the Church, and possibly broken into the Lim Valley. It is therefore a significant, but overlooked structure and if it was first built in 1662 or earlier it would suggest a response to rapid erosion. James I had already banned stone collection from the ledges some years before, although not much notice was taken of this edict, but after the Siege the Commonwealth made money available to Lyme for restorative works. However, there is no evidence to link its construction with the fabled loss of any settlement on Broad Ledge or any following concern about the any quickening in the rate of erosion. Could it be that a long-felt need and the ready money enabled Lyme to stem further losses?

Evidence for the date of 1662 comes from a note in the Borough Records that Sam Hoyte & Co were *working on the eastern wall*⁸⁴. Of course, the work could have been on any eastern wall, not this one. The Jetty and Wall are clearly marked on the Chart of 1787, which is the first conclusive evidence for its existence. On the 1856 legal case plan the combined length of wall and jetty was 229ft, and the wall returns at 90° around the point to run into the end of Church Cliff. Today the wall is a hotchpotch of repairs and additions, although the basic structure is of close-fitting massive blocks of Portland Roach ashlar resting directly on the limestone ledge which has been cut to fit, without any dug foundation groove – and with hardly any sign of undercutting. The jetty is very irregular. Again the basic structure is massive blocks of Portland Roach, much repaired and hacked-about where sewerage pipes have been taken through. The Tithe Map of 1841 and the 1903 OS Map show a thinner extension curving eastwards at the end of the jetty, possibly timber, whereas today the jetty has a thin tail in single Portland Roach blocks curving slightly to the west.

⁸⁴ DC/LR/G1/3



The eastern face of the Eastern Wall and Jetty, with the connection to the galleried sea wall around Back Beach on the left, and the old Church Cliff Sea Wall on the right. This view shows the sections of the wall described below: **(1)** is the Jetty in the foreground, rising to **(2)** the link section to the Wall; **(3)** is the Portland Roach ashlar blockwork which forms the first part of the main wall; with **(4)** a concrete faux ashlar breach repair under the railings; **(5)** is ashlar Portland blockwork under Lias, where the wall has been raised; **(6)** is a section of Blue Lias on Roach at its base; **(7)** is the concrete end of Church Cliffs Sea Wall also seen running around the bay in the distance and **(8)** the new wall, was not built when the photograph was taken in 2008. **Numbers in brackets refer to text below.**

The use of Portland Roach by the Borough before 1785, when the Board or Ordnance finally forced its use on the Cobb (see Part 1 of this paper), seems unlikely, as it was more expensive than locally-won material, particularly when thick Lias slabs were temptingly lying on the beach just around the headland at the time. If the wall does date to the 17th Century, then the Portland Roach work we see here today is more likely to be a 19th Century rebuild or a re-facing, when the Borough was known to be buying and using Portland Roach in such as the 1840s extensions to the Cobb.

The eastern combined face of the Wall and Jetty is completely accessible at low tide and shows at least eight different phases on construction and repair:

- 1. The outer Jetty**, which lies under high water, is in a poor state from much storm damage and patching over the years and is just one ashlar block thick, built on a Lias stone base in places. A short part is mass concrete, filling a gap where the sewer outfall was put through the walls foundations in 1900 - with the outcast ashlar blocks of Portland Roach resting on the ledge where they were left. Although the structure looks much degraded, it stands up to the worst the sea throws at it and does not appear, from old photographs, to have diminished much over recent years.
- 2.** The outer section of the Jetty joins the regularly coursed Portland Roach ashlar Wall by **a metre of Blue Lias stonework** resting on Roach blocks. On the western side this looks like a jetty termination, sloping seawards and now resting against a large lump of poured concrete. The Lias is coped by Roach and ends in

Roach. This feature appears in old postcards, but clearly has been rebuilt, because it includes odd pieces of Larvikite, a rock not introduced to Lyme until the late 20th Century. Spare blocks of Roach are lying on the ledges, perhaps kicked out whilst putting sewer pipes through or from storm damage.

