Portsmouth Explorations during Pandemic Times: Continuing Adventures Out of Sasashima

John Hamilton

First I must say thank you to my daughter Meg and her husband Bogdan Văcărescu. They decided suddenly about three months ago that they would move house (from a flat on the edge of Islington) to Portsmouth. Although I live quite close to Portsmouth ... it is about half an hour by car from here to GUNWHARF QUAYS.... I have only been there about three times in my life: the first time was to visit the VICTORY, Nelson's flagship at Trafalgar, the second time was to go to a football match at FRATTON between Pompey and another team, and the third time was to go and listen to ANDREW MOTION reading his poetry at Portsmouth Grammar School (PGS) ... he was poet laureate then. So during the Pandemic ... it is now August 2021.... I decided to go and explore Portsmouth every day. I can give my conclusion for them now. It is a foreign country if you live in the Sussex Downs as I do. They will need a sense of humour ... but it is a good place to live.

I started my exploring closer to home in the village of Racton.... I live in the Downs four miles east of Havant. Racton is not even a village. There is just Racton Church and a cottage beside it called the King Charles Cottage, and a ruined folly up on the hill. Otherwise there are only a few houses scattered about. Over the river from the church is a field of sheep where once there was a Racton Manor. Now it is just grassy bumps. In 1651 after the Battle of Worcester King Charles II was trying to escape to France. There is an account of his journey across England dictated by the King 25 years later and written up by Pepys (in code). This is in a library in Cambridge. It was Colonel Gounter of Racton Manor who found the boat along near to Brighton. It is not certain that the King stayed in the cottage beside Racton church, although I have seen the Royal coat of arms in

the bedroom there. He probably didn't know himself where he was sleeping. But certainly Colonel Gounter helped him to get across the Downs from Hambledon to Shoreham where he got on a coal boat which went on to the Isle of Wight to deliver coal. Then the wind blew from the north and he was across the Channel in no time.

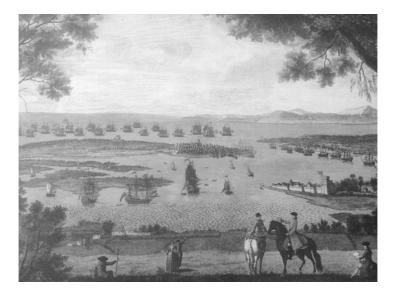
At Langstone, opposite to Hayling Island, there is a pub called the Royal Oak.



The board hanging outside shows King Charles II hiding in an oak tree, the Roundheads beneath. The Roundheads were serious ... I'm sure they were waiting for him at Langstone.... And they would have killed him if they had caught him ... he might even have found a boat at Langstone to take him across the Channel.... As it was HE ESCAPED TO FRANCE from Shoreham harbour further down the coast. I visited Shoreham. It is a nice place today. A few people these days live there on old houseboats in the harbour, their homes going up with the tide, and down with the tide, twice a day. It appealed to me....

Anyway, Charles II returned from France in 1660, after the death of Oliver Cromwell. The people wanted him back. I am reading about it now in Antonia Fraser's book on Charles II. In 1662 he married Catherine of Braganza from Portugal in PORTSMOUTH in the Royal Garrison Chapel. Actually he married her twice, once with a Catholic ceremony (SECRETLY), and then with a Protestant ceremony in the Royal Garrison Chapel (Domus Dei). This church is still there near to the entrance of Portsmouth Harbour. The roof over the nave was destroyed on January 10th, 1941, during the Second World War when Portsmouth was bombed very heavily, but the chancel has a roof and today there are services there sometimes. Catherine of Braganza brought chests of tea from India and is credited with introducing the English to tea drinking. In her dowry she brought BOMBAY and Tangier. In 1668 the East India Company leased the islands of Bombay from the British Government for ± 10 a year. Bombay went on to become the largest port in India and India 's financial capital. It was a British possession until Indian independence in 1947, and today 12 million people live there. Tangier was a British possession for a much shorter time 1662–1684. Today there is a pub called The Tangier near to Baffins Pond in North End, Portsmouth. SAMUEL PEPYS, who wrote up the account of Charles II's escape to France had guite a lot to do with Tangier, and according to Claire Tomalin's book about him, quite a lot to do with Portsmouth and the Royal Navy.

