

The Ingenious Mr Dummer: Rationalizing the Royal Navy in Late Seventeenth-Century England

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In the seventeenth and eighteenth centuries, the Royal Navy constituted by far the greatest enterprise in the country. Naval operations in and around the royal dockyards dwarfed civilian industries on account of the capital investment required, running costs incurred and logistical problems encountered. Like most state services, the Navy was not famed as a model of efficiency and innovation. Its day-to-day running was in the hands of the Navy Board, while a small Admiralty Board secretariat dealt with discipline and strategy. The Navy Board was responsible for the industrial organization of the Navy including the six royal dockyards; the design, construction and repair of ships; and the supply of naval stores. In practice its systems more or less worked, although they were heavily dependent on personal relationships and there were endless opportunities for confusion, delay and corruption. The Surveyor of the Navy, invariably a former shipwright and supposedly responsible for the construction and maintenance of all the ships and dockyards, should have acted as a coordinator but rarely did so. The labour force worked mainly on day rates and so had no incentive to be efficient, although a certain *esprit de corps* could be relied upon in emergencies.¹

It was long assumed that an English shipwright of the period learnt his art of building and repairing ships primarily through practical training and experience gained on an apprenticeship, in contrast to French naval architects whose education was grounded on science, above all, mathematics. In recent years, however, the significance of the distinction made between these empirical and theoretical methods for the progress of ship design and more generally in relation to dockyard efficiency has been the subject of considerable debate and the perceived contrast of approach downplayed. This article describes an early attempt to apply reason and science to the Royal Navy, an ambition that coincided with and was affected by the 'Scientific Revolution'. My protagonist is the Surveyor of the Navy from 1692 to 1699, Edmund Dummer (1651–1713) who, though never a Fellow of the Royal Society himself, knew men like Pepys and Evelyn who were. Using elements of mathematical calculation and meticulously honed standards of empirical observation, Dummer tried to introduce a more rational, planned approach to the task of building ships and dockyards, with the help of his extraordinary draughting skills. Operating on the margins of what was technically possible, meeting with opposition from vested interests and traditional work patterns, he struggled to succeed. Today he is little recognized outside the circle of naval historians and his grandest building projects were almost wholly destroyed by later dockyard developments or bombing. But if – unlike Pepys and Evelyn – he left no diaries, the magnificent visual records and pioneering written reports of his endeavours survive within the manuscript collections of the British Library and the Pepys Library at Magdalene College, Cambridge, supported by

¹ The argument that the Royal Dockyards were inefficient by the standards of modern management practice, advanced in J. M. Haas, *A Management Odyssey: The Royal Dockyards, 1714–1914* (Lanham, MD, 1994), has been effectively demolished by Roger Knight, 'From Impressment to Task Work: Strikes and Disruption in the Royal Dockyards, 1688–1788', in Kenneth Lunn and Ann Day (eds.), *History of Work and Labour Relations in the Royal Dockyards* (London, 1999), pp. 1–20. Ann Coats, 'Efficiency in Dockyard Administration 1660–1800: A Reassessment', *The Age of Sail*, i (2002–3), pp. 116–32. N. A. M. Rodger, *The Command of the Ocean. A Naval History of Britain, 1649–1815* (London, 2004), particularly pp. 408–25.

documents and correspondence in the National Archives and the National Maritime Museum. His achievement deserves to be more widely known for it demonstrates what happened when theoretical knowledge confronted practical experience. He knew how to employ the language of the Royal Society and that of the polite arts for promotional purposes, yet in order to achieve anything on the ground he had to operate in a world of mechanical arts whose operators used other, more pragmatic disciplines and forms of communication.

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The eldest son of a Hampshire gentleman farmer, Thomas Dummer (1626–1710), Edmund Dummer was baptized at North Stoneham on 28 August 1651.² He joined the Navy in 1668, older than usual for an apprentice shipwright. In December 1685, when putting himself forward for the post of Assistant Shipwright at Chatham or Deptford, he stated that ‘he was bred a shipwright under Sir John Tippetts at Portsmouth.’³ In his 1686 account of the state of the Navy, Samuel Pepys wrote that when Dummer was apprenticed to Tippetts, he was ‘mostly employed as his clerk in writing and drawing’.⁴ Dummer was indeed an artist of exceptional skill, although it is not known where he received his early training. He would have been too old to have benefited from the lessons in preparing draughts of all kinds received by pupils destined for the Navy in the Royal Mathematical School at Christ’s Hospital, established by Charles II in 1673.⁵ If he attended the most famous school in his locality, Winchester College, he is extremely unlikely to have received any drawing lessons.⁶ But he certainly knew Sir Anthony Deane (1638–1721), master shipwright, whose ‘Doctrine of Naval Architecture’, written in 1670 for his friend Samuel Pepys, who was then Clerk of the Acts at the Navy Board, contained instructions on how to draw sheer draughts, or draughts of the ship seen from the side.⁷

Having been appointed Controller of the Victualling Accounts on the Navy Board, in 1677 Deane was given the responsibility, together with Dummer’s master, Tippetts, who had become Surveyor of the Navy, for establishing for the first time standardized sets of dimensions of ships of the line to be applied to the ‘thirty new ships’, the largest single shipbuilding programme hitherto undertaken. By achieving uniformity within each rate, the Admiralty hoped to ease problems of supply by standardizing sizes of masts, rigging, equipment and stores.⁸ Dummer helped with the Establishment, ‘singled out by the Navy Board for his extraordinary ingenuity to lay down the bodies of all the thirty new ships.’⁹

² A useful resumé of Dummer family history is given in www.hants.gov.uk/newforesthistorystory/dummerfamily.htm. The most comprehensive account of Edmund Dummer’s career is given in Eveline Cruickshanks, Stuart Handley, D. W. Hayton (eds.), *The History of Parliament. The House of Commons 1690–1715* (Cambridge, 2002), vol. iii, pp. 931–3. He also appears in the new *Oxford Dictionary of National Biography* (Oxford, 2004), vol. xvii, pp. 184–5, in a short biography by Philip MacDougall.

³ National Archives (NA), ADM 1/3555, ff. 359, 371–5. The vacancies had arisen following the death of Thomas Shish, Master Shipwright at Woolwich and the consequent jockeying for promotion among the Assistant Shipwrights. In quoting from original manuscripts, I have reduced capitalization to a minimum and modernized spelling and punctuation except in titles.

⁴ Cambridge, Magdalene College (MC), Pepys MS. 1490, f. 148.

⁵ Kim Sloan, ‘Noble Art’. *Amateur Artists and Drawing Masters c. 1600–1800* (London, 2000), p. 104.

⁶ A Dummer is recorded as a Commoner or fee-paying student at Winchester College in 1667. There does not appear to have been a drawing master at the school before the nineteenth century. I am most grateful for this information to Suzanne Foster, Deputy College Archivist at Winchester College Archives.

⁷ MC, Pepys MS. 2910. Brian Lavery (ed.), *Deane’s Doctrine of Naval Architecture, 1670* (London, 1981). Technically, a sheer draught is a projection of the lines of the vessel on a vertical longitudinal plan, passing through the middle line of the vessel.

⁸ James Peter Hemingway, ‘The Work of the Surveyors of the Navy during the Period of the Establishments. A Comparative Study of Naval Architecture between 1672 and 1755’ (Bristol University Ph.D., 2002), pp. 50–4.

⁹ NA, ADM 1/3555, f. 375.

One of several letters he wrote in 1680 pleading for payment for this work provides a useful account of his activities during a turbulent political period.¹⁰ By 1678 Dummer was employed as an 'extra clerk' in the office of the Surveyor, 'my patron and friend from my youth upward'. His job was to make designs for a variety of projects – lanthorns, wet docks, lodgings at Sheerness, ships' sterns – as well as to draught ships' lines. Tippetts took Dummer with him to Harwich where, with Tippetts' approval, he drew the bodies of two ships (presumably the *Restoration* and *Bredah*) which were nearing completion. On their return, Deane asked Dummer to show him his draughts, adding 'if all the bodies were so taken it would be a useful work'; therefore Dummer proceeded to produce draughts of ships being built at Deptford, Woolwich and Portsmouth. A sketch-book of 'Tables of Proportions of Ships' possibly relating to this stage of the commission survives in the British Library.¹¹ It comprises a series of engraved sheets of squared paper, all within the same putti-laden border, on which are plotted in pencil or ink the curves or sweeps of the hulls of one second rate and some of the third rates (of the six classes into which the larger war ships were divided, the largest in size and capacity being first rates), newly built in the Thames and Medway yards (fig. 1). The volume is a work in progress, with pencil notes, tables of measurement and calculations.

The eight Dummer drawings in the Pepys Library are much more elaborate, doubtless intended to show off his extraordinary skills as a draughtsman to potential patrons. Finely drawn in grisaille on vellum, they are bound together in a volume entitled 'Draught of the Body of an English Man of War'.¹² Working on a scale of one inch to six feet, Dummer presented first, 'The appearance of her floor at an imaginary section', then a series of 'geometrick ichnographies' of her different decks. The most splendid drawing is that of 'The Orthographick Symetry of the Ship divided in ye Middle by a Straight Line from Stem to Stern; with the Scenographick Appearances of each Part, in ye Hold, & on each Deck' – a vertical section cut open like an doll's house to expose all the ribbing, the diagonal athwartship (across ship) bracing to strengthen the hull, the deck supports and staircases. This is followed by 'Her Perspective Appearance dissected in the Mid-ship' like two halves of a walnut (fig. 2) and finally, 'The Outside when finish'd'.

The draughtsmanship is most appealing even if, typically for the period, the descriptive terms are used somewhat loosely and 'geometric' elements jumbled up with more empirical forms of visual description. The 'ichnographies' are deck plans, conforming to the standard usage of the term at the time as synonymous with views from above. The 'orthographic' view is not a strict projection on to a vertical plane as scholarly geometers would have understood its meaning. Instead, it is a sectional ship's model which superficially appears to be drawn in perspective (but with several shifts in viewpoint), so that staircases, guns, panelling and even carved picture frames are visible and carefully shaded in to create little 'scenes' on each deck. The dissected perspective appearance of the ship again seems to be drawn in perspective, but from no fixed projection base. Nevertheless, the work constitutes the earliest surviving example of Dummer's skills as a draughtsman, demonstrating a capacity to express an organized tectonic sensibility that was to mark his progress towards the surveyorship.

¹⁰ NA, ADM 106/349, ff. 359–60, dated 27 April 1680.

¹¹ British Library (BL), 534.k.5, with a Sloane inventory number of MS. B.179. L. G. Carr Laughton, 'The Royal Sovereign 1685', *Mariner's Mirror*, xviii (1932), pp. 144–5. It might equally have been the work of Keltridge. See below footnotes 28 and 29.

¹² MC, Pepys Sea MS. 2934. The Pepys Library is preparing a facsimile edition of the work.

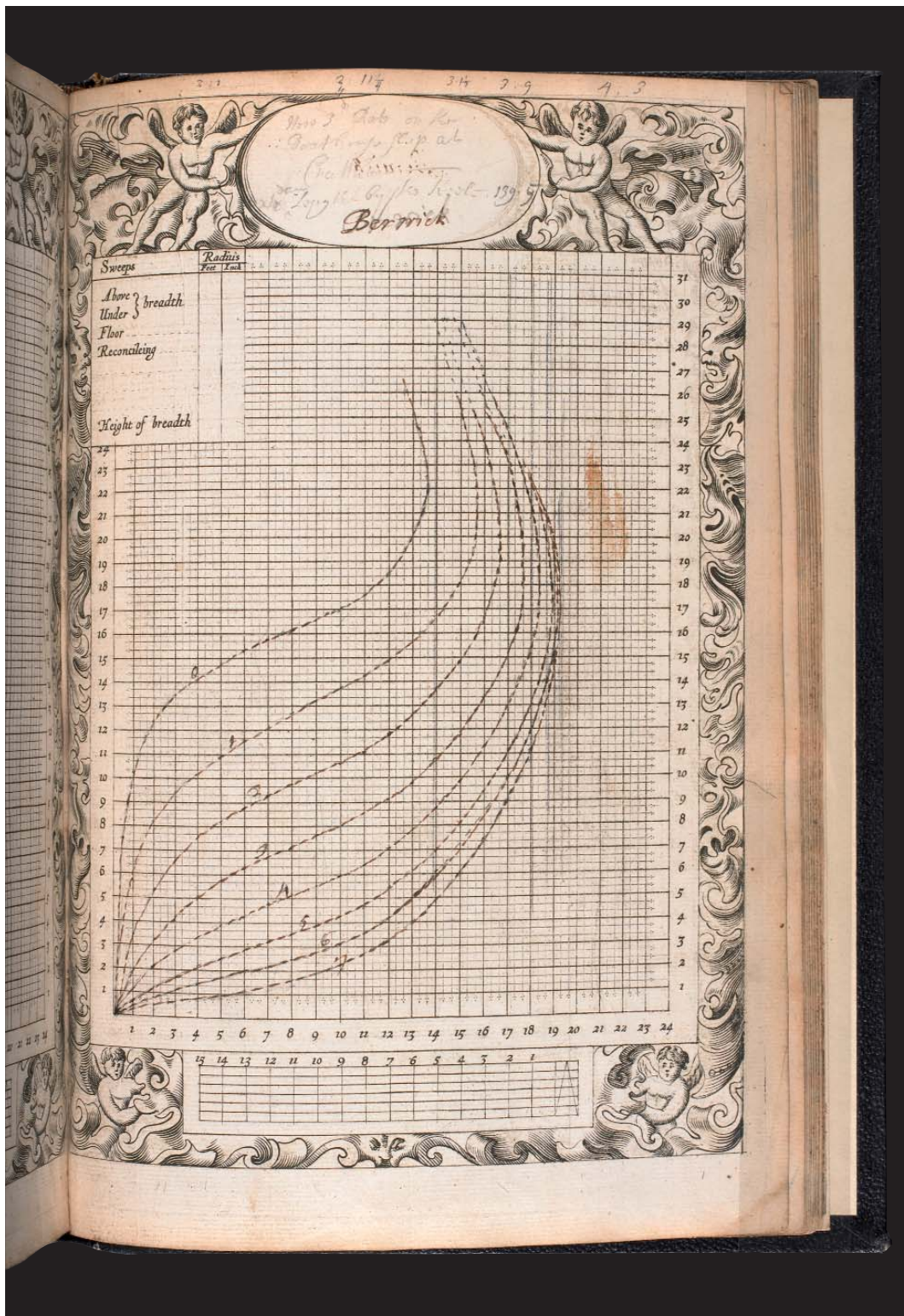


Fig. 1. Unnumbered page from *Tables of Proportions of Ships* in a series of engraved plates. BL, 534.k.5.

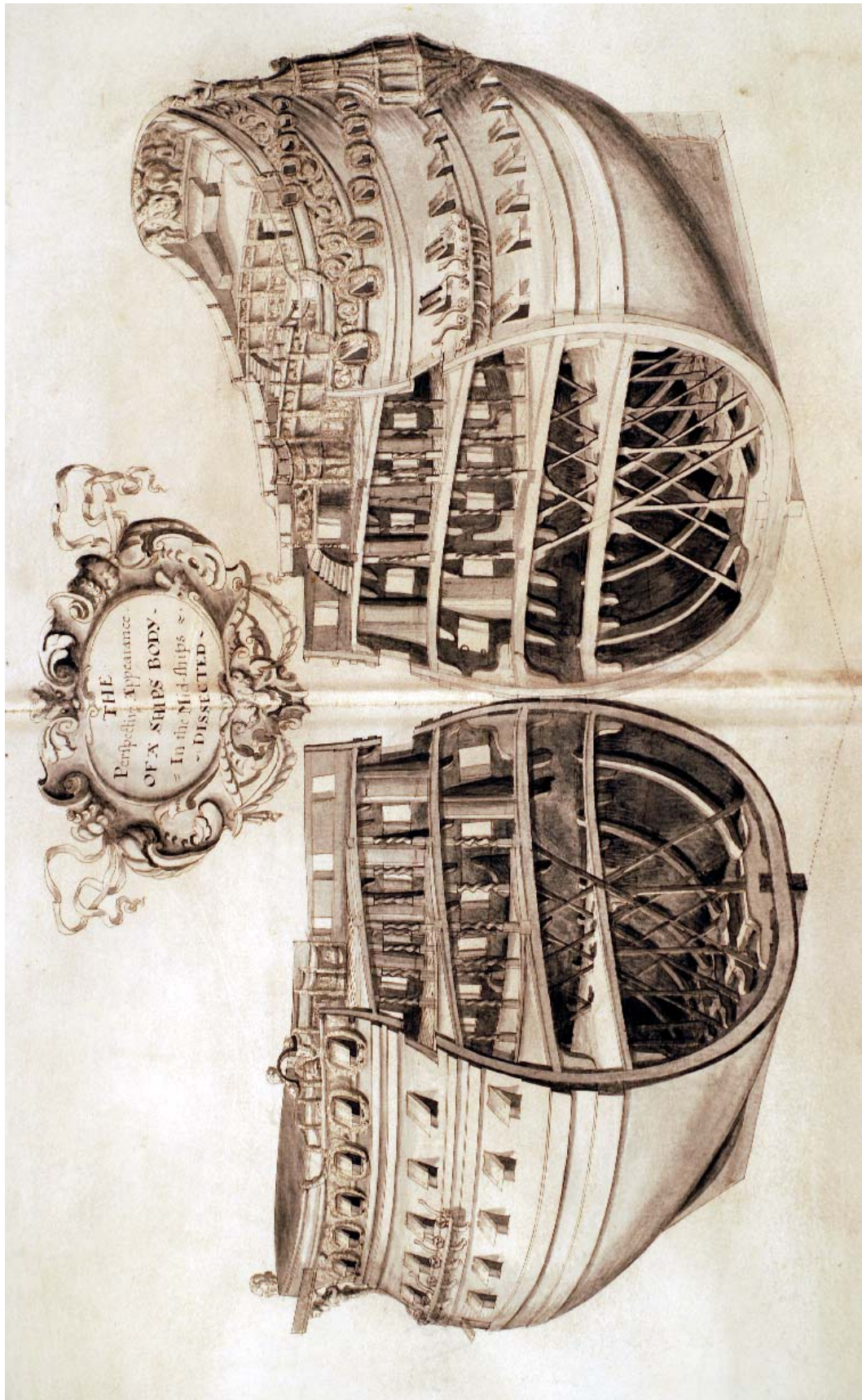


Fig. 2. 'The perspective Appearance of a Ships Body – in the Mid-ships Dissected'. The Pepys Library, Magdalene College, Cambridge: Pepys Sea MS. 2934. With permission.