3. On the eastern side the Wall quickly becomes high and vertical, consisting of very regular coursing of **massive ashlar blocks of Portland Roach**, fine jointed like those of the Cobb walls. Each stone probably weighs two or three tonnes. Most of the Eastern Wall is built of this material. **On the western side the Wall is in Blue Lias under a Portland Roach coping**, until it runs of sight behind rising shingle, which is retained by a concrete kerb which sits on the eastern side on top of the mass concrete repair.
4. **A section of the eastern side in mass concrete coursed to look like Portland Roach** and continuing the same joints as those either side. This could be a product of the 1940s, when the Borough Surveyor E Prescott was very keen on concrete. It probably fills a breach: perhaps the Portland Roach collapsed. The repair goes right down to the limestone ledge, but it was not a cut into to conceal a sewer pipe as none emerges and the ledge below is not cut into or damaged. [It is not possible to see the west side of sections 3 and 4].
5. **Ashlar continues** inland of the breach for a short section, capped by some Lias work, before a keyed joint to
6. **A section of wall built entirely of Blue Lias masonry** but resting on a single course of Portland Roach blocks. The Lias work is keyed into the Roach work at vertical joint, but it is impossible to say which is earlier, although the Roach is likely to be, simply because it stands longer without erosion. The Blue Lias could be a repair, an extension or a cost-saving measure. The Lias terminates with Portland Roach quoins. These quoins mark the corner where the old wall returned at right angles back into the cliff. A postcard of about 1909 shows the top of this section, with the wall top returning into the cliff, but much thinner than before (LRM 1980/22-7).
7. The next section is the **termination of the first Church Cliffs concrete sea wall.**
8. In 2013 another concrete section was added, the **termination of the new Church Cliff and East Cliff combined sea wall.**

Church Cliffs and East Cliff Sea Walls (1910-2014)

George Roberts reported on the rapid destruction of Church Cliffs at the start of the 19th Century⁸⁵, caused by working of the ledges for stone and the removal of fallen slabs that protected the base of the cliffs by direct quarrying of the cliffs. In addition, the Eastern Wall and Jetty cut off the shingle supply. All these factors enabled the sea to directly batter the vertical Blue Lias cliffs. Meanwhile Shales-with-Beef and Head were slipping over the top onto the denuded wave-cut platform below. The cliffs were indented, possibly where small caves had worked inland along minor faults. There is no record of actual mining for stone, but a watercolour by Lady Pittar in the 1890s in LRM shows what looks like either a cave or a mine entrance – it could be that the quarries were working back into a cave to get more of the cliff to fall and release stone to be taken away on stoneboats.

Roberts opined that 90ft of the cliff had been lost between 1803 and 1833 and lamented the loss of the town's eastern Walk, graves from the churchyard and the folly of continued quarrying. However, the gathering of stone by the town's stone boatmen continued unabated further east at East Cliff until the cement works closed in 1913, although it had been stopped earlier under Church Cliffs, after protestors feared the loss of St Michael's Church.

⁸⁵ George Roberts 1834 *ibid* p 214-7



Western Face of the Eastern Wall ending against the Eastern Jetty from Back Beach. The wall shows the Blue Lias termination **(2)** coped and quoined with Portland Roach, supported by a lump of mass of concrete marking a repair. However the termination contains mortared-in pieces of Larvikite, which did not arrive in Lyme until the 1980s, suggesting this these stones have been re-set. Seaward the Jetty **(1)** is a very irregular mix of Portland Roach blocks and some concrete at first, marking breaches caused by putting sewer pipes through and many repairs since the Jetty was first built in the 1780s. Further out it is pure Roach, as a single line of blocks. Somehow this flimsy structure endures what the sea throws at it and continues to retain the shingle and sand of Back Beach.