In December 1677 Pepys made a proposal in the Privy Council 'that no one should be appointed as lieutenant until he had served three years, received a certificate from his captain, and passed an examination in navigation and seamanship at the Navy Office. In the Council, Prince Rupert opposed this proposal, but the flag officers and the King supported Pepys, and the first examinations took place early the next year. Pepys had made history at a stroke, bringing about a revolution in the way the navy was run, fired by his belief that education and intelligence were more useful to the nation than family background and money, and that however gallant and courageous gentlemen captains might be, the service needed to be professional.' This comes from Claire Tomalin's book. The King knew something about the sea. During the Civil War aged 15 and 16 he had sailed a boat to the Scilly Islands and later on to Jersey.... And it was Pepys's proposal, with the support of the King, that made sure the navy was set up for the Battle of TRAFALGAR 130 years later.



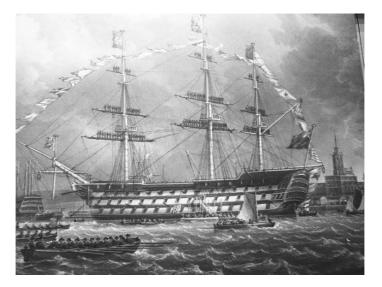
"A view from the harbour and town of Portsmouth, with his Majesty's fleet under sail". A handcoloured engraving published by Laurie and Whittle of Fleet Street on 12th May, 1794.

Actually this is a good picture of Portsmouth from Portsdown Hill even today. (My wife has ridden a horse up there like the people in the picture. And these days she rides with the Hursley Hambledon Hunt in the Southwick estate north of Portsdown Hill. In the foreground is Portchester Castle. Down in Portsmouth you can see the Cathedral which also served as a lighthouse. To the left is Southsea Castle on Portsea Island. You can see Portsmouth Harbour on the righthand side of Portsea Island, but you can't quite see Langstone Harbour on the left side. Out in the Solent is the Fleet ... Nelson's fleet. The ships were made of oaks from the New Forest and the Forest of Bere in Hampshire, and they were powered by the wind. It was these ships which took the British all over the world, to India, China, Australia and the Caribbean ... and to America. Beyond in the picture is the Isle of Wight. I often drive along the top of Portsdown Hill ànd the view is the same now, except that Portsmouth now covers most of Portsea Island.

Up on Portsdown Hill is the NELSON MONUMENT (it is not as large as

Nelson's Column in London) and on it is written his story. I will summarise it because this is how people here remember Nelson.

- 1771 He was 12 and a midshipman.
- 1794 At the siege of Calvi in Corsica he was blinded in his right eye.
- 1797 At the Battle of Cape St Vincent he led a boarding party to capture two Spanish ships.
- July 1797 He lost a right arm at Santa Cruz in the Canary Islands.
- 1798 He destroyed the French fleet at Aboukir Bay ... and met Emma, Lady Hamilton.
- 1801 He put the telescope to his blind eye and captured Copenhagan.
- 21st October, 1805 He defeated the joint Franco Spanish fleet at the Battle of Trafalgar, and was killed by a musket ball from a French sharpshooter.



This is a picture of Queen Victoria visiting the Victory in 1845, 40 years after the Battle of Trafalgar.

I visited Bishop's Waltham, just north of Portsmouth in the Downs, and there I

found the ruins of a Bishop's Palace, much of it built by William of Wickham, Bishop of Winchester (1377) ... and destroyed by Cromwell (1644). The beautiful fishpond there is the source of the Hamble river which goes out into Southampton Water. After the Battle of Trafalgar the French Admiral Villeneuve was put up in the Crown Inn in Bishop's Waltham and there is a plaque on the wall to commemorate this.