In the short term, however, Dummer's work was to have unfortunate consequences. Rocked by the aftermath of the 'Popish Plot' and Exclusion Crisis, Dummer sought reassurance from Tippetts, Deane and from Samuel Pepys who, in 1673, had been made Secretary to the Admiralty Board.¹³ A letter written by Dummer to Pepys on 1 February 1679 mentions he had accompanied Deane to his home that morning, 'in which time he gave me many and very particular concessions of his favour'. Deane told Dummer that he would share with him 'his experiments and rules wherein himself and [his] son had laboured, and all other assistance suitable to so great a work'. Dummer surmised that Deane did not think of publishing his own work ('making any thing common of so useful an art'), 'but rather that it be in such manner rectified as it may become a pleasant speculation either to the King or his Princes'. He himself, on the contrary, was wholly at the Government's disposal.¹⁴

On one level Dummer's attitude may be seen as characteristic of the new readiness to communicate and publish the practices of the mechanical arts, associated with the Royal Society's 'History of Trades' project.¹⁵ On another, Dummer appears to be vainly trying to negotiate the treacherously shifting balance of power by distancing himself from the King's party. By May 1679 Charles was forced to dismiss Prince Rupert's Admiralty Board. Pepys and Deane were arrested, Pepys accused of sending Deane to France to supply coastal maps and information about the fleet to the French government. Dummer relates, 'they were not under confinement two days but as I was going through the Strand I met Sir Jonas Moore's son ... who told me he had at that instant parted from four Parliament men, having been discoursing particularly on the misfortune of Sir Anthony and Mr Secretary and amongst the crimes laid to them it was aggravated that they had employed a man to take the bodies of the king's ships, supposed to be no good intention.' Dummer immediately told Tippetts, 'being extremely fearful myself what ill use might be made of me, or of the works so innocently meant. Sir John was pleased to carry me, and a prospect of the designs I was on, unto the King, to prevent (if in him it lay) by the King's approbation and allowance any reflection upon them that were already distressed.'¹⁶

The upshot was that Dummer was packed off to Bristol, out of harm's way, until January 1680 when he was summoned to attend the Navy Board with his draughts. There he met Sir Anthony (the rest of the Board had gone to Chatham), who had been released from prison though not yet discharged and was still, just, a member of the Board. Deane asked Dummer to make two draughts for him, a promise Dummer failed to keep, having been instructed by the Navy Board not to do so. The Admiralty was evidently still suspicious as to where Deane's and Dummer's loyalties lay for when Dummer came before the Lords Commissioners with his draughts, in the presence of the Navy Board, 'among the particulars of my business it was put to the Navy Board, what faith they had in me or what security they had upon me, that I did not at the same time draw draughts for any other and as well as that of the King's service, and ordered they should give me a written order, which was given me, and also to report what was fitting to allow me to draught, which order is also passed.'¹⁷

¹³ NA, ADM 106/249, ff. 359-60.

¹⁴ Oxford, Bodleian Library (Bod), Rawlinson MS. A.172, f. 26.

¹⁵ Kathleen H. Ochs, 'The Royal Society of London's History of Trades Programme: An Early Episode in Applied Science', *Notes & Records of the Royal Society of London*, xxxix (1985), pp. 129-58. Also, Walter Houghton, 'The History of Trades: Its Relation to Seventeenth-Century Thought as seen in Bacon, Petty, Evelyn and Boyle', *Journal of the History of Ideas*, ii (1941), pp. 33-60.

¹⁶ NA, ADM 106/249, ff. 359-60.

¹⁷ NA, ADM 106/249, ff. 359-60.

Dummer delivered five draughts by April 1680 and wrote to the Navy Board to ask ‘whether I can be supposed to draw new draughts by that way I have practised.’ In May he was still asking whether the Board wanted to discharge or continue employing him, warning of his impending ruin. ‘I could have borne the present with more respect and patience, were I not able to say it hath been always my misfortune, that the greatness of the enterprise was never truly valued nor encouraged’, he wrote in the aggrieved tones that were to recur throughout his dealings with authority in later years. By 2 June, having daily attended the Board for payment, he was desperate: ‘I should more heartily beg a clear discharge from the Navy, and cast myself on the common providence of the world.’ He was still waiting for an answer on 11 June.¹⁸ The order to pay him at the rate of £7 per draught was made by the Admiralty to the Navy Board on 24 February and again on 11 May 1680, the latter with the proviso, ‘to take care before the payment of any of the said sums to the said Mr Dummer, that the work be so performed as may answer the end for which the said draughts were at first designed.’¹⁹ They must have proved satisfactory for Pepys, once back in office, queried the ‘conditions and care’ in which the drawings were kept.²⁰ Sadly, I have not been able to trace their present whereabouts.²¹

However, during this probationary phase of his career, Dummer did not confine himself to following the orders of the Navy Board, but ventured into more speculative realms of enquiry. When he wrote to Pepys in February 1679, he had requested ‘that the design inserted at the end of the reference I last presented your Honour be secreted’ from Deane.²² This design is still in the Pepys Library, appended to a short treatise ‘about Improving the Art of Building Ships’, which reveals the young man’s keen interest in the science or principles of building ships and organizing dockyards.²³ It is set out in language with which Pepys, as a Fellow of the Royal Society from 1665, would have readily identified. Dummer began by pointing out the ‘many false axioms’ masquerading as ‘certain and undoubted truths’ even in the ‘mathematical and mechanical arts’ that were most useful and necessary to mankind, following imagination and opinion rather than balanced judgement based on experiments made with due and careful observation: ‘Your Honour knows that naval architecture, or the art of building ships hath had but too large a share of this epidemical disease in the empire of arts and learning. It hath obscurely and erroneously been delivered from man to man: been practised by custom and tradition only: and few (that I know of) have sought the reasons of their art, or endeavoured the true perfecting of it by settling it on positive and unerring maxims deduced from reason and experiments.’

Though sensible of his ‘incapacity to so great a work’, Dummer proceeded to submit to Pepys’s ‘most exquisite judgement’ his own ideas for ‘tracing the secrets of this art to their spring and head’, in the hope that His Majesty might enable him to be of service. His proposal was to collect a history of ships’ hulls, both ancient and modern, foreign and domestic. He

¹⁸ NA, ADM 106/249, ff. 361–6.

¹⁹ NA, ADM 106/45, 46.

²⁰ *Samuel Pepys’s Naval Minutes*, ed. J. R. Tanner, Navy Records Society, lx (London, 1926), p.151.

²¹ They do not appear to be preserved in the National Maritime Museum, National Archives, British Library or the Royal Naval Museum, Portsmouth. Among the earliest accurate draughts of ships’ lines and profiles in the National Maritime Museum is a series of six representing of fourth, fifth and sixth rates made in 1684 by Dummer’s near contemporary, William Keltridge (KLT 001–6). Drawn in grisaille on vellum and once bound in an album, they too display considerable artistry. The measurements are enclosed in baroque cartouches and the elaborate carving of the sterns are carefully represented. KLT 005, of a section midships, shows four gunners preparing to fire the cannon. Dummer’s draughts were probably very similar, combining geometrical, mathematical and pictorial means of representation.

²² Bod, Rawlinson MS. A.172, f. 26.

²³ MC, Pepys Sea MS. 1074.

would have exact models of these hulls made to the same scale, and then would observe their water displacement, fore and aft, when first water-borne, when their bilge-ways were cleared and with or without ballast. The ship's name, measurements and the name of the builder would be fixed to the model, together with a line circumscribing the body marking the first draught of water on the ship: 'Thus may bodies be made fit to experiment the natures of the fabrics they represent: thus may steps be made to the discovering of an excellent philosophy in naval architecture; and to the demonstrating of that physical and geometrical knowledge of ships bodies that remain as yet entirely mysterious.'

The degree to which such experimental methods would have advanced on the geometrical means already evolved by Deane and others to calculate the displacement of a ship is a moot point.²⁴ But to set his proposals in context, Dummer humbly offered Pepys what he called an essay or 'platform of an opera within which all that to ships are pertinent may have enclosure'. This was a hand-written diagram or 'tree of knowledge', by which Dummer sought to illustrate the branches and bifurcations of the discipline of shipbuilding. He divided ships into two classes – 'imaginative and representative' and 'real and operative'; the former category depended on reason, the latter on practical skill. The former rational branch called on knowledge of historical and international example, the teaching by instrument and demonstration the terms of all the lines of a ship, real and imaginary, and the rudiments of practical drawing of all its parts. The latter empirical branch – how ships had traditionally been built – depended on use, practice and judgement acquired through experience, such as the use of moulds 'graduated for the building of ships according to the custom of the builders in HM yards', the quality and dimensions of masts, rigging, blocks and dead eyes, sails, guns, stores and victuals.

Dummer was by no means alone in attempting to break down the complex range of variables affecting the Navy into constituent parts and bring them together to form an all-encompassing unity. Two near contemporary abstracts were produced by Fellows of the Royal Society, anxious to demonstrate they could be of useful service to the state: the 'Treatise of Naval Philosophy' outlined by William Petty in 1671 and the tree of knowledge devised by Robert Hooke some fourteen years later.²⁵ Petty's view of the Navy was more comprehensive than that of Dummer, covering political and economic considerations as well as placing the special emphasis on experimentation that might be expected from a Fellow of the Royal Society.²⁶ In his tree of knowledge, Hooke slotted 'Navigation, Ship Art or Ship Craft' into the much broader scientific framework of hydrography, being 'a full description of the nature and use of water'. He also emphasized the importance of seeking out the basic qualities of materials, utilizing practical mathematics and employing precision instruments.²⁷

²⁴ See Lavery, pp. 24–5.

²⁵ BL, Add. MSS. 72854, ff. 99–104 and 72895 (Petty MS.), the latter copies of original material in National Maritime Museum (NMM), SPB/16. Royal Society, Classified Papers, vol. 20, f. 70, 24 March 1685.

²⁶ Its final appearance as 'What a Compleat Treatise of Navigation should contain', drawn up by Petty in 1685, was published posthumously in the Royal Society's *Philosophical Transactions*, xvii (1693), pp. 657–9.

²⁷ Hooke's tree of knowledge reflects an avowed shift in his concerns by the 1680s from describing the specifics of 'trades' to establishing the general principles behind them. Michael Hunter, *Establishing the New Science. The Experience of the Early Royal Society* (Woodbridge, 1989), pp. 312–15.

Furthermore, in 1675, the ship's carpenter William Keltridge (and possibly another protégé of Deane and Tippetts)²⁸ had produced a manuscript book which went some way towards accomplishing Dummer's concept of empirical codification as part of 'real and operative' shipbuilding.²⁹ Introduced with a decorative title-page and a fanciful frontispiece representing Neptune in seventeenth-century masque dress, the work contained tables of measurements and costs for each rate of ship, including the number, length and thickness of the blocks required, length and size of rigging, yardage of sailcloth and so on. The stores and victual allowances were also carefully worked out according to the rank of ship and time spent at sea. He drew up rules to be observed in drawing draughts for building ships, for ensuring ships were made of like shape and dimensions and for measuring the contours of ships already built. Finally he listed every ship in the Royal Navy in 1674, detailing its complement of men and guns. Dummer's 'platform' is modest by comparison, lacking the theoretical reach of Hooke or Petty and the applied mathematical detail of Keltridge.

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Nevertheless, in the short term, Dummer's erudition paid off. On 12 July 1684 Pepys signed a retrospective warrant from Charles II sending Dummer abroad.³⁰ Although by then ostensibly Master Carpenter on the *Windsor Castle* (which was laid up), 'from divers instances given by him of his knowledge in, and addiction to the further improvement of the theory of ship-building', Dummer was sent to the Mediterranean 'in order to his collecting what useful observations should arise to him, in his enquiries through the several foreign ports there, relating either to the said art of ship-building, or the nature and order of the said ports, appearances of land, or ought else than might conduce to our service.' The resulting draughts were to be lodged with and carefully preserved by the Secretary of the Admiralty. Dummer had estimated that his expenses for about two years would be £95 4s 0d and it was agreed he was to be reimbursed for that sum by the Treasurer of the Navy. His allowance would be equal to the wages and victuals of a Midshipman Extraordinary with a servant.

The fruit of this mission is the sumptuous volume in the King's Library, MS. 40 of the British Library, entitled, 'A Voyage into the Mediterranean Seas, containing (by way of Journall) the Viewes and Descriptions of such remarkable Lands, Cities, Towns, and Arsenalls, their severall Planes, & Fortifications, with divers Perspectives of particular Buildings which came within the compass of the said Voyage; Together with the Description of 24 Sorts of Vessells, of common use in those Seas, Designed in Measurable Parts, with an Artificiall Shew of their Bodies, not before so accurately done, Finished in the Yeare 1685, by E. Dummer.' Its grand-luxe format, designed to attract royal attention, follows the example set by another volume in the King's Library, King's 48, 'The Present State of Guernsey with a short accompt

²⁸ On 31 August 1675, Pepys made the somewhat enigmatic comment in a letter to Captain Fasby on the *Cleveland* yacht at Portsmouth, 'His carpenter shall be hastened down to him, being one William Keltridge, who is in an especial manner recommended by Sir John Tippetts and Sir Anthony Deane.' *Catalogue of the Pepysian Manuscripts*, vol. iii, Navy Records Society, xxxvi (London, 1909), p.106.

²⁹ National Maritime Museum (NMM), AND/31. I am most grateful to Gillian Hutchinson, Curator of the History of Cartography at the National Maritime Museum, for bringing the book to my attention. Another version of the contents was completed by Keltridge in 1685-9. This volume is in a private collection which I have only been able to see in a faded microfilm in the NMM, SPB/49. It once belonged to Sir Jacob Acworth, Surveyor of the Navy from 1715 to his death in 1749. His career overlapped with that of Keltridge as he joined the Service in 1683. According to Rodger, pp. 412-13, Acworth was a ship designer of talent, although his attempt to apply Newtonian theory to underwater lines was not a great success.

³⁰ NA, ADM 106/58. In his application to fill the vacancy of Assistant Shipwright at Chatham or Deptford in December 1685, Dummer referred to his having been 'sent abroad by the late King for the making his observations upon all foreign shipping the effects whereof are now tendered to his Majesty.' NA ADM 1/3555, f. 375.

of Jersey and the Forts belonging to the said Islands', presented to Charles II in 1680 by Colonel Charles Legge (Baron Dartmouth from 1682), Lieutenant-General of His Majesty's Ordnance. The written surveys, estimates, particulars of ordnance and stores &c, drawn up by Sir Bernard de Gomme, Chief Engineer and Assistant Surveyor of Ordnance, Captain Richard Leake, Master Gunner of England and others, were illustrated with maps, charts and watercolour prospects by the military engineer Thomas Phillips, who was to become Second Engineer of England.³¹ But while the essential purpose of 'The Present State of Guernsey ...' was to secure funds for the repair of national fortifications, Dummer's 'Voyage' was much more personal, ultimately designed as a means of gaining notice and preferment.