The Eastern Wall termination against the Church Cliff Sea Wall in 2014. This shows the 2013-14 sea wall **(8)** in the background and terminating against the earlier Church Cliff Sea Wall **(7)**, in turn abutting the old Eastern Wall **(6)** at its return into Church Cliffs. Note that the return is faced with Portland Roach, the coping of which is visible on old photographs running into the hillside.

George Roberts started a public subscription as far back as 1840 to provide a sea wall to protect the church, but nothing was done despite further major falls along Church Cliffs and East Cliff in 1844, 1849, 1862 and 1908⁸⁶. After three slips in 1908, a short distance beyond the end of the East Cliff Sea Wall, which just missed quarrymen, A J Jukes Browne of the Geological Survey reported that the whole of Church Cliff was unstable⁸⁷. By this time most of the churchyard and several cottages had already gone. At last in 1910 a short section of wall and a couple of groynes to retain shingle were built under Church Cliffs to protect the churchyard. The £2,000 [£21,042] required was raised by subscription⁸⁸. Trenches filled with rubble, drainage and concrete had done what Roberts had argued for in 1834, but a further major fall occurred in 1928.

By 1938 the wall shown in the photograph below had been built. It had four groynes and terminated in a massive concrete buttress to the east. It merely rested against the lower part of the cliff and was built by pouring concrete behind shuttering. Some drainage was installed, but it did little for the unstable slope above. Drains can be seen running down the cliff above the concrete section.



The 1938 Church Cliffs Sea Wall, a photo by Muriel Arber

It was still not enough, and a more extensive **Church Cliff Sea Wall** was built in reinforced concrete some time before R Humby of Poole reported on its possible extension along East Cliff in 1952⁸⁹. Only one general arrangement drawing from Humby's report survives in the Lyme Regis Museum archive. This wall had a narrow walkway on top, but it was soon surcharged by slipped clay slumped from above, despite a stone-faced retaining wall. The main wall started at the Eastern Wall or Jetty, where its

⁸⁶ A C G Cameron, *Lyme Regis: an account of its geology & its history* 1890 and Brian Conway *Black Ven landslip* Inst Geol Sciences Report 74/3 1974

⁸⁷ A J Jukes Browne *The Burning Cliff and the Landslip at Lyme Regis* 1908 Proc Dorset NH and Arch Soc vol 29 pp 153-160

⁸⁸ Cyril Wanklyn *Lyme Retrospect* 1927 p 100

⁸⁹ Humby R *Church Cliff and East Cliff - Proposed extension of Sea Defences* Unpublished drawing for the Borough of Lyme Regis in LRM. Part of lost wider report, dated 1952.

termination is the only part of it still visible. A ramp to the beach was incorporated where the wall curved around the embayment.

The East Cliff Sea Wall (1957)

Humby's proposed extension along East Cliff was built by W C French & Co for the Borough in 1957. It was cast in reinforced concrete at a cost of £36,130 [£778,067]. It is now covered entirely by the 2013 wall. It joins the Church Cliff sea wall and extends 300m under East Cliff at a slightly lower height than the Church Cliffs wall, linked to it by steps, where it set back slightly. No walkway was provided, although when clear of debris the unprotected top could be used for emergency egress at high tide. Later, climbing aids such as iron ladders and handholds were installed for that purpose, after people had been cut off by the tide in 1960s.

The wall is now encased in a newer sea wall. It is 8ft thick at the base, tapering to 2ft just below the cast concrete wave return at the top, which is 2ft 9" deep. The wall stands 16ft above the ledges, with drain outfalls 18m apart, just above HWMOST and near the top. Like the Church Cliffs Wall it was built to follow the indentations of the cliff behind, so it curves sinuously along the top of the foreshore, a feature much loved by Lyme artists such as Sydney Jessett. It was first built without groynes. Rubble-filled shallow surface drains were provided on the slope above. No sheet steel piling was provided in front of the wall, as intended, owing to a steel shortage at the time of construction.