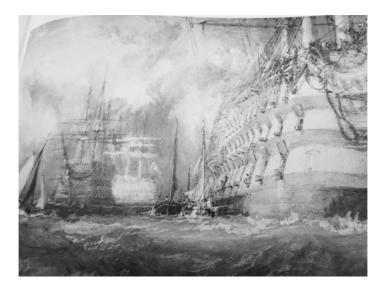
And I visited BUCKLER'S HARD and LEPE on the Beaulieu River estuary where ships were built during the late 18th century. At Buckler's Hard one can see the slipways used for vessel construction. The timber came from the New Forest. The first ships were built from 1744. The chief shipbuilder was a Henry Adams. In 60 years 43 Royal Navy ships were built here. Three ships from here were at Trafalgar. (I give the names of just three. An exciting book could be written about each one of the 43.) The 36 gun HMS Euryalus, built in 1803, captured the French Admiral Villeneuve at Trafalgar ... and the Spanish ship Santa Ana. The 74 gun 3rd rate ship of the line HMS Swiftsure, built in 1787, took a serious part in the Battle of the Nile in 1798 (which stopped Napoleon getting to India!?).... The 64 gun HMS Agamemnon was built in 1781. Nelson was her captain from 1793 to 1796. In 1801 she took part in the first Battle of Copenhagen. At Trafalgar she captured the Spanish Santisima Trinidad....

Later in World War II they built motor torpedo boats at Buckler's Hard, also landing craft for the Normandy invasion.

At Lepe on the other side of the Beaulieu River, Henry Adams and Moody Janverin were the chief builders of the ships. The 50 gun HMS Greenwich was built in 1747 and served in the Seven Years War but was caught in a gale and wrecked in 1758. HMS Fowey built in 1749 was sunk in 1781 fighting the French at the siege of Yorktown in the American War of Independence. The 64 gun HMS Europa built in 1765 fought in the Battle of Cape Henry in 1780 and the Battle of Chesapeake in September 1781 where she suffered heavy damage....

Later, in the Second World War the shipyards at Lepe helped with the construction of Mulberry Harbour in Normandy for the D-Day Landings....

Here is a watercolour by Turner painted in 1818 with the title 'A First Rate taking in stores'.



A 'First Rate' was a ship of the line of battle with more than 110 guns. It must have been very formidable for a ship of the line like this to come alongside with

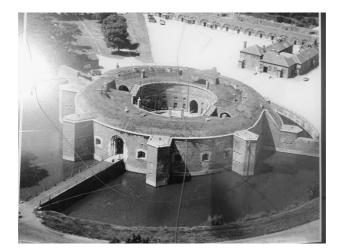
all the guns firing.... I suppose 55 on one side, then on another tack, the 55 on the other.... I have been trying to find out where all these cannons were made. Some people have pointed me towards the Woolwich Arsenal near to Greenwich, but I think they were made in foundries all over the Weald in Sussex and Kent, and further afield, and then transported to the ships by river and canal, or by sea. Some of the guns were captured from the French. This is all quite important because it wasn't just ships with sails which took the British all over the world, it was sailing ships with guns. They had to see off the French on the way, and bombard ports which were hostile. (This is called 'Gunboat Diplomacy'. For example, it was the Royal Navy which delivered the Macartney embassy and the Stauntons to China in 1793. The Commander on this occasion happened to be Admiral Sir Erasmus Gower on HMS Lion from Hambledon, a village north of Portsmouth. This voyage is written up in the 'Authentic Account of the Embassy' by George Leonard Staunton.... But fifty years later it was the gunboats which went up the rivers in China during the Opium War, which opened up the Chinese ports to trade and led to the Treaty of Nanking in which Hong Kong was ceded to the British. Actually in this case it was the Nemesis, a shallow draught ironclad, using Congreve missiles (which usually missed their target) which did the trick.