On 3 August 1682, Dummer set out from Deal on the fourth rate *Woolwich*, under the command of Captain William Holding, a ship that was taking the Moorish Ambassador, who had been in England for six months, back to Tangiers. Despite his royal mission, Dummer started his journal *faute de mieux*, in the wake of some unspecified affliction that had left him, he wrote, friendless and without guidance, support, encouragement or hope of reward. Possibly he was still feeling sore about his treatment over the draughts of the thirty new ships: 'however not desponding of GOD's providence; and considering time might be improved if I began with it I resolved to hedge in all occurrences of my voyage (appearing worth a notice) by particular views, as well as relation, and to make the whole progress a lineal visible demonstration.'³²

As in the case of King's 48, the elaborate title-page of King's 40 is indicative of an age when there was no absolute distinction between the geometric skills required for all forms of surveying and their pictorial embellishment. The great maps produced in Antwerp and Amsterdam in the late sixteenth and seventeenth centuries were richly decorated with complex cartouches containing symbolic devices borrowed from ornamental prints, a practice followed by English mapmakers.³³ Dummer's title-page is decorated with an archway raised on twisted Solomonic columns, the pediment of which contains a prospect of a fortified city while the arch frames a view of a semi-ruined classical port and sea busy with shipping (fig. 3).

Next there is a map of Europe, marked with the journey that Dummer made and his ports of call, keyed into pages of the illustrated journal that follows and numbers of the hydrographical line on the chart. The journey is described in a succession of pen and wash panoramas drawn like a strip cartoon, in the artist's words a 'lineal visible demonstration' showing the ship as it passed various coastlines – through the English Channel past the Isle of Wight to Plymouth and south to Cape St. Vincent – accompanied by notes on the time, weather and daily occurrences, like an illustrated pilot book (fig. 4). Stylistically, these marine views recall the drawings made by Willem van de Velde the Elder (1611-93) who came to England with his son Willem the Younger (1631-1707) in 1672; by 1674 they were settled in Greenwich on a salary from Charles II. The draughtsman father frequently sailed with the fleet, observing and recording sea battles at first hand. His son, the more gifted artist, used his father's drawings as the basis for his own marine paintings.³⁴

The first stage of the voyage was not without incident – the Ambassador's Moorish retainers attempted to mutiny while the ship was still at anchor in Plymouth Sound – but the *Woolwich* reached Tangiers on 31 August and after a change in command to Lieutenant Rigby (Holding died and was buried at Tangiers) sailed on east into the Mediterranean, south of

³¹ Again, I am grateful to Gillian Hutchinson for bringing Phillips's work to my attention.

³² 'Voyage', ff. 2-3.

³³ See Ulla Ehrens-vård, 'Colour in Cartography: A Historical Survey' and James Aweln, 'The Sources and Development of Cartographic Ornamentation in the Netherlands' in David Woodward (ed.), *Six Historical Essays* (Chicago, 1987), pp.123-46, 147-73. Also Catherine Delano-Smith and Roger J. P. Kain, *English Maps: A History* (London, 1999), pp.70-5.

³⁴ M. S. Robinson, Van de Velde, *A Catalogue of the Paintings of the Elder and Younger Willem Van de Velde* (London, 1990).

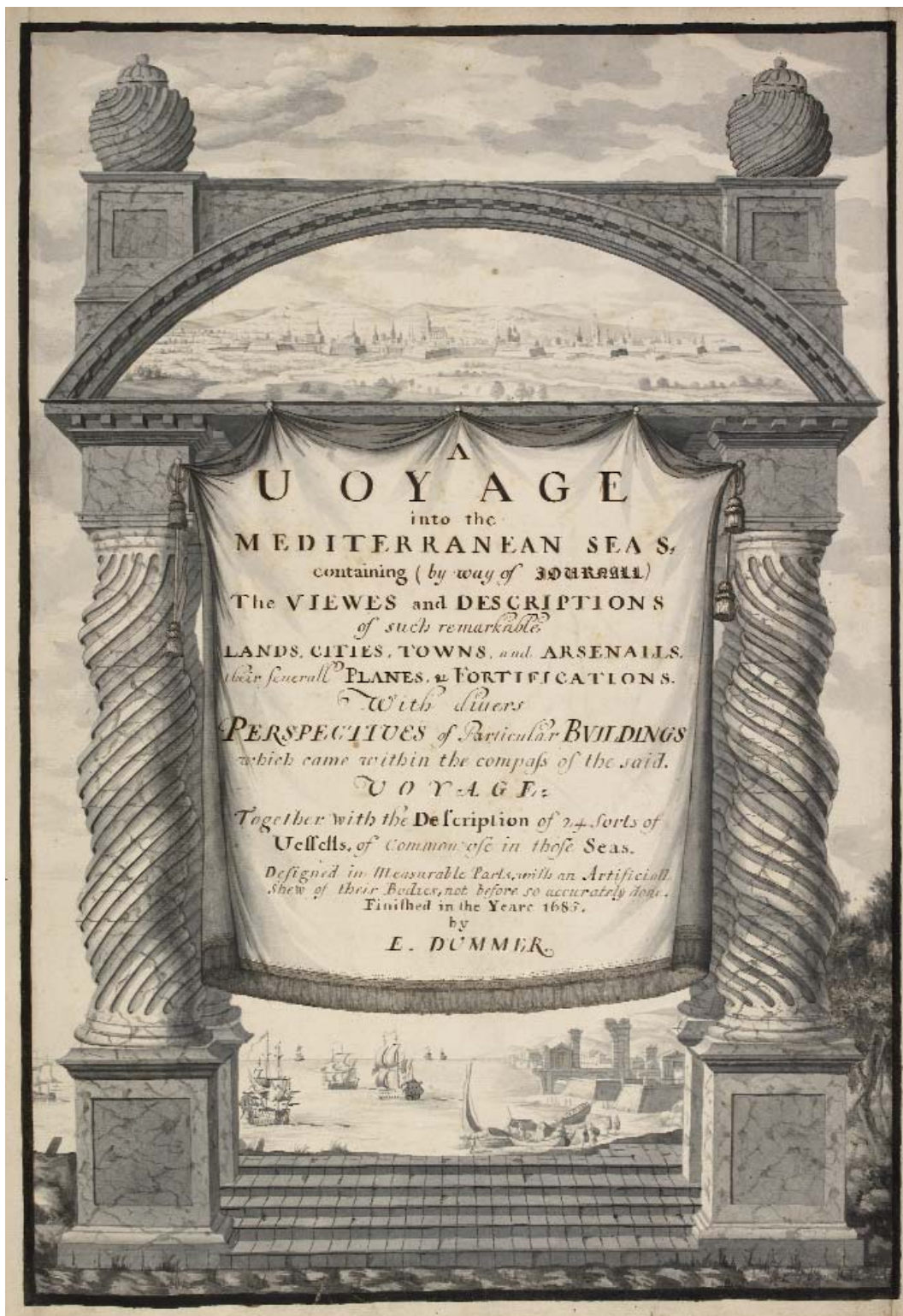


Fig. 3. Title-page, King's MS. 40.

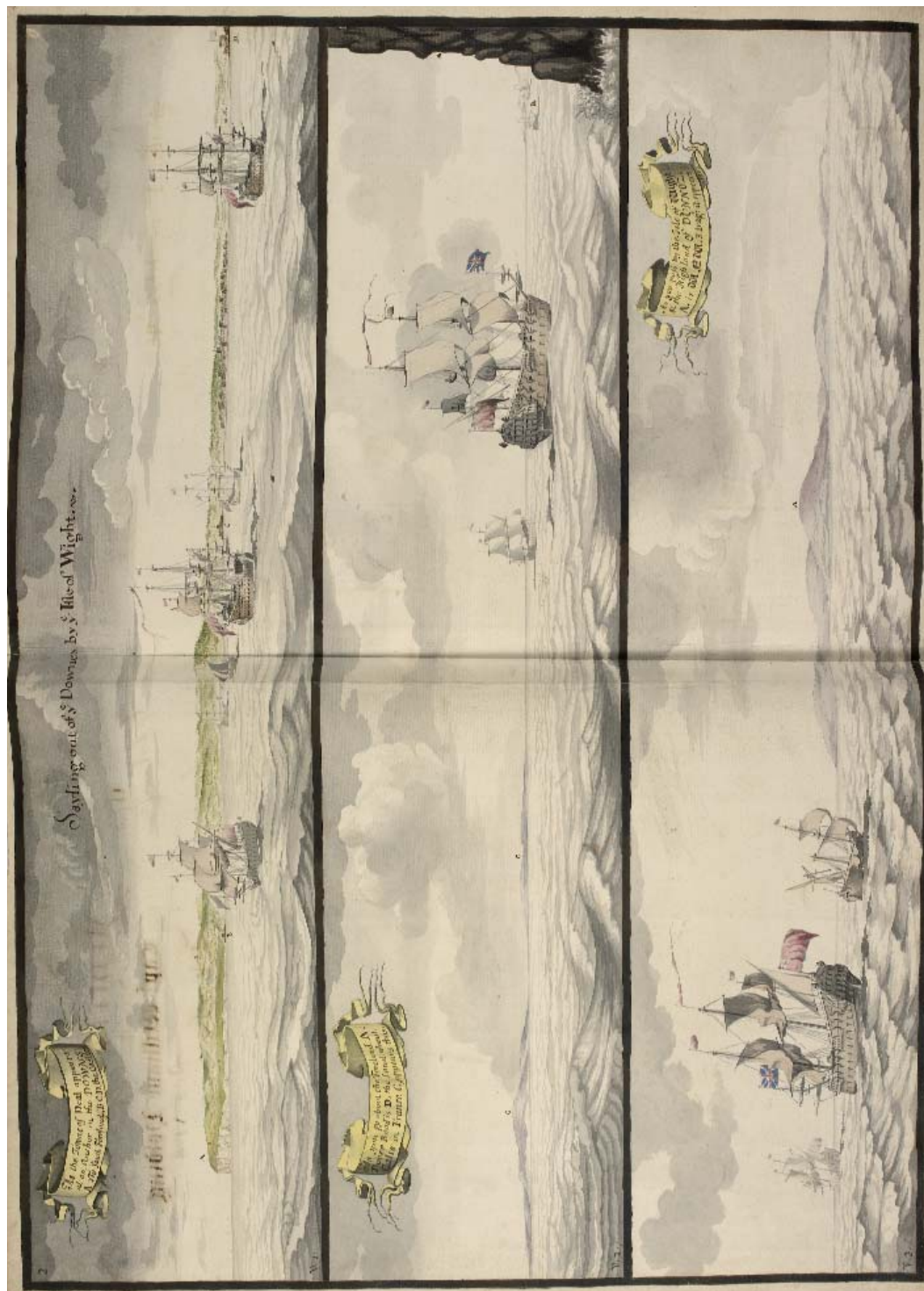


Fig. 4. 'Sayling out of y^e Downes by y^e Isle of Wight'. King's MS. 40, ff. 5v-6 (original foliation f. 2).

Sardinia and Sicily, across the Ionian Sea to Cephalonia and Zante, then back through the Straits of Messina (one dramatic double-page illustration, fig. 5, shows the active volcano of Strombolo as it ‘appears by night in bad weather when you are west about 2 leagues’) to Naples and Livorno, where Dummer disembarked, while the *Woolwich* started back to England on 24 November. Dummer records that he then divided his time between Livorno and Pisa until 11 February 1683, when he received an answer from the Commissioners of the Admiralty ‘to whom I had given an account of my leaving the ship, and the reasons’. Probably Dummer sought and obtained permission for extended shore leave.³⁵ Certainly, he delivered to Sir Thomas Dereham, the English envoy in Florence, the magnificent panel trophy carved by Grinling Gibbons (who had worked as a young man as a ship carver in Deptford), celebrating the fruits of peace and friendship between princes, which was commissioned by Charles II as a gift for Cosimo III de’ Medici, Grand Duke of Tuscany. It had been packed in a deal case for the voyage on the *Woolwich* and was only unpacked after considerable delay in a lazaretto, supposedly for fear of its carrying the plague.³⁶

Dummer used his time ashore to learn about the methods of government in Tuscany. He also took a keen interest in recording towns, their dockyards and fortifications elsewhere in Italy and Provence, making detailed perspectives and measured plans. Thus we have a visual record of the arsenals of Naples, Livorno, Pisa, Venice, Genoa, Toulon, Marseilles, Gibraltar and Cadiz. In contrast to the English method of building and repairing ships in dry dock, the Mediterranean ports used covered slipways which fascinated Dummer, judging from the drawings he made of them. He was particularly impressed by the Venetian Arsenal, drawing it in plan, general and detailed perspective, including ‘A Perspective of the Mode of laying up small Ordnance’ and ‘A Perspective of Two Arches ... under which Ships & Gallies are Built & Repaired’ (fig. 6).³⁷ The panoramic views of the ports (fig. 7) and detailed studies of fortifications suggest a familiarity with the work of the draughtsmen employed on an ad hoc basis by the Ordnance Office under Sir Jonas Moore (1617–79), Assistant Surveyor of Ordnance, from 1665 and then Surveyor General from 1669 until his death. As we have seen, Dummer certainly knew Moore’s son and he might have been acquainted with the series of splendid panoramic watercolours of Tangiers executed in 1669 by the Bohemian artist, Wenceslaus Hollar (1607–77).³⁸ Equally, he could well have been aware of the watercolour

³⁵ The only part of this correspondence which I have been able to trace is NA, ADM 106/365, f. 506, a letter written by Dummer on 1 March 1683 in Venice to the Navy Board. In it he acknowledges a letter of 12 January, the receipt of which coincided with an opportunity to travel to Venice where he had been for two days ‘and by next Friday hope to have satisfied myself of what will be fit for me [to see and study]’. He would then return to Livorno: ‘I shall not fail to improve my time abroad as far as my poor ability will go.’

³⁶ BL, King’s MS. 40, ff. 58–9. For a detailed description of Gibbons’s masterwork and its later vicissitudes see David Esterly, *Grinling Gibbons and the Art of Carving* (London, 1998), pp.130–45.

³⁷ BL, King’s MS. 40, f.68. For a useful account of the Italian ports depicted by Dummer see Lucia Nuti, ‘“To make the whole progress a lineall visible Demonstration”: The Journal of Edmund Dummer’, *Word & Image*, xv (1999), pp. 299–302.

³⁸ Thirty Tangiers watercolours by Hollar are known, over half of which are in the British Museum, falling into two groups. The studies were transferred from the War Office to the Department of Manuscripts in 1887, and thence to the Department of Prints and Drawings in 1932. The finished drawings are from the collection of Sir Hans Sloane, who bought them from Hollar’s widow. Antony Griffiths and Gabriela Kesnerová, *Wenceslaus Hollar. Prints and Drawings* (London, 1983), pp. 64, 87, nos. 116–21. Richard T. Godfrey, *Wenceslaus Hollar, A Bohemian Artist in London* (New Haven and London, 1994), pp. 27, 159–60, nos 125–6. Gillian Tindall, *The Man Who Drew London: Wenceslaus Hollar in Reality and Imagination* (London, 2002), pp.187–9.