As soon as 1960 the ledges in front of the wall were suffering erosion and Willet Civil Engineering Ltd were contracted by the Borough to build a concrete apron along the foot of the wall in lieu of the forgone sheet steel piling, to grout up cavities in the Blue Lias in the ledges next the wall, to provide extra pipe outfalls over the wall, to build 9 long and 4 short groynes made of timber, rails and concrete and to replenish the beach with shingle. Each groyne was originally provided with steps at the foot of the wall for public access to the beach, which was a public footpath. This remedial work cost £45,810 [£942,324], £8,680 [£186,279] more than the original wall had cost 3 years earlier.

At its eastern end the wall terminated against the cliff, but soon the sea got behind this termination and the gap had to be filled with large imported armour stone boulders. The steps on each groyne were eroded by the sea - and later chipped off as they became dangerous, although later provided with steel hand-holds for climbing in emergency. Beach access was later maintained at mid-tides and low tides by the removal of sections of each groyne and by hand rails fitted to the apron. There was no way of accessing the wall top from the beach at the far end from the wall, so the wall totally prevented egress from the beach at high tide, stranding the unwary.

By 1984 the East Cliff wall was deteriorating badly. Hutchinson⁹⁰ reported on the condition of both the Church Cliff and East Cliff walls. He could find no constructional account of the former. It remained in fair condition, being in the embayment and therefore not having been subject to the full forces of sea. It also had a lesser weight of slumped material surcharging it than the East Cliff wall.

The 1957 East Cliff Wall is of similar mass concrete construction to the Church Cliff Wall, but it was known to rest in a shallow trench cut in the foreshore not protected at its base from undercutting, except retrospectively by the 1960 concrete apron. It had inadequate drainage and it was under lateral pressure from surcharging by clays slipping from the very unstable slopes above. The eastern end was rotating into the sea-cut void behind it and the entire wall was cracked and becoming out of true. The arrangements to channel the small stream which drained the Charmouth Road Car in two pipes over the wall smacked of expedience.

⁹⁰ J M Hutchinson *The Condition of the sea walls at Church Cliff and East Cliff, Lyme Regis* Report to WDDC 1984 Typescript in Lyme Regis Museum's Sea Defences file.

Hutchinson also reported that the groyne were hardly trapping any shingle and that erosion of the ledges was continuing through the washing-out of each shale bed and collapse of the overlying limestone bed. He noted that the cracks were widening and recommended that the public should be kept away from the wall east of the 7th groyne – advice which was ignored whilst the danger was not manifest, as exclusion would damage Lyme as a resort and its fossil hunting experience. He advised that the wall should be buttressed and anchored, or replaced seawards with the gap properly filled and the slopes above stabilised. He also suggested that a new sewage works could be provided between the walls.

The entire structure, apart from the rotating termination which was demolished, is now encased in the new wall built seaward in 2013/4.



The new Church Cliff Wall under construction in December 2013, encasing the old

The New Combined Church Cliff and East Cliff Sea Wall - completed in 2013-4 as part of the Lyme Regis Environmental Improvements

The object of this scheme was to secure the entire eastern coastal slope from sliding catastrophically over the existing, failing, sea wall. Minor slides had already threatened buildings, including a collapsed wooden bungalow, whose fallen brick chimney stack remained as a solid piece of masonry perched above the wall. But by the start of the 21st century it was realised that not only was the sea wall failing, but also the whole slope from Timber Hall down, with the Charmouth Road and all of its houses, could slough off down the slope and over the wall. It would have been reactivated by failure of the old sea wall – and would then have threatened 140 properties, Davey Fort and Charmouth Road and its car park

Gallois Consulting reported to WDDC on the geology of Church Cliffs in May 2005⁹¹. Following on civil engineers High Point Rendel reported in 2007 that⁹²:

- surface and sub-surface ground movement is ongoing,
- areas of wet ground vary seasonally in some parts of the site, while other areas contain springs and streams and others are saturated throughout the year,
- the unprotected sea cliff to the east is retreating as a result of marine erosion and
- there is general lowering of the level of the ledges and shingle in front of the sea wall.