On the east side of the Beaulieu river is Exbury Gardens owned by the Rothschild family. This garden is famous for Rhododendrons. The Rhododendrons there originally came from high mountain places like Sikkim and Bhutan, and China Sichuan, and were brought back by planthunters like Frank Kingdon-Ward. Garden history in England is very much connected with naval history because a lot of the plants came from a long way away.

Portsmouth is a FORTRESS CITY, built on an island, with forts up behind on Portsdown Hill, and in Gosport (God's Port) to protect it from the land side. And there are more forts out in the Solent (not on this map).



I visited Fort Brockhurst in Gosport which was closed (it usually is), but I photographed the moat and the helicopter (or drone) photograph at the gate. I think they put sheep or goats on the roof of the fort to graze off the grass. It is representative of what the forts look like.



I went to the Royal Armouries at Fort Nelson on Portsdown Hill and took photographs of some of the guns. For instance there was an anti aircraft gun used in the defence of Portsmouth in January 1941. And I saw a British howitzer used in Malaya (Semenyih Selangor) in 1956 ... and a Soviet light anti-tank gun from 1942. There is a big collection of guns there. I learned the difference between a Mortar, and Artillery, and a Howitzer. This is a question of trajectory. A mortar goes up and comes down and explodes. Artillery goes straight. And a Howitzer is somewhere in between. It is curious to have a museum devoted to guns (free entry!). I was told that the cruise liners that dock in Portsmouth, send their passengers up to Fort Nelson in buses, and then let them loose to explore the exhibits in the tunnels and magazines.

And I walked along the Hilsea Lines. This is a fortification running along the north side of Portsea Island. Today it is a long thin park about 3 miles long, all trees and bushes, and you can't see any fortications at all. But they are definitely there, hidden in the undergrowth. In World War II, if tanks had been landed in Kent, Portsmouth might have become a sort of STALINGRAD ... in which case all these forts would have been reduced to rubble.... Portsmouth might even have been England's HIROSHIMA if Hitler had got the Atomic Bomb first....

The forts were known as Palmerston's follies and they were built mainly to protect Portsmouth from the French. Actually they are not follies at all, they are forts. There seem to be forts all the way along the South coast of England. There is one at Shoreham, and there is one at Littlehampton, West Beach. The one at Littlehampton was constructed in 1854 and it is claimed to be the first of Palmerston's forts. According to the explanation it was constructed under the command of Captain Fenwick of the Royal Engineers and built by Messrs Locke and Nesham. West Beach, Littlehampton is a beautiful place with sand dunes, and breakwaters, and lots of wild flowers, including sea cabbage which you can eat. There is a very good fish shop along the quay beside the river Arun. Littlehampton is the port of Arundel.

During the 19th century Portsmouth grew a lot larger. At the end of the venture up to 1914 there was a naval arms race with Germany. The Portsmouth Dockyard workforce expanded. Dreadnoughts were built in record time, every year bigger and better ones. HMS Dreadnaught 17,900 tons was launched by King Edward VII, 10 February 1906. An industrial town grew up on Portsea Island in Kingston and Milton. By 1914 Britain had 20 commissioned Dreadnoughts and 9 Battle Cruisers. Germany had 15 commissioned Dreadnoughts and 7 Battle Cruisers. Portsmouth had become a heavily defended naval port and garrison town. The army was needed to defend Portsmouth, and the army was also sent out from there to the world. Barracks were built. The troops were drilled on Southsea Common by the sea. By August 1914 there were more than 17,000 men working in the Dockyard, 600 pubs on Portsea. All this had a big effect on how the City of Portsmouth developed. It still is the only industrial town in the south of England.

Then the First World War arrived and for many in Portsmouth it was a disaster.