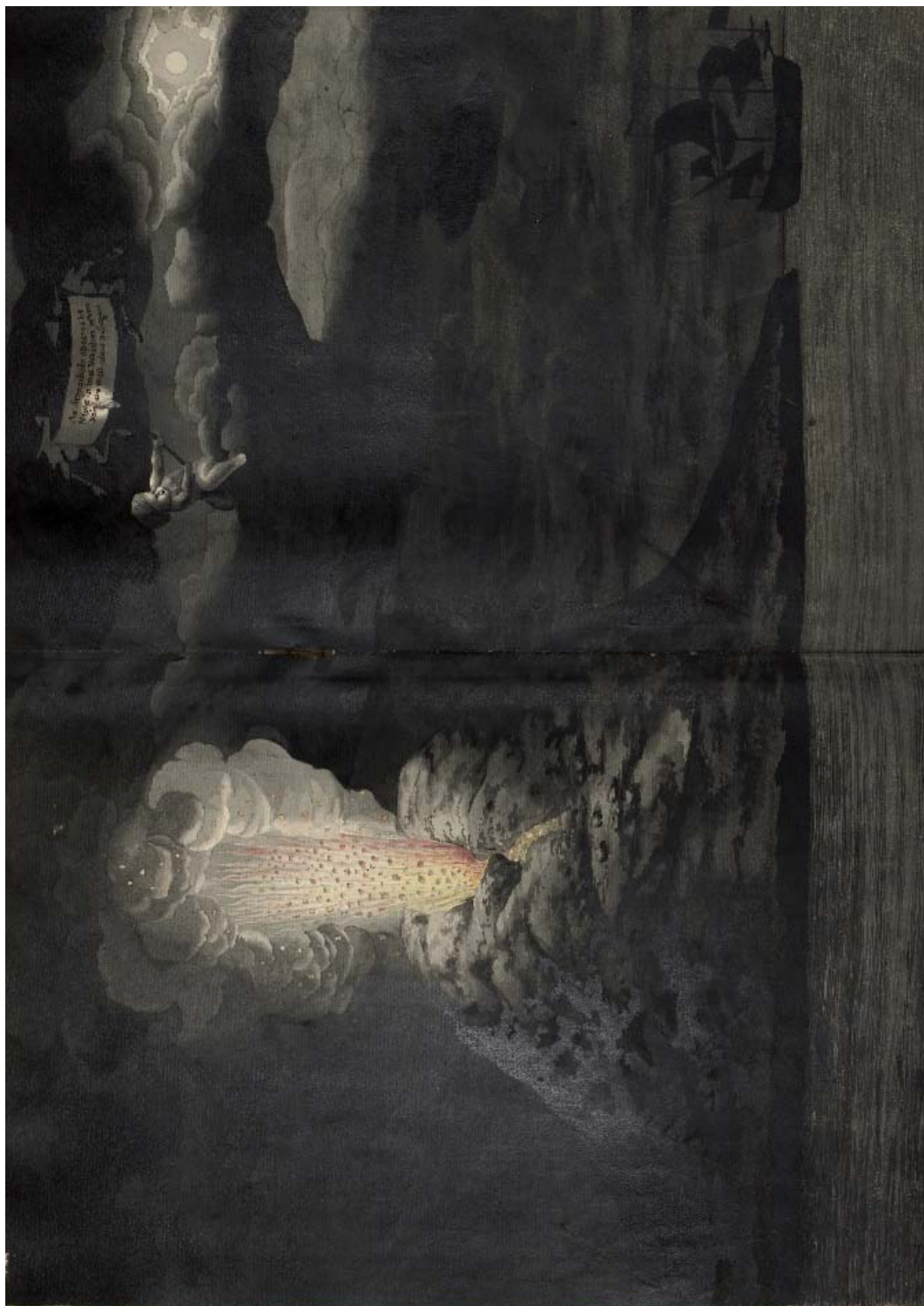


Fig. 5. Stromboli. King's MS. 40, ff. 29v-30 (original foliation f. 38).

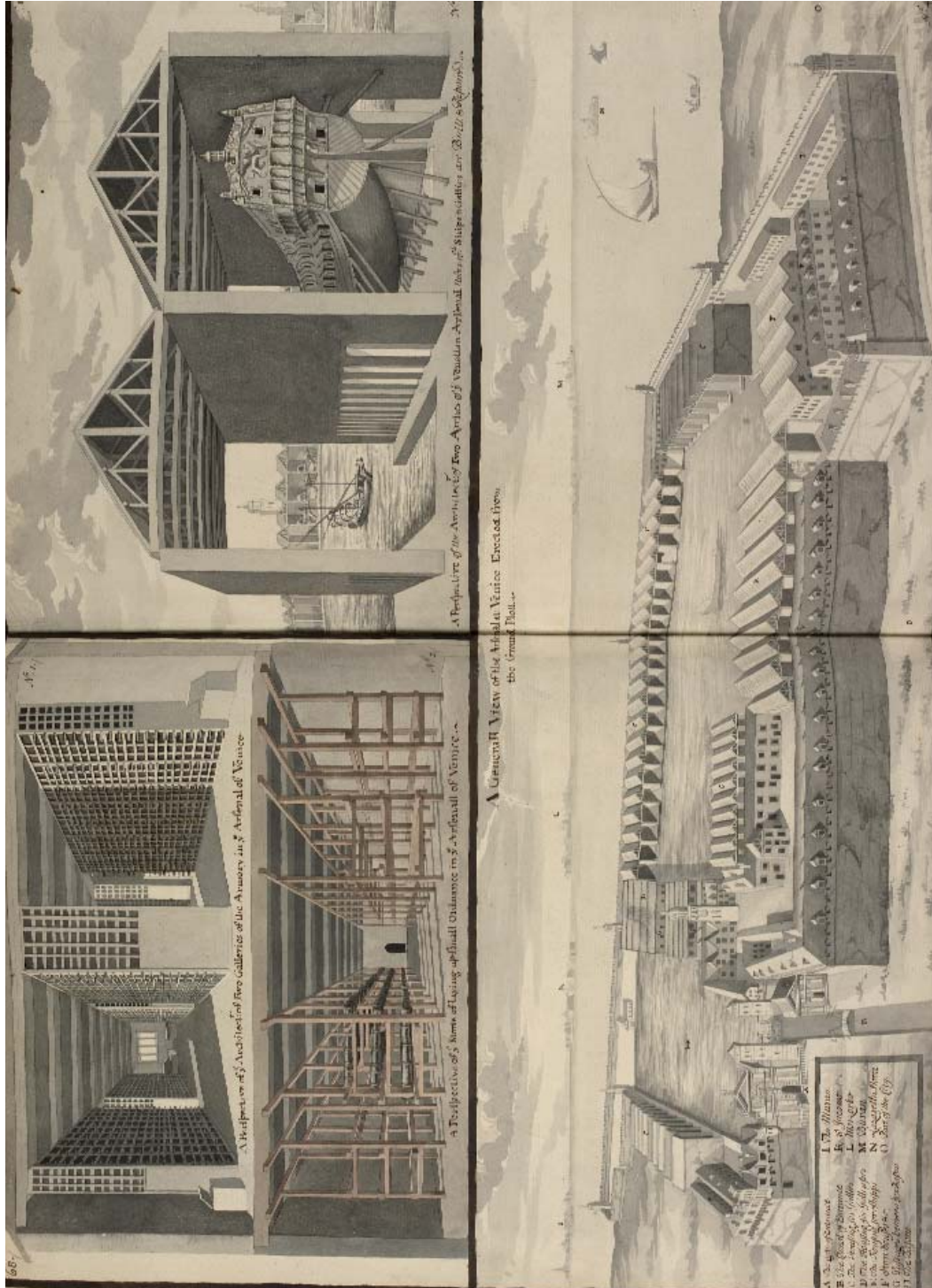


Fig. 6. The Arsenal, Venice. King's MS. 40, ff. 49v-50 (original foliation f. 68).



Fig. 7. A View of Tholon. King's MS. 40, ff. 57v-58 (original foliation f. 80).

plans and prospects of Channel Island ports and fortifications made in 1680 for Colonel George Legge, Lieutenant General of Ordnance by the military engineer Thomas Phillips.³⁹

At Toulon, where he was by April 1683, he took advantage of the French fleet being in port to undertake a little informal espionage: 'They with much readiness permit you to go aboard their ships, but it is in such regularity, as not to be done but by a note, under the hand of a special officer.' Toulon was, he wrote, 'the only harbour and port of the French King's ships of war in the Mediterranean, and in its quality extraordinary ... At this time the Fleet designed against Algiers was near ready to sail, with 7 or 8 galliots, on which occasion I saw diverse trials of their mortars ... Here is now in port, about 50 sail of ships and room for many more. Duquesne is now going with 16 sail against Algiers, & though they brag of 15000 sailors in Provence, he is very thinly manned, non obstante the King's edict (reported to threaten death against the disobedient).'⁴⁰

Here lay the 'Grand Lewis' (*Royal Louis*),⁴¹ two more first rates and forty-nine other rates. Dummer evidently felt qualified to make technical observations and criticisms: 'A good fleet, but in appearance ill built, or through some weakness in long living have generally put their wales a little straight in the midships.' The *Royal Louis* was 'a great ship and glorious in her first carving, no doubt; but to my judgment not of good proportion, nor good workmanship, her figure under water I know not, nor is that above to be admired; she has now a constant guard on board, and lieth just at the entrance into the mole or basin.'

With regard to the industry of ship building, Dummer found that at Toulon, as in Italy and in contrast to English practice, 'all ships great & small are built on launches, and are careened when their occasions require it; for here are no docks, an obligation we are not tied to.' The buildings were large and stores in good order but 'low'. It is not clear whether Dummer meant low built or low in supplies, but he went on to say that the situation would be altered and improved when the new basin was made. The additional fortifications would be, he considered, almost as extensive as those round the town. Dummer's drawings showed them under construction and dredging engines at work in the new basin, which was finally being built to Vauban's third design (fig. 8).⁴² He also noted that ordnance was manufactured within the arsenal 'having a very convenient place for the purpose', unlike in England where it was manufactured on separate sites.

Marseilles, where he arrived on 14 April 1683, was a more mercantile town than Toulon, he observed, but nevertheless of interest because it was the home of the French King's galleys, 'their sterns turned to the wharf or quay 125 paces long ... Here is now 35 galleys, whereof 15 are new, and the most polite and beautiful I ever saw, 30 of these are always ready armed, and can be out in 6 hours space, officers, soldiers, and slaves, being always ready at beat of drum.' The galleys intrigued him as there was nothing like them in England. So he drew 'the plan and views of the French King's naval storehouse at Marseilles, being the proper haven of his galleys' (fig. 9). It was, he considered, 'a noble building but a small arsenal, consisting of two docks only, the magazine is extremely pleasing and distinct, each galley hath her storehouse and her name in capital letters cut over the door, the arms of 35 galleys have also a distinct

³⁹ BL, King's MS. 48. Gillian Hutchinson has pointed out that if they did not know each other earlier, Dummer could have met Phillips in Tangiers in 1683 where Phillips made two prospect drawings of the town, showing it before and after it was demolished. Four working proofs of prints by N. Yeates and J. Collins, made after the drawings, are in NMM, P.43, a volume from the Dartmouth Collection of maps, plans and prospects relating to Tangiers.

⁴⁰ BL, King's MS. 40, ff. 79-81.

⁴¹ Undoubtedly the *Royal Louis*, a 110-gun ship built at Toulon in 1667 and scrapped in 1690. I am grateful for confirmation from Jean-Philippe Lamy, Chef du service recherche, Musée National de la Marine, Paris.

⁴² BL, King's MS. 40, ff. 80-3. In the second half of the seventeenth century there were numerous abortive projects to improve the facilities at Toulon. Vauban's third plan of 1682 took over twenty years to complete. Jean Peter, *Vauban et Toulon. Histoire de la construction d'un port-arsenal sous Louis XIV* (Paris, 1995).



Fig. 8. The Perspective of ye Bason ... at Tholon. King's MS. 40, ff. 59v-60 (original foliation f. 83).

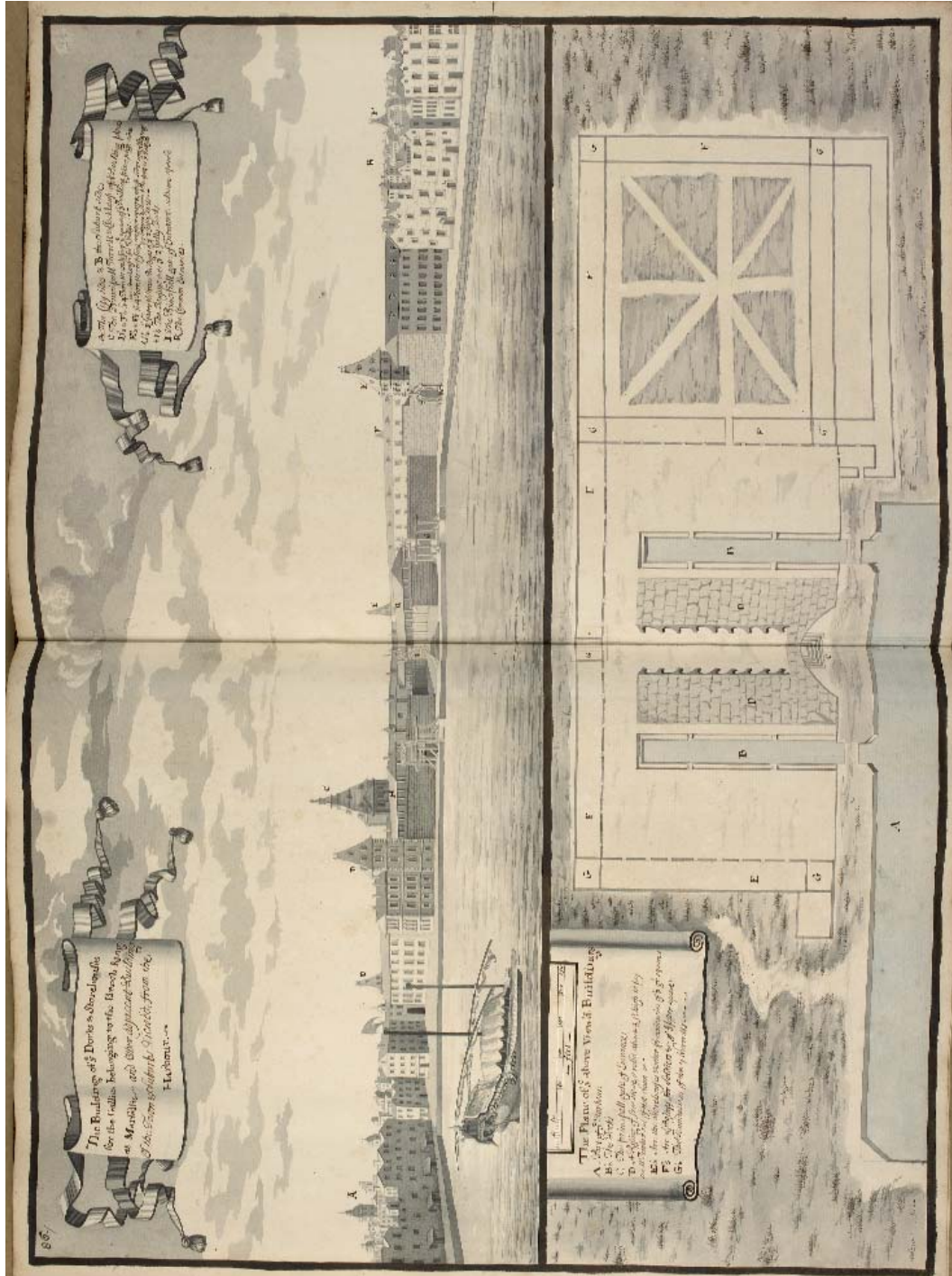


Fig. 9. The Building of ye Docks & Storehouses for the Gallies... at Marseillis. King's MS. 40, ff. 61v-62 (original foliation f. 86).

place, and curiously kept with an armoury apart, to supply as many more upon occasion, slaves, soldiers, and other artificers as smiths, painters, carvers &c have their apartments, all in this one building which is very well guarded and looked after. This magazine standeth at the east end of the mole or pool, where the galleys lie, and is the best ornament of the town.⁴³

Dummer diligently fulfilled the King's orders to make 'observations upon all foreign shipping', from Cadiz to Constantinople. The final section of his journal is devoted to describing each of them, many quite small fishing or cargo boats: the Taratan, Londra, Scaique, Gymbar, Gabarra, Polacque, Saettia, Marcillana, the Burchio of Padua and Verona, the Navecello of Pisa and Livorno, the Venetian Galley (including the Bucentoro used by the Doge), Gondelo and Piotta, the Feluca, the Spanish Barco Luengo, the Corsaire and Galliot ... He recorded them not only by means of 'geometrical designs', in other words ships' profiles, but by 'Two distinct appearances the one showing their sailing and figure to the eye upon the water; the other a bodily appearance made by the position and concurrences of diverse papers proportionally cut and raised on edge or upright by a thread'. The former were watercolour views. The latter was an ingenious attempt to represent the different craft in three dimensions by slicing them horizontally into paper sections, which lay flat on the page until drawn up vertical using the string to form a skeleton model (fig. 10). By these means was rendered 'visible and exact the proper body of each design, and therewith also their various burdens and uses (in the parts that employ them) are distinctly treated of.'⁴⁴

In subject matter, Dummer was – presumably unwittingly – following in the footsteps of the Marseilles artist, Jean Jouve, who created an album of thirty-two drawings of Mediterranean craft in the late 1670s.⁴⁵ But Dummer's geographical range was more extensive and he went further in artistic terms, combining naturalistic views of the various vessels under sail, meticulous geometrical profiles and what were among the world's first pop-up illustrations.⁴⁶

In July 1683 Dummer sailed homewards from Livorno in the *Swallow* via the Balearic Islands, Malaga, Alicante, Gibraltar and Cadiz, where on 13 September he received orders to attend Lord Dartmouth in Tangiers and stay until the English garrison was given up and destroyed, on 6 February 1684. Samuel Pepys was Dartmouth's sole counsellor in undertaking the withdrawal and met with Dummer on at least one occasion here.⁴⁷ After a particularly

⁴³ BL, King's MS. 40, f. 85.

⁴⁴ BL, King's MS. 40, f. 103.