Work started in 2013 as Phase 4 of the Lyme Regis Environmental Improvements. The new re-enforced concrete wall encases the old, except where it had to be demolished at the eastern end because its foundations were failing. It is wider and has steps to access the beach at the end, where they are set back behind the wall for shelter where the termination juts out from the cliff, rather than butts up to it. Following the curves it is about 500m long from the Eastern Jetty. The wall has a wave return curve at the top and a broad walkway, which is connected by a footbridge over soft ground to a path to Charmouth Road car park. It does not depend on groynes for its security, which have been removed from the ledges, making walking at low tide easier.

In addition the slopes of Church Cliff have been drained with sub-horizontal drilled drains and secured by dowel pins, soil nails, wire netting and planting. Further east the toe of a fossil mud slide extends upslope towards Timber Hill. It has been supported by a continuous pile wall angled NE-SW across the bottom of Charmouth Road car park. Drainage has been provided by two cut-off drains, a higher one for the drainage from Charmouth Road and a lower one taking the water from the Charmouth Road Car Park. Both discharge through the new sea wall. The total cost of the wall and slope stabilisation by nailing, piing and drainage was £30M⁹³.

Acknowledgements

I am indebted to members of the Lyme Regis Museum Research Team for information, but all errors are mine. Diane Shaw assisted with the transcription of the Cobb Gate letter and Ken Gollop and Pete Lacey provided useful information in discussion. Nigel Day showed me the bath chambers at the Marine Theatre.

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⁹¹ Gallois, R. W. 2005. Report on the geology of Church Cliffs and adjacent areas, Lyme Regis, Dorset. West Dorset District Council Technical Services Report No. 05/01. Copy on CD in LRM

⁹² High Point Rendel *Lyme Regis Environmental Improvements Phase IV Preliminary Design Stage Addendum Geomorphology Report to WDDC 2007* PDF file accessed on Dorset for You Web site

⁹³ Information from WDDC Lyme Regis Coastal Works Update Autumn 2009 and on-site information panels

Appendix: Stones used in the Lyme Regis Sea Walls etc

NB a list specific to the Cobb is annexed to Part 1

Local Sedimentary Rocks

Blue Lias – grey soft limestone used for walling, traditional won from the ledges and cliffs, although hardly fit for purpose when salted. Better Blue Lias came from Uplyme, but now got from Somerset. Not now used where open to wave action. In the Phase 1 works the Blue Lias walling to the Gun Cliff pumping station and landward faces of sea walls came from Charlton Adam, Somerset.

White Lias – this formation occurs directly under the Blue Lias, although is not exposed until west of Devonshire Head. It is a creamy hard blocky limestone from Lime Kiln Lane or Venlake Cross, Uplyme or Axminster.

Chert – some Upper Greensand Chert was used in Phase I works to match existing chertstone walls at Gun Cliff.

Cowstones – large rounded boulders of naturally calcareous cemented grey Upper Greensand taken from the foreshore both sides of Lyme and named after their resemblance to cows lying in a field. Cowstones were floated to the Cobb between casks to be placed loose in piled timber revetments to build the first breakwaters at the Cobb, but occur elsewhere in sea walls. After 2-300 years marine exposure weathers with a honeycomb finish, but when fresher can resemble Blue Lias in a wall, but much harder and usually contains *Serpula*, a coiled fossil worm tube.