Six Portsmouth ships were sunk at the Battle of Jutland in the North Sea in May/June 1916 with 4000 men lost. Soon after this HMS Hampshire sank after hitting a mine with Lord Kitchenor on board and many Portsmouth people on board, 655 officers and men. In Flanders Hampshire regiments were dying in the trenches. Portsmouth Grammar School lost 127 boys. Portsmouth men played their part at Gallipoli. Lieutenant Norman Holbrook VC (formerly PGS), the 26 year old submarine commander, dived under 5 rows of mines in the Dardanelles to

sink the Turkish Mesudiye battleship. (It seems that PGS ... Portsmouth Grammar School ... is famous as a school because of the number of heroes it produced in the First World War.). And I found out that out in the Far East in January 1918 HMS Suffolk delivered the Hampshire Regiment to VLADIVOSTOCK to fight the Bolsheviks. Miss Theodora Williams of the St Wilfred's Mission, Portsea wrote in her diary: 'The refugees (women) cheer up when they have something useful to do ... there are mud villages with little onion domed churches, an icon with a candle in every house ... they bow to the icon before and after eating.... In the out patients, there are many races....'

This is s picture of the great hospital at NETLEY beside Southampton water. It was built during the Crimean War (it's design much criticised by Florence Nightingale) and used during the Boer War, the First World War and the Second World War. It was pulled down in 1966 except for the chapel in the middle. The land is now used for football pitches.



The Second World War was another appalling story for Portsmouth. I have a pamphlet here called 'The Smitten City. The Story of Portsmouth under the BLITZ'.

There were 67 air raids between July 11th, 1940 and May, 1944. The major attacks were on August 24th, 1940" ... January 10th, 1941 ... and March 10th,

1941.... The worst night was January 10th, 1941. 300 bombers came over dropping 25,000 incendiaries and 350 tons of high explosives, destroying more that 3000 houses, 6 churches ... it was a seven hour attack. There were decoy bonfires on Hayling Island. With the searchlights, and anti- aircraft batteries, and barrage balloons, what a night it must have been! On January 31st Prime Minister Churchill and Mrs Churchill visited the ruins. The Royal Garrison Chapel lost its roof. The Theological Library in Edinburgh Road with its priceless old manuscripts was destroyed. The station survived, but there were large craters in the road in front of it. The Cathedral survived, but Oyster Street around it was in ruins. Dunbar Road, Eastney was reduced to rubble. There are photographs of the King and Queen with the Lord Mayor of Portsmouth, Sir Denis Daley, inspecting bomb damage in the city, saying, "You are wonderful people. We are very proud of Portsmouth." Palmerston Road in Southsea was all tottering brickwork, tangled girders..., the George Hotel in the High Street, where Nelson used to stay, was completely demolished. The Harbour Railway Station was also completely destroyed, and alongside the platform was the wreckage of a train. Obviously the air raids had a big influence on the way the city looks now. It was the same story in Plymouth, Coventry, Hull, Ipswich and of course London.

As part of this exploration I went to BRIGHTON to see what I could learn there about Portsmouth. It is not at all like Portsmouth. It is not a port. I will describe my visit and what I learned.

The Sussex Downs are just up the hill and a big road, the M27 runs along the Downs east west across England. That is where I came from. I stopped in a garage where two Tamils from Jaffna kindly sold me a map of Brighton. I parked in the Laines which is a Bohemian area of Brighton with it's Coffee Shops and places selling sandwiches, and boutiques ... it is quite scruffy. I saw several girls with rings in their noses. From there I walked down to the Pier, passing the Youth Hostel. There was a blue plaque on the wall saying that King William IV and Queen Adelaide had stayed there in 1829. I wondered if I could stay there. Not yet I was told. During the Pandemic they had been putting up the Homeless in the hostel. Next I went to the Royal Pavilion which had just been opened. It is a

beautiful building thanks to its garden with a Chinese interior and and an Indian (Mughal) exterior, full of exotic Chinese things inside. In one of the paintings there was a girl with a mandolin who I thought might even be a Uighur princess. The dining room is spectacular. It was really built as a place out of London where the Prince Regent could have parties. It is still used as a venue for wedding parties. On 29 March it hosted the first legal same sex marriages (according to my iPad). Queen Victoria sold the Royal Pavilion to the City of Brighton and built Osborne on the Isle of Wight opposite to Portsmouth, which was more spacious and further from London. During the First World War, up to 1915, the Pavilion was used as the Indian Military Hospital. Great care was taken to respect Indian differences ... Muslim, Sikh, Hindu ... there were seven different kitchens for example. The Chattri at Patcham in the Downs commemorates Indians who died in the hospital.