⁴⁵ There are two so-called *Albums de Jouve*. The first, signed and entitled *Dessins de tous les bâtiments qui naviguent sur la Méditerranée* (Bibliothèque nationale, cabinet des estampes, Ic 46), covers some of the same ground as Dummer. Each craft is represented moored and under sail and as with Dummer the pages are embellished with elaborate maritime cartouches, but in a more stilted style. The second is unsigned: *Dessins des différentes manières de vaisseaux que l'on voit dans les havres, ports et rivières depuis Nantes jusqu'à Bayonne qui servent au commerce des sujets de Sa Majesté* (bearing the arms of Seignelay, it is conserved in the Service Historique de la Marine, château de Vincennes). Meticulous drawings of profiles, plans, sections and perspectives of ships in the so-called *Album de Colbert* (dating from the early to mid 1670s and also conserved at Vincennes) are closer in documentary and constructional spirit to Dummer's enterprise. Michel Vergé-Franceschi and Eric Rieth, *La France Maritime au Temps de Louis XIV. Edition critique des deux Albums dits Jouve et de l'Album de Colbert* (Paris, 2001).

⁴⁶ Gillian Hutchinson kindly directed me to the second edition of Robert Dudley, *Arcano del Mare* (1661) in which the tipped-in plates of astrolabes have dials and rules which can be revolved using pink thread. Dummer might conceivably have come across a copy in Tuscany and been inspired to develop further the concept of interactive illustration. The second Keltridge volume (microfilmed as NMM, SPB/49) contains a similar skeleton pop-up of a sixth-rate frigate, attached to the back board. The accompanying draught is signed by Keltridge and dated 1689. It is illustrated in *The National Maritime Museum. The Collections* (London, 1990), p. 33.

⁴⁷ Pepys reported that Dummer could tell him as many stories as anybody relating to the lewd and brutal behaviour of the Governor of Tangiers, Colonel Percy Kirke. *The Tangier Papers of Samuel Pepys*, Navy Records Society, 1xxiii (London, 1935), p.103.



Fig. 10a. A Saettia. King's MS. 40, f. 81v (original foliation f. 116).

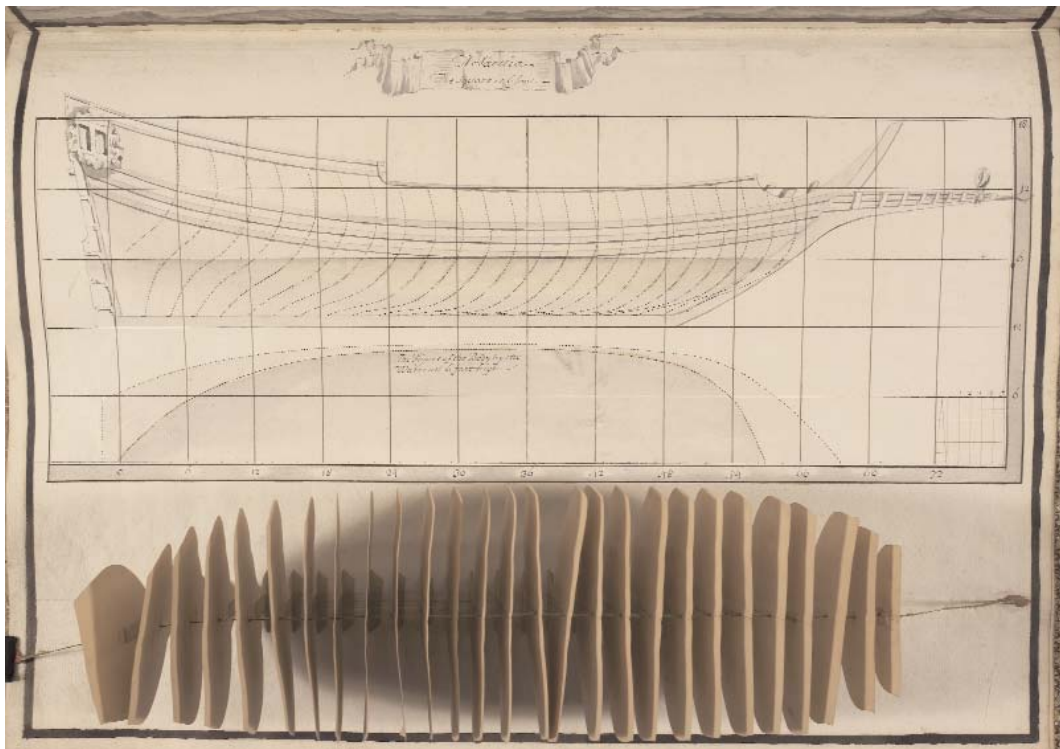


Fig. 10b. A Saettia. King's MS. 40, f. 82

rough passage, Pepys and Dummer arrived back in England at the end of March. By the end of the year his expenses, which amounted to £150 10s 6d – 50% more than his initial estimate – had been reimbursed.⁴⁸ While completing the fair copy of his beautiful journal, Dummer put himself forward for shipwright positions in part on the strength of his skills as a draughtsman.

In September 1685, on the recommendation of Pepys (reappointed Secretary to the Admiralty Board), Dummer visited John Evelyn in Deptford. Evelyn was ‘so charmed with his ingenuity’, he wrote to Pepys, ‘that I look on it as a new obligation to you; and if you find I cultivate it for my own sake a little; you will let him understand ... how much I wish him the improvement of your favours ...’⁴⁹ Evelyn must have been delighted to meet a civilized young man with the capacity to expand upon the interest in shipbuilding he himself had demonstrated some thirty years earlier.⁵⁰ In December 1685 he again approached Pepys with regard to Dummer’s prospects: the Master Shipwright at Woolwich, Thomas Shish, had died, enabling the other Master Shipwrights and Assistant Shipwrights to scale the career ladder and creating thereby vacancies for Assistants at Deptford and Chatham, for which Dummer applied. Evelyn repeatedly emphasized his superior qualities, thanking Pepys for having advanced ‘a diligent and most ingenious man’ and asserting again on 1 January 1686, ‘in my life I have never observed a young man (qualified as he is, in his way, or more susceptible of what can be wanting) less pragmatical, and of greater modesty, beside his so humble, cheerful and becoming dedication of himself to his patron alone [presumably Tippetts, or possibly Pepys], which is a mark of his discretion, as well as of his duty.’ Evelyn would have preferred to retain his companionship by having him placed in the neighbouring dockyard of Deptford, as would Dummer, for ‘a certain proper gentleman [was] very sweet’ with his wife and the posting of this man⁵¹ to Chatham rather than Dummer would have removed the source of the scandal.⁵² Evelyn’s friendship with Dummer evidently survived the latter’s eventual departure for Chatham: on 21 May 1688 Evelyn wrote to Dummer who seems to have been undertaking some research for him, ‘let no curiosity of mine divert you from more useful speculations, and especially the public concern. I shall be heartily glad upon all occasions to shew how distinguishably I value the tutoring you daily cultivate and improve with so much diligence.’⁵³

Pepys, however, was by this time less willing to favour Dummer, particularly when he threatened the chances of his close friend Deane. From the notes Pepys prepared for a list of the country’s leading shipwrights ordered by the new King, James II, in 1686,⁵⁴ he considered Dummer ‘an ingenious young man, but said rarely to have handled a tool in his life, nor knows judiciously how to convert a piece of timber; has been much abroad indeed, but gained his present promotion [as Assistant to Robert Lee, Master Shipwright at Chatham] upon the

⁴⁸ *Calendar of Treasury Books*, vol. vii, part 2, 1681–1685, pp.1410, 1464.

⁴⁹ BL, Add. MS. 78299, f. 33. Compare with the transcript in *Particular Friends: The Correspondence of Samuel Pepys and John Evelyn*, ed. Guy de la Bédoyère (Woodbridge, 1997), C25.

⁵⁰ BL, Add. MS. 78339, ff.182v–186v.

⁵¹ Dummer’s rival for the vacancy of Assistant Shipwright at Chatham or Deptford was a Phineas Pett, Second Assistant at Chatham, not to be confused in the ubiquitous Pett clan of shipwrights with Sir Phineas Pett, Yard Commissioner at Chatham from 1685 to 1689. One Mr Miller, Boatmaker at Deptford, hoped to succeed to Pett’s position. NA, ADM 1/3555, f. 375.

⁵² BL, Add. MS. 78299, f. 34. Also *Particular Friends*, C28, 29 and 30, 6 December 1685, 2 January and 8 January 1686.

⁵³ BL, Add. MS. 78299, f. 48v. See also Add. MS. 78318, f. 39 where Dummer writes to Evelyn on 4 July 1688 seemingly in relation to some common ornithological (or culinary) interest and hopes ‘in a little time [to] find some opportunity to entertain you as to what thoughts I am capable of in relation to the dockyards and (?) shipping’. I am most grateful to Frances Harris at the British Library for bringing these references to my attention.

⁵⁴ Later printed in Pepys’s *Memoirs relating to the State of the Royal Navy of England* (London, 1690) without the libellous character sketches to be found in MC, Pepys MS. 1490.

credit only of his designing and making of draught.’ These comments were, it must be stressed, written by Pepys to ensure Deane was appointed to the special commission to rebuild the Navy by rubbing out all of his potential rivals, variously accusing them of ignorance, infirmity, illiteracy and drunkenness.⁵⁵

In the early 1690s, perhaps not surprisingly with Pepys out of power following James II’s exile, Dummer and Lee (also said by Pepys never to have built a ship in his life and to suffer from gout) were to make complaints about the conduct of Deane’s special commission, although their objections were dismissed as groundless.⁵⁶ According to the vitriolic counter-attack made in 1692 by Deane and his co-defendant William Hewer to the Public Accounts Commissioners investigating the allegations, during his Assistantship at Chatham Dummer suffered the indignity ‘of having his work committed by [Lee] to a common foreman; while Mr Lee both owned and justified it, charging him with ingratitude for his no better requiting him than with complaints, for the provision he had so in kindness made, for the supplying what ’twas true indeed was his work, but what through ignorance and idleness he never had done, had never been bred to do, nor could ever be now brought to the knowledge how to do himself.’ They excused their own failure to displace Lee and Dummer on the grounds of the urgency of the task which ‘would not admit of the loss of time, which criminal enquiries and shiftings of hands are ever attended with ... Or, how otherwise could our ... tenderness be justified towards Dummer, in suffering a trust like his of the first Assistantship in such a yard as Chatham, and at a time of so much action, and so weighty as that of the ripping-up, ransacking, and repairing of the greatest ships of England, to rest in a hand of so little use, as necessitated the Master Builder ... to provide an ordinary working shipwright at 2s 2d a day to discharge his office for him?’⁵⁷

In retirement in 1694, Pepys was once more to belittle Dummer’s abilities, evidently still mindful of Deane’s and Hewer’s scorn. Drawing a contrast between the ‘mathematical admirals’ Charles II and James II, who understood the sea and enjoyed visiting both their own and merchant yards, and the current regime under William of Orange, Pepys asked: ‘But how this is made good under a Prince whose genius seems bent to land-action only, and consequently what obligations, inducements, or indeed regard is now had to the keeping up of that emulation, and consequently the hopes of our still further advancing the science of shipbuilding, whether by any applications used towards it by those who have the charge of the Admiralty, or the Officers of the Navy, or in particular by the Surveyor thereof (if he may yet be admitted for sufficient to judge of the work of a master-builder, who was so lately condemned of insufficiency in his duty as an assistant) I am out of the way of knowing.’⁵⁸ Ironically, in view of Pepys’s avowed commitment to the ‘science of shipbuilding’, Dummer was seemingly condemned for being too much the philosopher draughtsman dreaming in his closet, and not enough the practical shipwright.

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Nevertheless, by 1694, Pepys was somewhat out of date. Parliament was spending extraordinary sums on the Navy which, in William’s wars against Louis XIV, was firmly identified with the defence of English political and religious freedom. The annual vote rose from under £1.2 million in 1689 to £2.5 million in 1694 and seamen borne from 22,332 to 47,710.⁵⁹ At the same time, Dummer was engaged on his greatest works. Tippetts had looked

⁵⁵ MC, Pepys MS, 1490, f. 148.

⁵⁶ *A Descriptive Catalogue of the Naval Manuscripts in the Pepysian Library at Magdalene College, Cambridge*, ed. J. R. Tanner, Navy Records Society, xxvi (London, 1903), pp. 77, 92–3.

⁵⁷ BL, Harley MS. 7476, ff. 21–3. According to Deane and Hewer, Dummer was on 16–18 shillings a day.

⁵⁸ *Samuel Pepys’s Naval Minutes*, pp. 394–5.

⁵⁹ Rodger, pp. 636, 642.

after his protégé: in 1689 Dummer was appointed Assistant Surveyor of the Navy with a salary of £300 a year and on the death of Tippetts in 1692, he succeeded him as Surveyor at £500 a year. It was an auspicious moment: public and parliamentary support for a strong navy surged around 1690, when the defeat of the Anglo-Dutch fleet by the French off Beachy Head drove a government threatened with invasion to vote a special fund to build twenty-seven men-of-war, authorize the construction of a new dockyard at Plymouth and attempt to reform naval administration. Success seemed to follow swiftly: in May 1692 the French fleet was decisively beaten by an Anglo-Dutch fleet under Admiral Edward Russell at Barfleur-La Hougue. In the wake of the catastrophic loss of the Smyrna convoy the following year, Russell was made First Lord of the Admiralty and in 1697 he was raised to the peerage as the Earl of Orford. In the early 1690s Dummer's own career seemed to be riding high: in 1695 he was returned Member of Parliament for Arundel on the Court interest and the same year he became a Governor of the new Greenwich Hospital, a position he held until his death.

Whatever shortcomings Dummer might have had as a practical shipwright, he could scarcely be accused of idleness and insufficiency in his duties as Surveyor. He did his best to strengthen the Navy by furthering that measure of uniformity in ship construction initiated by the thirty new ships project, which he had also sought to promote in his theoretical writings. Despite the avowed desire for standardization, it seems that even the thirty new ships differed in size and tonnage, shipwrights taking the dimensions specified as being minimum rather than absolute measures.⁶⁰ To end these disparities, in 1692 Dummer wrote to the men appointed to survey and measure the ships then under construction, enclosing a small printed sketch, with measurement points keyed in to letters, 'to serve for one common rule of direction and information, whereby the parts necessary to be truly measure[d] and known are at one view made intelligible to every man alike: and the numbers to be set down are to respect the letters in the manner following ...'⁶¹ So once again, Dummer expressed his rationalizing bent in visual form. His method of measurement was adopted as official practice on 22 April 1696.⁶² According to a near contemporary, he was the first 'that brought the proportions to exact standards, sending each builder with his warrant for building a new ship, the length on the lower deck, breadth extreme and depth in hold ... Mr Dummer caused every master builder, at docking a ship, to measure the body and compare the figure, and also ordered blocks [models] to be made for almost every ship.'⁶³ Unfortunately, because Parliament had specified not only the tonnages but the number of guns, N. A. M. Rodger has commented, the ships built under Dummer's surveyship were 'cramped, weak, unstable and overgunned', although he did his best to rectify their defects by adding a third deck to the last four ships of the programme.⁶⁴

Dummer was now in a position to pursue experiments based on the knowledge he had picked up on his Mediterranean study tour. In January 1693, having been told by the Admiralty to report on the subject of bomb vessels, he wrote to his old master Robert Lee at Chatham and to Fisher Harding at Deptford, asking them to check the proportions of a bomb

⁶⁰ Hemingway, p. 54.

⁶¹ NA, ADM 91/1, ff. 278-9, quoted in Evan W. H. Fyers, 'Shipbuilding Abuses in the XVIIth Century', *Mariner's Mirror*, x (1924), pp. 382-6. See also f. 282 in the same volume of Surveyor's out letters, in which Dummer writes of 'Having been along time making some steps towards a rational account of the burthens of the ships of the Navy' by collecting diverse lists purporting to give the dimensions, but which in fact contradicted each other, so that he had had the sketches printed to update and correct them.

⁶² NA, ADM 106/2507, no. 117.

⁶³ William Sutherland, 'Action and reaction equal in a fluid, or a specimen towards removing some untoward approved of maxims in building and equipping ships', n.d. NMM, SPB/50. Reproduced in John B. Hattendorf et al. (eds.), *British Naval Documents 1204-1960* (London, 1993), pp. 266-9. I am indebted to Brian Lavery for this reference. Sutherland was author of *The Shipbuilder's Assistant* (London, 1711).