Imported Sedimentary Rocks

Portland Roach Bed or Capstone – creamy hard shelly limestone with voids where fossils have been dissolved out, sometimes filled with calcite crystals from the Isle of Portland. Regarded as waste suitable only docks and harbours, it had to be removed before the high quality Portland Stone beneath could be extracted. The whole Roach Bed was used as massive ashlar blocks up to 2ft 6" thick by the Board of Ordnance in late 18th and early 19th rebuilds of the Cobb. In the same monolithic way the Borough used it for the North Wall, the Eastern Jetty and to cap jetties and for copings on sea walls from the 1780s. Roach cannot be got thicker than this, but it can be extracted in pieces up to 5-6ft long and cut to precise sizes and shape, despite its rough appearance. Although it has voids where fossil shells have been dissolved, it weathers so well in a marine environment that in 200 years there is hardly any surface loss.

Purbeck Stone – creamy hard limestone, some paving setts in Phase 1 are from Downs Quarry, Swanage. The sea walls below the central section of Marine Parade and some steps down to the Cart Road are faced with Purbeck Stone

Shingle - in Phase II 60,000 tons of shingle were dredged from the seabed off the Isle of Wight and delivered directly by ship to Main Beach, matching the Lyme chert shingle in rock type and colour.

Sand – in Phase II 40,000 tons of sand were pumped from the sea bed off France and delivered directly by ship to Main Beach. This sand is coarser than Lyme sand, not forming such good sand castles.

Carboniferous Limestone – grey hard crystalline limestone from the Pas de Calais, used for rock armour west of the River Lim in Phase I Sea Walls 1995-7. The parapets of the new Buddle Bridge are cut and polished Carboniferous Limestone from Gurney Slade in the Mendip Hills.

Calcareous Sandstone – buff, grey-hearted hard sandstones with some oyster-type shells forms the massive copes of retaining walls between Gun Cliff and the Eastern Jetty. These stones appear to be Jurassic or Cretaceous, but their origin is not known.

Devonian Limestone - grey hard crystalline limestone from South Devon, with pink or white veins and marbling, used to a limited extent in the 20th century for walling and some rock armour. Can be found as a band in the Marine Theatre walls.

Exotic Igneous Rocks

Granite - grey Lias-matching Northern Portuguese granite was used to face the concrete walls at Gun Cliff and the new Buddle Mouth. Pale buff granite ashlar blocks cap the new Cobb Gate and Kevin's Jetties. Pale grey granite was used in the walls from Jane's Café to the ramp to the east.

Syenite – grey coarse intrusive crystalline basic igneous rock from Larvik Syenite Quarry in Norway – some was used as core stone in Phase I Sea Walls 1995-7, but not exposed.

Larvikite - Dark blue-grey coarsely crystalline ultrabasic igneous rock delivered direct by barge from Larvik used for the rock armouries.

Basalt – bluish grey fine grained basic extrusive igneous rock from Parnell Quarry, Arklow, Ireland. Some 15,000 tons were used for rock armouries in Phase I, delivered direct to site by barge. The quarry also supplied some grey greywackes.

Dolerite - Tooled ashlar basalt blocks were used to build the new Cobb Gate and Kevin's Jetties, located on stainless steel rods. Dolerite is dark and similar to basalt but coarser grained, but intrusive rather than volcanic.

Other

Concrete – one of the earliest concrete sea walls in Lyme is the Museum's mass concrete wall built around 1900, adjacent to a higher mass concrete wall with wave return top on part of Gun Cliff. These filled a long-standing gap created by a collapse many years before. In 1903 re-enforced and mass concrete was used to create scalloped bays of great strength to hold back the landslips along Marine Parade - still in place to support the second generation of shelters. Many underpinnings by Lyme Regis Borough Council after 1920 were of roughly shuttered concrete, usually faced with Lias stone blocks where exposed, particularly under the reign of Mr Prescott as Borough Surveyor. Now most new Lyme sea walls consist of reinforced concrete, even if stone faced. 20,000 tons of concrete were used in the Phase I works. Some coping stones in Phase I are moulded in-situ brushed concrete, massive in size to match the Portland Roach copes. The new Cart Road sea wall built in Phase II consists of interlocking cast blocks of creamy reconstituted stone, concrete by another name.