The outside of the Royal Pavilion is in Mughal style. It was built for George Prince of Wales from about 1787. In 1811 he became Prince Regent (due to his father's mental illness) and from 1820 to 1830 he was King George IV.

Since the Second World War the Brighton Pavilion has been restored with most of the original furniture brought back from Osborne Buckingham Palace and Windsor. The architect of the Pavilion was John Nash (but he drew on the ideas of Humphrey Repton, Henry Holland, William Porden and Augustus Pugin to whom some of the credit is due!).

As the Pandemic started drawing to a close in the summer the Historic Dockyards Museum opened up and for only £33 I was able to get a combined ticket for one year to visit all the attractions. This included the SUBMARINE MUSEUM which is actually in Gosport on the other side of Portsmouth Harbour.

The HMS Alliance which is on display in the Submarine Museum is a World War II submarine commissioned in 1947. I watched a film showing Marines being put ashore in cances somewhere near Brunei 1963–1966 ... with talk of the smell of sweat and diesel in the submarine ... and there were pictures of the crew having a shower with a hose on the deck.

The submarine in this picture is an Astute class submarine. It is nuclear powered



and carries cruise missiles and torpedoes.

I didn't know that in World War II (1943) that there were British submarines based in Fremantle, Western Australia and in Trincomalee (Ceylon). Submarines are very important these days. In the museum I had a cup of coffee sitting beside a Polaris missile. Here is another photograph from the museum.

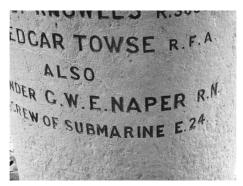


In Stoughton, a village five minutes from here, an old lady died recently. She had had a battle with the Vicar. She had given money to repair the church (foundations ?) and wanted to have some say in how her money was used. The vicar said that this was impossible. I believe that the church didn't get the money.

This was Betty Killick 1924–2019 an electronics engineer. From 1966 she had been at (ASWE) the Admiralty Surface Weapons Establishment on the Isle of Portland, and from 1969 she had been the key person at (AUWE) the Admiralty Underwater Weapons Establishment. The building where she worked at Portland Bill was known as 'Betty's Hilton'. In 1982 she was elected a Fellow of the Royal Academy of Engineering. Her research was in Radar Systems and Torpedoes. I have another story about Submarine E24.

HMS E-24 was a Royal Navy E-class mine-laying submarine commissioned 9 Jan 1916. (180 feet long with a crew of 3 officers and 28 men) She belonged to the Harwich based 9th Flotilla, and on the morning of 21 March 1916 left Harwich to lay mines in the Heligoland Bight (in the mouth of the River Elbe which leads up to Hamburg.) She didn't come back and is thought to have hit a mine.

In 1973 she was found by divers and salvaged. Believed to be a German U-boat, she was towed to Cuxhaven and identified as British. The commander of the E-24 was Lieutenant-Commander George Naper RN aged 31. He was identified by the rings on his sleeve. (This is the great uncle of my wife.) I visited the memorial in the churchyard at Sullington, southeast of Storrington in West Sussex. His pipe and a bottle of blackberries, a sextant, a pistol and his boots are in the museum in Cuxhaven along with the conning tower and the propellers of the submarine.



POSTSCRIPT

I haven't written about the FIRST FLEET.

One Sunday morning I went to the Cathedral Eucharist in Portsmouth and after it walked 5 minutes to Sallyport and found the Memorial to the First Fleet which went to Australia in 1787. Here is a photograph of the plaque on the wall.