⁶⁴ Rodger, pp. 219-20. Hemingway, pp. 89-91.

vessel given by 'A French engineer [Jean Fournier] who contrived those bomb vessels I saw when I was at Toulon.'⁶⁵ On the basis of their views, an experimental and far from satisfactory class of bomb vessels was built to English dimensions and rigging in 1693. A smaller, cheaper and more effective class followed two years later, built to mercantile dimensions in merchant yards.⁶⁶ Rather less time was spent pursuing the proposal sent by the English Consul in Genoa, made by a Venetian shipbuilder in the city, to build their Majesties a Venetian 'galleas'. The Navy Board's report to the Admiralty on 12 February 1694, enclosing a sketch, was based on information from traders and the observations made by some members of the Board who had been resident at Venice (Dummer, for example). It was deeply sceptical, because of the doubtful seaworthiness of such vessels in Western oceans, not to mention a lack of slaves to row them.⁶⁷

Further evidence of Dummer's scientific approach is provided by his letter of 31 January 1694 addressed to the Admiralty and signed by the entire Navy Board, logically rebutting the practice of girdling ships, promoted by Peregrine Osborne, Earl of Danby, then Rear Admiral of the Blue Squadron.⁶⁸ Dummer could also be curtly dismissive of innovations submitted by outsiders, as the military engineer Thomas Savery (inventor of the steam engine) discovered to his cost. At first Dummer seemed willing to consider Savery's patent design of paddle-wheels driven by a capstan, supplying him with draughts of the half breadths of the several rates so that Savery could work out the proportions of the 'engines'. But once Savery had submitted them, Dummer stopped communicating with him and submitted a negative report on the venture to the Admiralty. Savery published a refutation in 1698, telling his readers that although he believed his engine was as beneficial to shipping as the compass, 'unless you can sit round the green-table at Crutched-Friars, your invention is damned of course.'⁶⁹ Yet Dummer could also act as an advocate of change, predictably, in matters concerned with education. In 1698, the Admiralty Secretary, Josiah Burchett, singled him out for successfully representing to the Admiralty the need to improve shipwrights' training: 'that most, or all, the carpenters of His Majesty's ships are very illiterate in all things, except in the bare trade of a shipwright, and that it might be of advantage to the service, if some of them were instructed

⁶⁵ BL, King's MS. 40, f. 79. Dummer reported watching 'diverse trials' of mortars, fired from galliots: 'I saw many shot, but very few passed home, the most breaking in the air.'

⁶⁶ NA, ADM 91/1. See Chris Ware, *The Bomb Vessel* (London, 1994), pp. 9-21, for an authoritative account of early French and English bomb vessels.

⁶⁷ NA, ADM 2/174, f. 109, 3 February 1694. ADM 1/3571, ff. 225-34. The sketch is now in MPI, 1/265.

⁶⁸ NA, ADM 2/174, f. 96 for the order of 26 January 1694 directing the Navy Board to report on Danby's proposal. ADM 1/3571, ff. 267-9 for the response of 19 February from Chatham dockyard. Hemingway, pp. 90-1, comments, 'This is the first recorded instance of a logical rebuttal of girdling on scientific grounds, although it was ignored by the Admiralty who ordered it done anyway and the practice would continue well into the second half of the eighteenth century.' In their letter of 1 March (appended in ADM 1/3571) the Navy Board refused to advise on the thickness of the girdling and lengthening of the masts ordered for the *Royal William* 'not thinking it reasonable for them to determine either the one or the other, after our having given our opinion (and we think upon reasonable grounds) against the girdling of the said ship.'

⁶⁹ Thomas Savery, *Navigation Improv'd: Or, the Art of Rowing Ships of all Rates in Calms, With a more easy, swift, and steady motion, than oars can. Also a Description of the Engine that performs it; And the Author's Answers to all Mr. Dummer's objections that have been made against it* (London, 1698).

in other things that may the better qualify them to judge of, and perform the duty of a master builder.⁷⁰

Dummer's main achievement as Surveyor was his development of the royal dockyards.⁷¹ On 23 September 1689, he was ordered as newly appointed Assistant Surveyor to report on the most suitable site for a single dry dock at Plymouth. He returned to London in November with details of three possible locations, giving estimates of the cost of building on each both in timber and stone. After some debate, the small inlet behind Point Froward was selected; the work was to be done in stone with a protective wet dock in front and, at the King's insistence, the dry dock made large enough to hold first rate ships. In fact, Dummer seems to have been the designer of the first successful stepped stone dry dock in Europe.⁷²

In 1693-4 he was busy both at Portsmouth and Plymouth, for work had commenced on enlarging the former in 1689.⁷³ On 2 August 1693 Dummer wrote from Portsmouth to a new friend and potential patron, Robert Harley, in the powerful Office of Public Accounts,⁷⁴ to tell him that he intended to stay for three weeks or more 'to quicken the works of these new docks'. By 16 September 1694, he could report from Plymouth, 'Our docks here are finished and we purpose to take in the cleaning the mouth of the basin from the dam that stands before it, which will be done in a few days; a more particular account I will give you hereafter.'⁷⁵

Dummer's 'Account of the Generall Progress and Advancement of his Majestie's New Docks and Yard at Plymouth' was presented to the Principal Officers and Commissioners of the Navy in December 1694.⁷⁶ It gives a clear idea of the logical thinking behind his planning of the works, influenced by his extensive travels. Typically, to the description of works undertaken he appended eight draughts: plans of the site, the yard and the dry dock, plans and elevations for the officers' dwelling houses (and designs for the pediments), the great store house, hemp house, rope house and rope yard buildings, for 'by representations and descriptions of works of this nature, when they are disposed in a manner most familiar and

⁷⁰ NMM, ADM/A/1860, f. 326, 3 December 1698, quoted in Coats, p.118. Significantly, while he was in Toulon Dummer noted that the many French officers on half pay were 'obliged daily to study, and learn navigation, gunnery &c of a master appointed for the purpose.' BL, King's MS. 40, f. 81.

⁷¹ The most comprehensive overview of Dummer's contribution to the development of the royal dockyards is given in Jonathan G. Coad, *The Royal Dockyards 1690-1850* (London, 1989).

⁷² According to José P. Merino, Intendant Arnoul at Rochefort supervised the construction of such a stepped stone 'forme' at Rochefort in 1683-8 but it did not work. 'Graving Docks in France and Spain before 1800', *Mariner's Mirror*, lxxi (1985), pp. 36-8. For the most authoritative account of the dockyard's early history see Jonathan Coad, 'The Development and Organisation of Plymouth Dockyard, 1689-1815', in Michael Duffy et al. (eds.), *The New Maritime History of Devon*, vol. i, *From Early Times to the Late Eighteenth Century* (London, 1992), pp.192-200.

⁷³ In 1691, the Admiralty ordered the work at Portsmouth to be enlarged to include the construction of two wet docks at an estimated cost of £15,890, in addition to the dry dock, 'answerable to a design thereof presented by the Surveyor of the Navy' – and presumably drawn by his then Assistant, Dummer. NMM, ADM/A/1777, 7 October 1691.

⁷⁴ Hemingway, p. 82, speculates on the basis of information supplied by Michael Duffy that Dummer might have met Harley when he was giving evidence to the Commission of Public Accounts investigating the alleged malpractice of Deane's special commission.

⁷⁵ BL, Add. MS. 70035, ff.150, 188.

⁷⁶ BL, Lansdowne MS. 847, ex Harley MS. The number of surviving Harley or ex Harley MSS associated with Dummer confirms that Robert Harley, Earl of Oxford (1661-1724) was Dummer's chief patron in the 1690s and early 1700s. The account has been reprinted in Michael Duffy (ed.), *The Naval Miscellany*, vol. vi, *Navy Records Society*, cxlvi (London, 2003), pp. 93-147, with a detailed introduction by the editor.

easy of the understanding, one finds at once both encouragement in the contemplation, and satisfaction in the judging of them.⁷⁷ The drawings therefore served as a means of explanation and a form of advocacy, as well as evidence of and pride in his achievement (figs 11 and 12).

Dummer was at pains to emphasize the ways in which the new yard would answer the 'great abuses committed in their Majesties' yards'. As recently as 25 June 1694 he had conceded these took place before the Committee of Public Accounts hearings of the charges made by the merchant shipwright, George Everett.⁷⁸ He displayed his grasp of logistics by placing particular emphasis on space-planning to counter the malpractices that occurred in the other yards: 'namely the tedious and expensive practices of carrying all things afloat for expediting of ship works, and which are many times very remote from the places where materials are kept, and workmen resort.' This, he recognized, led to time-wasting and obstruction and presented opportunities for embezzling ships' stores, 'for men are not such mathematical movements to be governed exactly by one common force, or rule, but have separate passions and springs prompting them to do what they like best themselves and how moral, or severe soever our laws and instructions be, they are ever more observed with some as the temptation to break them.' Because there were innumerable abuses, 'too many to be named, and some too subtle to be discovered', he ensured that men and materials were placed close together under the constant eye of command, saving time and costs.⁷⁹ The thirteen officers' dwelling houses were similarly sited 'on the most eminent spot of ground in the yard, for the officers' better observance of things abroad, and readier communication and conference with one another, on all occasions.' The design of these buildings was intended to unite in harmony 'utility, proportion, strength and ornament'.⁸⁰ The ornamental part was represented in the pediments decorated with the arms and trophies of the King, Admiralty and Navy which Dummer drew in a final ninth draught.

Again, when describing the way in which the hemp store and rope house, sail making and sail mending were contiguous, freed from interruption by other business, he spelt out the advantages: 'For nothing giveth greater ease in works of the Navy (the busiest, most intricate, and chargeable of any other office of this Government, and which also aboundeth with numerous and different artificers) than providing due space, and separation of them, from the intercourse of one another, for carrying and recarrying many things in one track, is like a multitude (from some violent agitation) crowding themselves through a narrow space, where they choke and disable one another.' Fit accommodation had to be devised for the hemp as, 'barring the means and occasions of temptation, are the first and chief securities against the inventions and designs of wicked men.'⁸¹ It seems that Dummer's experience of working in the dockyards had not advanced a belief in the mechanistic view of human nature espoused by some of his more philosophically minded contemporaries.

Rather, the views Dummer held as a surveyor are remarkably close to those of the greatest military engineer of the French *ancien régime*, Sébastien le Prestre de Vauban (1633-1707), who in 1679 was called upon to repair the fortifications of the port of Toulon. From 1669 numerous plans for the port had been proposed and rejected and it was only on Vauban's third attempt in 1682 that matters were put in hand according to his abiding principles of 'convenance et commodité'. Like Dummer, he believed the key to security lay in placing everything in view of the intendant. All shifting was to be reduced to a minimum, using water transport by canals when necessary. The victualling was to be confined to a specific area. Buildings particularly susceptible to fire risk were to be isolated (there had been a fire at the port in 1677). Finally,

⁷⁷ BL, Add. MS. 9329, a printed version of the account produced in 1698, with some variations and a prospect view of the whole yard engraved by Kip.

⁷⁸ BL, Harley 7471. For Everett's charges see Coats, pp. 120-3.

⁷⁹ BL, Lansdowne MS. 847, ff. 21-3.

⁸⁰ BL, Lansdowne MS. 847, ff. 34-5.

⁸¹ BL, Lansdowne MS. 847, ff. 44-6.

the military was to be separated from the merchant port. To Colbert's architectural watchwords of simplicity and beauty, he added 'commodité' and 'solidité' – presumably from the ideal qualities of the building art as stated by Vitruvius – spurning the architectural extravagances of Rochefort.⁸² Their closeness to Dummer's sentiments of 'utility, proportion, strength and ornament' suggests that the Englishman might have learnt something of the rationale behind the construction of the new dockyard when he was in Toulon in 1683.

Dummer conceded that there had been difficulties in executing his designs but believed that these had now been overcome, 'for the beginnings of things always meet with obstruction or misrepresentation.' He proved to be over-optimistic. Objections to his drawn designs for sluice-gates had been made in 1693 by no less an expert than Robert Hooke.⁸³ In his Account Dummer was particularly proud of the sluices which were, he wrote, 'as new as they are secure and easy to be used ... For being under the command of a very large screw, they are raised and depressed with little strength and great exactness.'⁸⁴ Dummer had had a design model made of the gates for the Board's approbation and wrote to Captain Henry Greenhill, Commissioner at Plymouth, on 13 December 1692, 'I know you will like the project of the gates when you see them, having communicated the manner of them to the best judges I can find in town, particularly to Sir Henry Sheeres [Pepys's engineer friend who had worked on the Tangiers mole], who approves extremely of the manner of it, so visibly gaining all the use we require of two gates and contracting the solidity of our work into less extension and consequently into less weight, and into a figure capable of more strength and resistance of the force of water.'

However, the gates needed much adaptation before they could withstand the pressure of water, as calculated by Dummer. Greenhill's successor, the short-tempered Captain George St. Lo, proved to be extremely sceptical while Dummer in turn blamed the delays on his discouragement. In February 1697 St. Lo complained directly to the Lords of the Admiralty about the 'tottering condition' of the new rope house and tar house, not to mention the new dry dock which had become a wet dock. When he had complained to Dummer, he said, Dummer had told him it was not his business to investigate such matters and the Navy Board too had ignored him. Dummer denied he had ever addressed the Commissioner in such a manner and attributed the Commissioner's charges to malice.⁸⁵

In September 1697, Dummer anticipated that a second pair of gates could be installed expeditiously, 'provided the Commissioner will rest satisfied with handing the proper orders to the respective officers and leave them free agents to their instructions and when he finds them unfaithful to that, it would be much better, instead of puzzling them with his apprehensions and personal directions in mastery of their practice, to represent their failures plainly whenever they do amiss in their duty. I am forced to say this, for however this came to be advised 'tis a very great prejudice as well as distraction to these officers in their business.' He concluded his letter to the Navy Board on an upbeat note, 'I think this also a proper place to assure you that notwithstanding those many complaints that have been about these docks, they do remain in the very same state Captain Greenhill left them [in April 1695]. And all the

⁸² Peter, pp. 279–90.

⁸³ BL, Sloane MS. 4024, entries from Hooke's Diary for 28 April and 10 June 1693. Transcribed in R. T. Gunther, *Early Science in Oxford*, vol. x, *The Life and Work of Robert Hooke (Part IV)* (Oxford, 1935), pp. 235, 248. For Hooke's mechanical expertise see Jim Bennett, 'Hooke's Instruments' in Jim Bennett, Michael Cooper, Michael Hunter, Lisa Jardine, *London's Leonardo – The Life and Work of Robert Hooke* (Oxford, 2003), pp. 63–104.

⁸⁴ BL, Lansdowne MS. 847, f. 27.

⁸⁵ NA, ADM 91/1, ff. 158, 206, 211–12, 276–7, 291, 293–5, 297, 308, Surveyor's out letters 1693; ADM 106/472, Commissioner St. Lo's report on the gates, 21 June 1695; ADM 2/178, p. 7, 20 February 1697. NMM, Serigson Papers, Admiralty Orders, 82, 20–24 February 1697.

other buildings in as firm a condition as any other new works of that kind in any other of the yards.⁸⁶

An abstract of the costs in Dummer's 1694 account amounted to £50,000, but he was at pains to point out that this was because of the greatness and novelty of the works, which overcame the deficiencies of the other yards. Obstructions had been brought about because of the irregular cash flow, the weakness of contracts and 'the imbecile stock of a private man under the weight of so chargeable a work',⁸⁷ not to mention the fact that the country was at war. Increases on the original estimate (£23,406 in 1692, which nearly tripled by 1698) had, he maintained with some aplomb, been made purposefully by stealth so that they would be borne more easily, rather than by demanding too great a lump sum and getting rejected at the outset. He even had an answer for those who questioned the utility of Plymouth as a harbour, given its notoriously difficult entrance. Skilful pilots and buoys would lessen accidents for the home fleet while the dangers of gaining entry would protect it from the enemy.⁸⁸

Further evidence of Dummer's pioneering designs for docks is found in an account he made in 1698 of the new docks at Portsmouth 'setting forth the uncommon properties of the dry dock, the several contrivances of the parts, and the usefulness of the whole design for the repairs and despatch of all ship works in a letter to the Navy Board.'⁸⁹ But again the works were dogged by controversy on site, as opposed to in plan, and the account reads, ominously, like an apologia: 'For time and labour have at last obtained full testimony of their accomplishment, and shown without contradiction that that undertaking (though the most hazardous in its nature that could be imagined) was grounded upon as solid reason, as the fruits and advantages which are already seen, and are hereafter to be received there from, will be found considerable to this kingdom.' Dummer admitted he had been criticized for the 'fruitless' expense of the works. But against the malice, prejudice, knavery, envy, provocations and injustice he had suffered through a mixture of 'ignorance and design', he claimed to have 'never knowingly mislead you or misapplied the trust I have the honour to hold with you in the Navy; either personally or collectively in any one act of my life.'

The main body of the account is devoted to the successful docking of the *Royal William*, the first great ship to be brought into the dry dock, with particular emphasis being placed on the speed and economy of manpower with which the new twin-leaf gates could be opened. Furthermore, although most of the water drained out on the ebb tide, Dummer had introduced horse-driven pumps to empty the dock, a technical advance on the manually-operated chain pumps hitherto employed. To his account he appended meticulously drawn plans of the wet and dry docks, the water-courses, pumps, a water-wheel and capstan (fig. 13).⁹⁰ Dummer also offered his thoughts on what would be necessary to complete the works in the foreseeable future, given that the 'ill performance of the contracts and abuses therein' were

⁸⁶ ADM 106/502, Dummer to the Navy Board, 3 June 1697, enclosing a letter of 30 May from the Master Shipwright Elias Waff making similar complaints, Dummer to the Navy Board 17 September 1697. The views of Dummer and Waff were shared by others. See R. D. Merriman, 'Captain George St Lo, R.N., 1658-1718', *Mariner's Mirror*, xxxi (1945), pp. 21-2, who comments, 'St Lo had an unfortunate knack of doing the right thing in the wrong way.'