Captain Cook discovered Australia in 1770, and after the American War of Independence, America was no longer accepting convicts.

The First Fleet set off from Portsmouth (Spithead) on 13 May 1787 carrying 736 convicts ... men, women and children ... altogether. There were about the same number of crew, also Marines and passengers along with them. It went first to Rio de Janeiro, then Cape Town, then the Southern Ocean and arrived safely at Botany Bay on the 18 January 1788. Botany Bay was not suitable but they found Sydney Harbour further up the coast.... Altogether between 1787 and 1868, 162,000 convicts were transported to Australia. I found this all very interesting. Transportation was quite a feature of 19th century life. The French sent people

(Communardes) to New Caledonia in the South Pacific, also to Devils Island off the coast of Guiana (Dreyfus for example). The Russians sent people to Siberia. These days people in Siberia are proud of their ancestry (The poet Yevgeny Yevtushenko for example). Australians are too. I think it is partly because they are proud of their country. And they are quite right. I have only spent a week in Perth, Western Australia and it is an amazing place, the people good company.

Two days ago I had breakfast in Cornwall with my cousin Ivan on the way to the Isles of Scilly. (Professor Ivan Cosby formerly of Aichi University).

On the wall upstairs is a signed print of Wellington and Nelson.



Wellington and Nelson only met once, in the anteroom at 10 Downing Street before meeting the Prime Minister, Pitt the Younger in 1804(?).... Nelson had just been explaining his plan to the PM before the Battle of Trafalgar. Nelson has signed the picture Nelson Bronté. He was created Duke of Bronté in 1799 after the Battle of Aboukir Bay by the King of Sicily.

While I was in the Historic Dockyards Museum in May 2021 there was an Aircraft Carrier moored at the end. Here is a photograph of it.



It was one of the two Queen Elizabeth Class carriers. It is called HMS Queen Elizabeth after Queen Elizabeth 1. (There is another one called HMS Prince of Wales.)

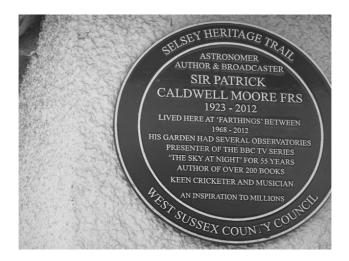
The Prime Minister (unannounced) came to see it off on its maiden voyage to the Mediterranean, Suez ... Korea and Japan ... while I was in the Museum. I didn't know! His visit was announced on the BBC the next day. It was a rather curious thing to witness this.... I had thought aircraft carriers were out of date, but it seems not!

In this paper about Portsmouth I haven't written about the Vanguard nuclear powered ballistic missile Submarines. There are four of them built in Barrow-in-Furness in the years before 1999. All four are based at HM Naval Base in Clyde in Scotland, always one at sea. Each have between 8 and 16 Trident missiles (from the US), which can be armed with between 120 and 260 nuclear warheads. The figures from the Internet seem to vary. A Dreadnought class of submarines will replace the Vanguard class in 2030. This is the UK's Independent Nuclear Deterrent which most people in England who I know think we ought to maintain.

So he Royal Navy is still important and Portsmouth as its main port likewise, even if it is not quite clear how these expensive pieces of equipment might be used.

As part of my explorations during this pandemic I went to Selsey. Just before Selsey there is a right turn off to Church Norton where there is a pretty church and a castle ruin ... only the moat and a grassy hump remain ... and beside it is Pagham Lagoon where people go to swim at high tide. Somewhere near there, possibly the church itself is the site of the original Chichester Cathedral founded by St Wilfred in 681....

Also in Selsey is the house of Patrick Moore, the Astronomer.



I don't know anything about Astronomy but I used one of Patrick Moore's books for an English class in the Community College in Toyohashi, Japan. It was a GREAT SUCCESS. I still have friends who took that class. Thank you Patrick Moore because we all enjoyed that class. Today we have WIFI and GPS as part of our daily life. Both came out of the Space Program described by Patrick Moore in his book.