⁸⁷ Probably the stonemason Robert Waters who was also blamed by Dummer for problems with the works. NA, ADM 106/484, Dummer to the Navy Board, 5 October 1696; ADM 106/502, Dummer to the Navy Board, 3 June 1697.

⁸⁸ BL, Lansdowne MS. 847, ff.62-77.

⁸⁹ BL, Harley MS. 4318. NMM, Sergison Papers, Navy Board Minutes, 1 July 1698, record the order of a copy for the Lords of the Admiralty, perhaps the present example.

⁹⁰ Coad, *The Royal Dockyards 1690-1850*, p. 97, notes Dummer's ingenious design to power the chain pumps not only by horses but by water using a waterwheel, working on the principle of a tide mill, but there does not appear to be any documentary evidence, apart from Dummer's drawing, that the water-wheel was ever built.

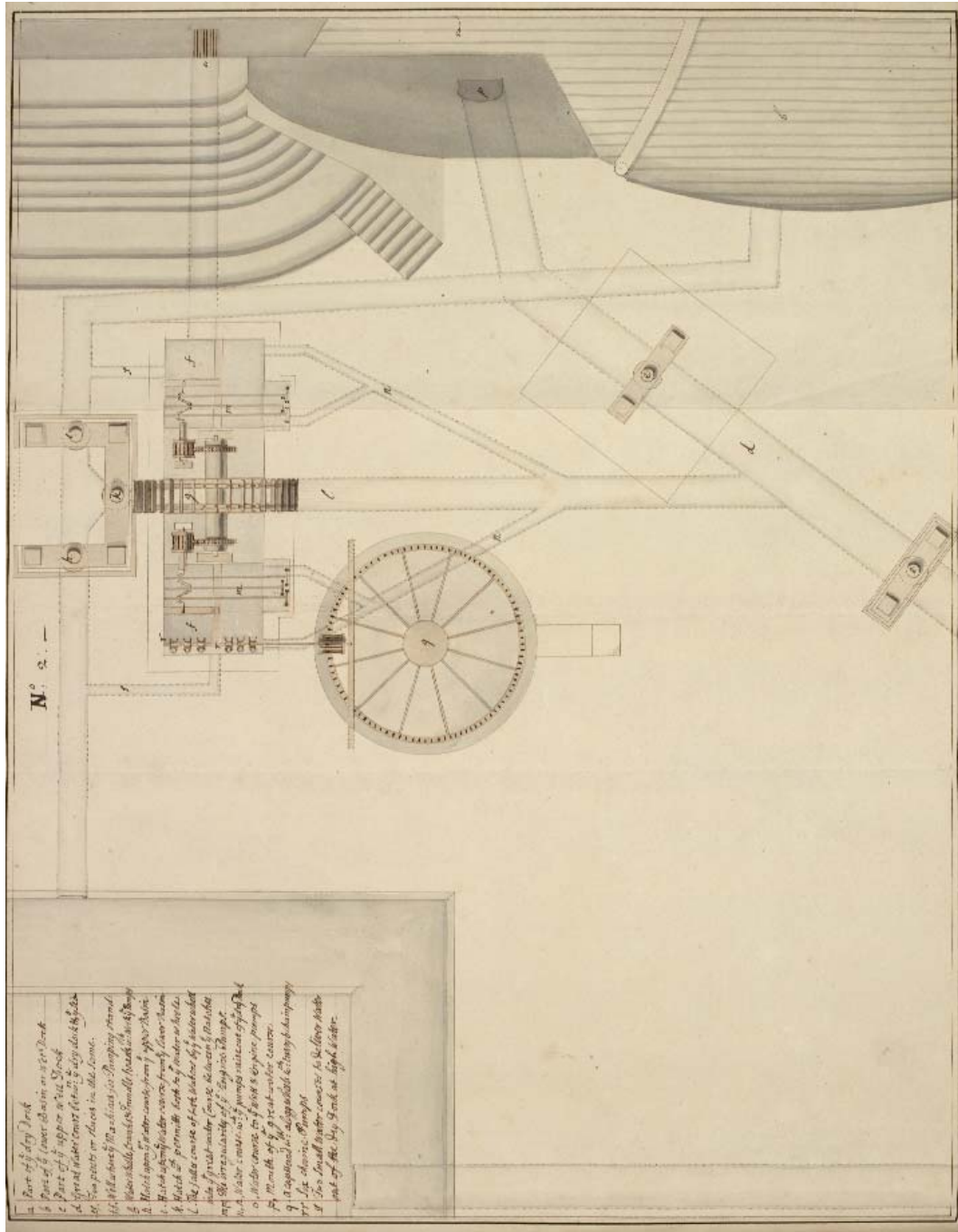


Fig. 13. No. 2, Part of the Dry Dock and Wet Dock, showing water courses, capstan and water-wheel in plan, Portsmouth Royal Dockyard. Harley MS. 4318, f. 42.

preventing the use of the upper wet dock until it was rebuilt. The fourth and final drawing showed not only what had been done but an addition which Dummer believed would make the work complete: 'a new smaller dry dock proposed by placing two pair of gates thereof at the distance observed', at the west end of the channel leading to the upper wet dock (fig. 14). The two dry docks could then be used interchangeably, he believed, affording a variety of service at one and the same time.⁹¹

On 19 November 1698 Dummer also managed to complete 'A Survey of the Ports on the South West coast of England, from Dover to Lands-End', which he undertook with Captain Thomas Wiltshaw, a fellow Navy Board Commissioner and two Masters of Trinity House, Captain James Conaway and William Cruft.⁹² It was ordered by the Lords of the Admiralty on 6 June to ascertain whether any other ports and harbours, besides Portsmouth and Plymouth, could usefully be developed.⁹³ Understandably, given the short time available and number of copies evidently required, the descriptive text and charts were somewhat sketchy although the latter were embellished with putti-laden cartouches, seemingly the Surveyor's trademark (fig. 15).

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Nowhere is Dummer's skill as a surveyor and draughtsman more in evidence than the work which represents the culmination of all his efforts in the Navy, King's MS. 43, 'A Survey and Description of the Principal Harbours with their Accomodations & Conveniences for Erecting Mooring Secureing and refitting the Navy Royall of England ...' of 1698.⁹⁴ It provided 'An Account of the Emprovements which have been made at Each Yard since the Revolution 1688 giving a Numericall Account of the Severall Kinds of Building with their Quantity and value which by an Estimate Rate they may be Accounted worth to the Nation. Also An Account of the Nature and usefullness of the Late Erected New Docks at Portsmouth and the Yard at Plymouth.'⁹⁵ Thus it was designed to record the improvements made to the royal dockyards during the first ten years of William's reign. Typically, Dummer's presentation was lavish with the letters of the title-page set against the lining of a rich cloak held aloft by putti flying over a view of the fleet, and Neptune in his chariot in the foreground, bearing the royal ensign (fig. 16).

The circumstances of its commission are not wholly clear. It may date back to the early months of Dummer's surveyorship when, not finding in his office any surveys of the dwelling houses in any of the yards, he directed the Clerks of the Survey 'to take a survey of every house in the yard, as also of the offices, and carefully to set down what belongs to their Majesties in every room as also how it is furnished and fitted, and send a copy of the said survey ... to the

⁹¹ The alteration was ordered during Dummer's suspension. NMM, POR/A2, 19 May 1699.

⁹² BL, Sloane MS. 3233. Another copy giving soundings is in BL, King's Maritime III.67 (Map Library) and a third, also with soundings, Add. MS. 31324. Other copies survive in the National Maritime Museum, the Royal Geographical Society and Hampshire Museums Service. A. H. W. Robinson, *Marine Cartography in Britain* (Oxford, 1962), pp. 45-6. I am grateful to Elisabeth Fairman, Curator of Rare Books and Manuscripts at Yale Center for British Art, New Haven, for letting me know that the Center has the missing ninth copy mentioned in www.geog.port.ac.uk/webmap/dummer. The conclusions of the Survey as to the use by the Navy of the eighteen harbours covered were on the whole pessimistic, with the exception of those near Portsmouth, sheltered by the Isle of Wight – Southampton, Bussleton, Beaulley and Lymington.

⁹³ NA, ADM 1/3584.

⁹⁴ A second less elaborately finished copy of the Survey, presumably deposited by Dummer with the Admiralty, is now in the collection of rare books and manuscripts at the Yale Center for British Art, New Haven. I am most grateful to Peter Barber, Keeper of Maps in the British Library, for bringing it to my attention.

⁹⁵ BL, King's MS. 43.

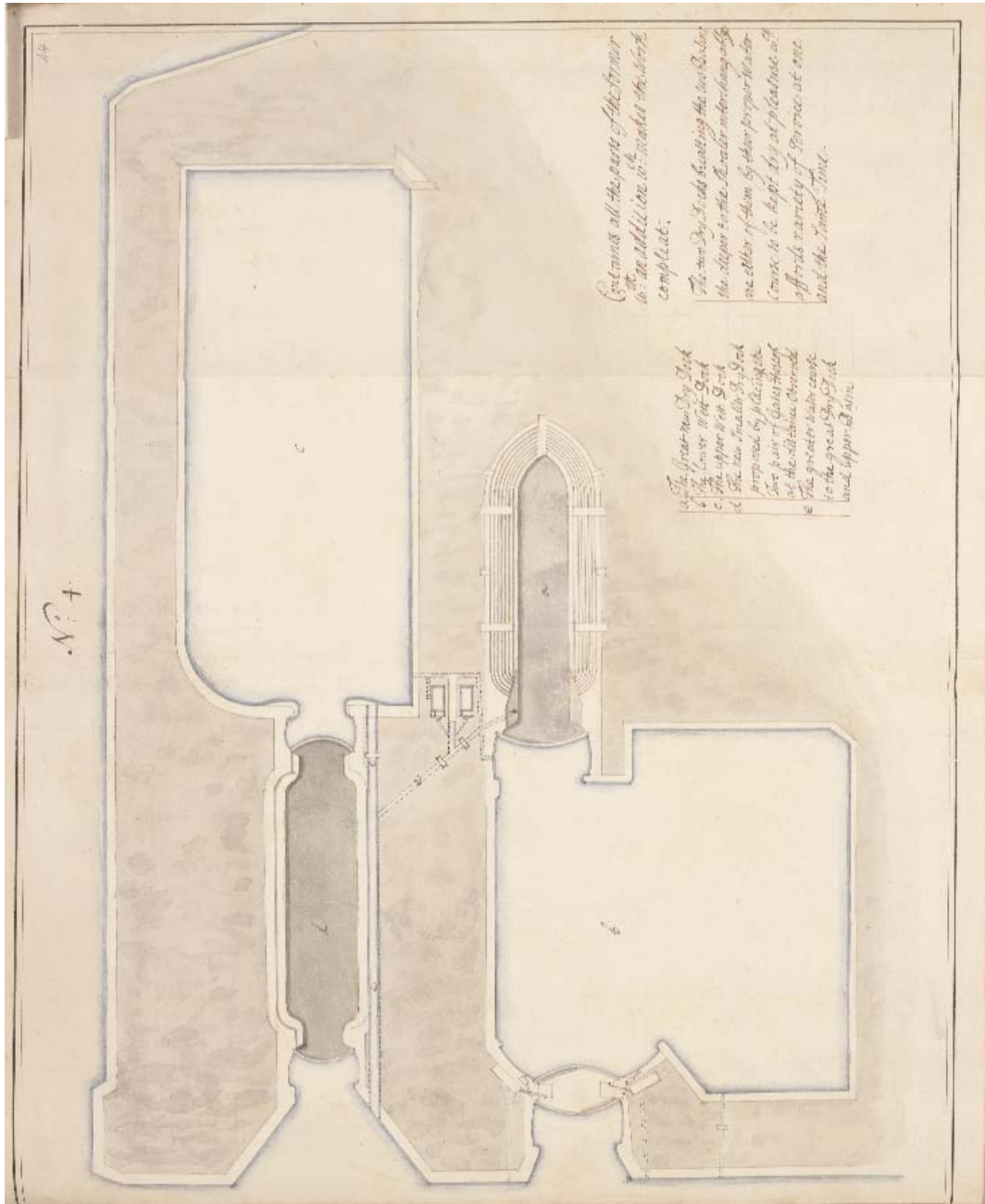


Fig. 14. No. 4, Contains all the parts of the former with an addition w:ch makes the work complete, Portsmouth Royal Dockyard. Harley MS. 4318, f. 44.



Fig. 15. The Port of Rye at low water. Sloane MS. 3233, f. 4.



Fig. 16. Title-page. King's MS. 43, f. 1.

Surveyor of the Navy without delay.’ The intention was to prevent irregularities for ‘very often when Officers remove they do deface them in an extraordinary manner, and carry away every furnace locks, lead locks, hinges, chimney pieces, hearths and other things belonging to their Majesties so as every house is to be fitted up anew as the Officer is changed.’⁹⁶ Dummer’s Survey was undoubtedly part of a general effort on his part and that of a handful of colleagues on the Navy Board to get to grips with the management of the massive business under their charge. When Charles Sergison (1654–1732), Clerk of the Acts, had a private interview with the King on 24 May 1699, principally to grouse about the difficulties he had experienced from colleagues’ self interest, faction and favour, neglect and downright corruption, he produced a ‘book in marble paper’ containing a detailed account of the state of his department, with lists of the Navy at sea, the commanders, men and guns, which ships were fitting out, the condition of others and an abstract of the whole, ‘thinking it for your Majesty’s service to have always by you the state of your Navy, for as much as your curiosity, if not your occasions may lead you sometimes to look into it, and that it should be laid before you twice a year at least.’⁹⁷ The King examined the book closely for over a quarter an hour with seeming satisfaction, so Sergison ventured to claim that he had maintained the Navy at sea for nine years, adding to it three hundred ships, great and small, two hundred of which were built and one hundred bought. Moreover, the docks and building yards had more than doubled in the same time: ‘Draughts and descriptions were drawing for Your Majesty by Mr Dummer in an extraordinary manner fit for Your Majesty’s perusal, but are unluckily stopped by that gentleman’s misfortune, though I hope they will not be lost, but that at one time or other they will be perfected and presented to Your Majesty.’⁹⁸

We shall come on to the misfortune suffered by Dummer, but at least he managed to perfect the drafts and descriptions, which were duly presented to the King. They do indeed constitute an extraordinary feat of surveyorship. In the volume, each royal dockyard is treated separately and its description given in the same order, each of the four types of drawing being made to the same scale so that cross-comparisons can be made. A brass rule was even included at the front of the volume (now lost) marked with the four scales ‘and may be used as artificers do their rules in lineal measure, whereby any harbour, yard, fortification, or particular building whatsoever, may be measured without applying a pair of compasses there.’ The emphasis was on exact measurement, but again Dummer combined geometrical precision with great artistry which evidently he was loath to have damaged with pin-holes.

The first type of drawing relating to each dockyard gives the general situation of the port and harbour; the second focuses on the situation of the yard; the third compares the plan of the yard at the Revolution with its development ten years on, the parts coloured red showing the improvements or new buildings added; the fourth – and by far the most extensive section – gives in plan and elevation every single building in each yard. Dummer was justifiably proud of this last feature, for ‘Hereby the room or space for accommodating the ships in each harbour and the magnitude of the buildings dwelling or stores &c may be compared to each other by inspection which is the best demonstration though a thing not used in any of our common

⁹⁶ NA, ADM 106/2507, no. 92, dated 18 August 1692. References are made in the NMM, Sergison papers, Navy Board Minutes, 39, 29 July and 25 November 1698, to a ‘General Survey’ whose delivery planned for Michaelmas was delayed in all the dockyards bar Woolwich and Plymouth through lack of assistance, but this may refer to a general survey of the stores.

⁹⁷ Mark Antony Lower (ed.), ‘Some Notices of Charles Sergison, Esq., One of the Commissioners of the Royal Navy, temp. William III and Queen Anne’, *Sussex Archaeological Collections*, xxv (1873), pp. 62–84. A note by Dummer at the end of his Survey confirms that it was delivered after his dismissal, for he excuses changes made subsequent to 1698 – e.g. sash windows which had replaced transom windows in one of the Navy Office dwellings and odd sheds in the dockyards – on the grounds of the change of Surveyorship in the interval. If anyone found other alterations, ‘he will find it of a date since this work for it’s presumed that a more correct survey has not been taken of the Navy Yards.’ BL, King’s MS. 43, f. 152.

⁹⁸ Lower, p. 64.

surveys.’ Furthermore, by a calculation of the size of each building by linear foot and the materials used to build it by linear rate per foot, its value was quantified, contributing to the total value of the dockyard and carried over to a complete overview at the end of the book ‘where may be seen the full value of all the said docks and buildings &c which were before the said Revolution together with additions and improvements since.’⁹⁹ Even the Navy Office itself in Crutched Friars was surveyed in like manner.

The Survey commences with a map of the Thames and Medway, thereby including four of the royal dockyards – Chatham, Sheerness, Woolwich and Deptford – as well as the Navy Office. This is followed by a long watercolour view, dated September 1698, representing ‘The River Medway from Rochester Bridge to Sheerness taken from the Steeple of Finsbury Church opposite the Dock at Chatham shewing how the Ships of the Royal Navy are secured moored unto the village of Gillingham. Together with the present Number and Names of them as per the Tables thereof’ (fig. 17). The next illustration is a prospect of Chatham dockyard taken from the opposite side of the Medway and below it two plans of the dockyard, one showing its extent in 1688 and the same in 1698. They reveal that a new mast house, various docks, shops and offices, a capstan crane, anchor forge and spinning house had been built. Two new single docks cost in total £8,733 10s, the digging of nearly 18,000 yards at 8d a yard accounting for less than £600, the cost of the timber accounting for most of the rest. The mast dock cost £3,180 4s 4d for although it was a much greater area to dig (28,277 yards), at 6d a yard (£706 18s 6d), it used much less timber. The thirty-two brick arches built to keep the masts under water accounted for £1,821 5s 10d of the cost.

The following twenty-five pages present a visual account of all the buildings within the yard, drawn in plan and elevation, all duly quantified, and revealing a jumble of building styles and standards. The yard was an amalgam of different workplaces, each section dealing with different aspects of or stages in ship building without there being – at least in the oldest yards – any obvious ‘assembly line’. The close connection between work and home for the dockyard officers is vividly brought to life in descriptions of their ‘dwelling houses’. The Commissioner’s House was cramped (a spacious new house was built in 1705 which still survives) but its garden included a fountain and a banqueting house. The Clerk of the Cheque’s home had a summer-house and a shed for fowls. The Master Caulker had a shed for fowls and a hogsty; the Boatswain had a pigsty.

Next, the forts and castles of the Medway are detailed in profile and elevation before ‘A View of his Majestie’s Dock Yard at Sheerness’ is given, the prospect taken from on board a vessel riding opposite the hulks that formed a breakwater. The plans of 1688 and 1698 indicate that there had been few changes, only some new timber storehouses for the sum of £39. The prospect of Woolwich is taken from the opposite bank of the Thames (fig. 18). Improvements here included a new pitch house, joiners’ shop and a fine storehouse built of brick at a cost of £3,233 5s, incorporating a building office and Storekeeper’s office. The classical style of the storehouse contrasts with the assemblage of Elizabethan dwelling houses – with their associated wash-houses, drying houses, wood, coal, bake- and brewhouses – where the principal officers lived (fig. 19). The adjacent ropery was also greatly extended with a new storehouse, tar kettle house, tar cellar, gallery and shed; the new storehouse here also contrasts in its up-to-date style with the living quarters of the ropeyard officers.

The view of Deptford – again taken from the opposite side of the Thames (fig. 20) – and associated plans reveal more improvements: additional stables, a saw house and offices as well as the completion of the ‘great new storehouse’ in brick costing over £1,571, a wharfing dry

⁹⁹ BL, King’s MS. 43, Explanation, ff. 2-2v. This method of ‘measure and value’ quantity surveying was standard practice in the building industry of the time as a method of settling payments for new build, although less realistic presumably as a way of calculating accumulated value, given the lack of allowance for depreciation (let alone inflation) which in the case of the dockyards must have been considerable. F. M. L. Thompson, *Chartered Surveyors: The Growth of a Profession* (London, 1968), p. 66.

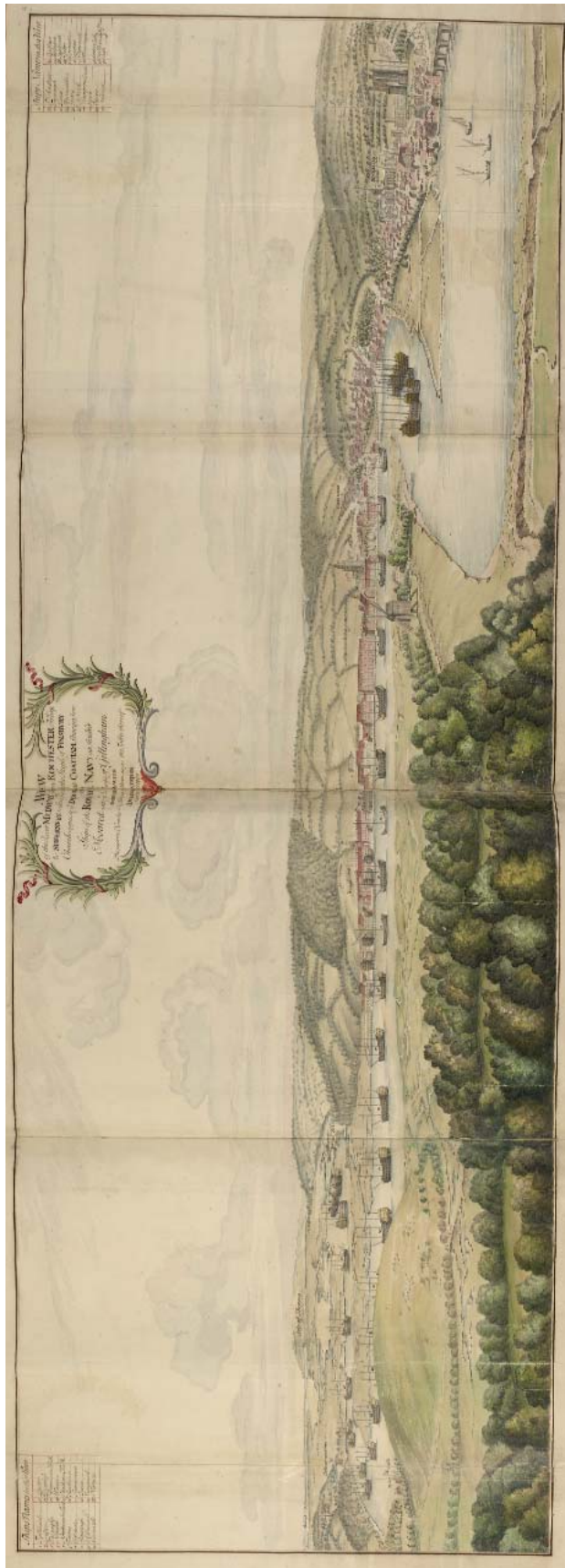


Fig. 17. A View of the River Medway. King's MS. 43, f. 6.

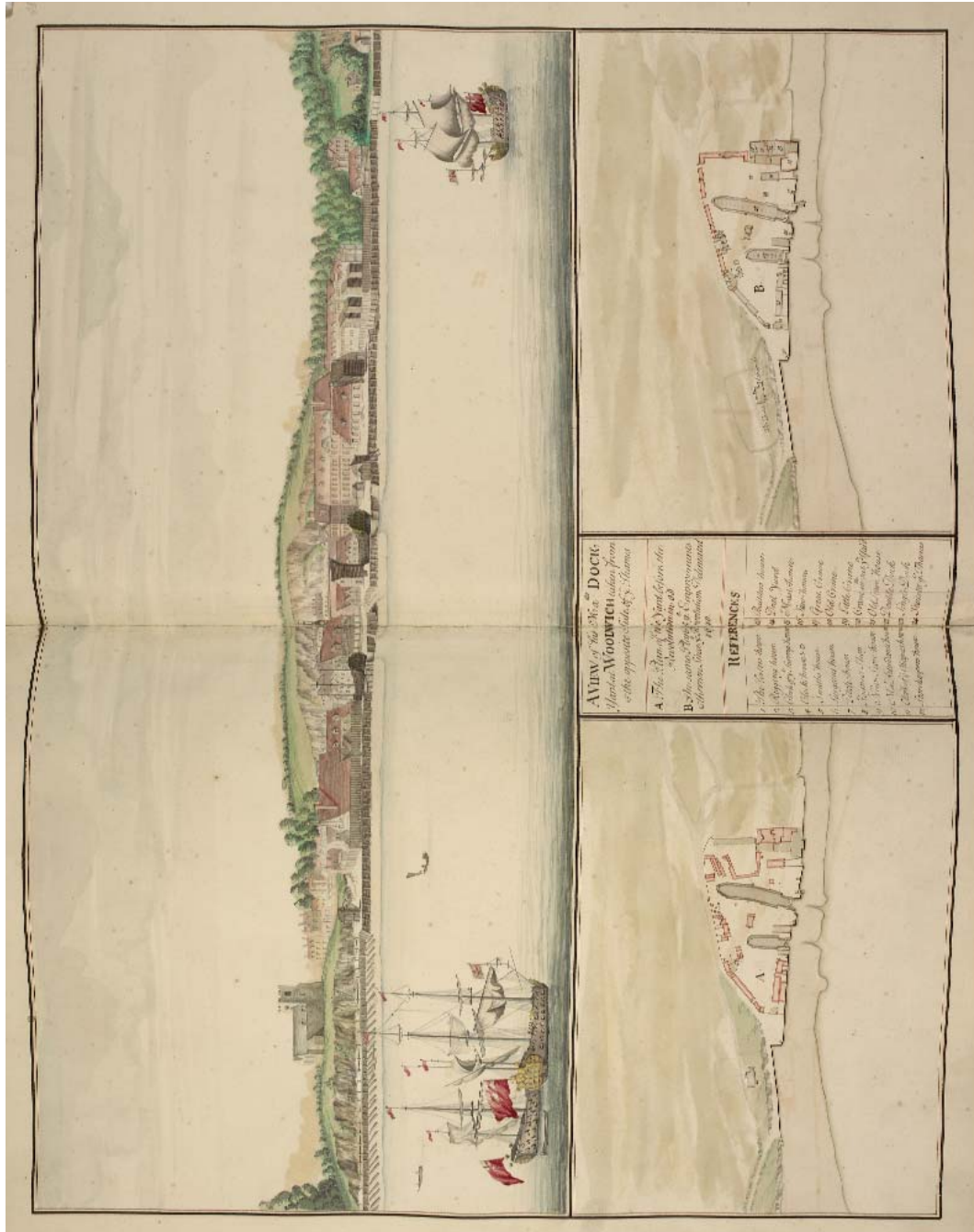


Fig. 18. A View of His Majesty's Dock Yard at Woolwich. King's MS. 43, f. 48.

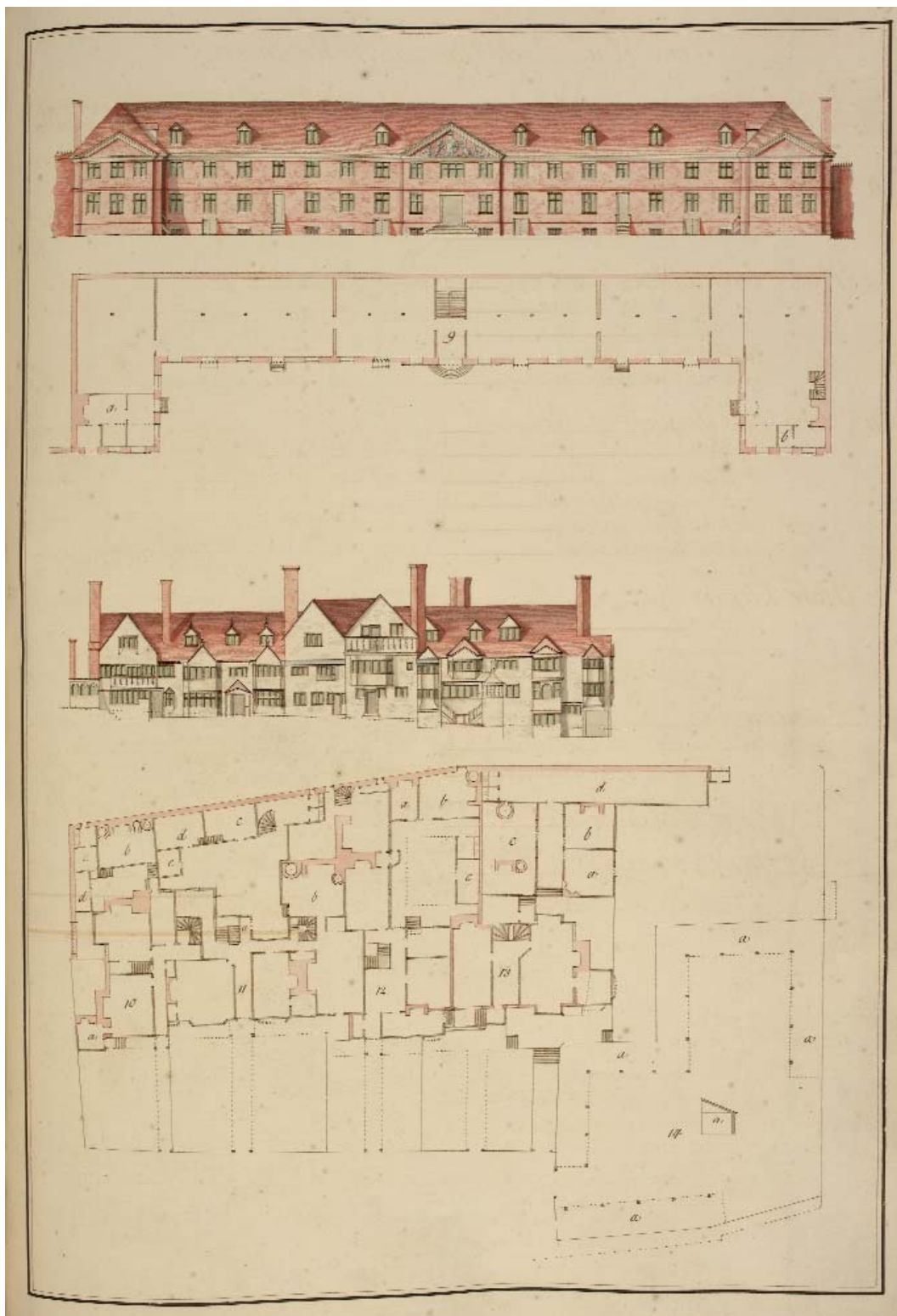


Fig. 19. New Store-house [numbered 9] and assorted Dwelling-houses [10-13] in elevation and plan, Woolwich Royal Dockyard. King's MS. 43, f. 54.



Fig. 20. A View of the Dock Yard at Deptford. King's MS. 43, f. 66.

dock (£1,224) and improvements to the mast dock (£2,596 8s). A row of diverse offices, built chiefly of brick, cost £2,362 4s 7d and include an iron house and block loft, storehouse, treenail house and shops for ‘Treenail Mooters’ (craftsmen who cut the wooden pegs or pins used to fasten together parts of the hull), House Carpenters, Joiners and Oar-Makers. Tsar Peter I would have been familiar with the dockyard recorded by Dummer for he leased Evelyn’s house, Sayes Court in Deptford, from February to April 1698, knocking a hole in the garden wall to gain direct access to the dockyard, where he spent most of his time working alongside the shipwrights.¹⁰⁰

As we have seen, the greatest changes were made at Portsmouth and Plymouth. The Portsmouth section commences with a map (completed in October 1698) of the Solent and the Isle of Wight, followed by a long prospect of the scene, taken from the high land of Post Down in the manner of Hollar’s views of Tangiers, showing how the ships of the Royal Navy were moored and secured from Portsmouth to Fareham (fig. 21). The prospect of Portsmouth dockyard is taken from on board a hulk riding opposite the new dock. There had been huge developments here since 1688: a new ropewalk, extended boat houses and boat pond shops, a new mast pond, a deal store house and above all the two new wet docks and two new dry docks built of stone at the cost of £46,001 13s. A vast plan complete with sections and descriptions of the nature and use of these new docks (in effect an elaboration of the plans attached to his 1698 Account) underlines the pride Dummer took in their completion. A new storehouse had been built at a cost of £2,366 10s 3d (fig. 22). The Commissioner’s House was still a splendid Jacobean pile built of brick with a large garden containing a banqueting house; it was not to be replaced until 1785 (fig. 23). But new offices were provided for the Clerk of the Cheque, the Master Shipwright, the Storekeepers, the Clerk of the Rope Yard and the Surveyor. One ornamental feature was the column with a spherical dial on a terrestrial globe above its capital, built in Portland stone for £46 4s (fig. 24). The new ropewalk was built of brick at a cost of £2,991 2s 4d (fig. 25). The new mast dock cost nearly £4,000. Altogether, £63,384 18s 7¼d had been spent at Portsmouth during the first ten years of William’s reign, nearly tripling its value according to Dummer’s calculations.

Perhaps the finest prospect in the volume is taken of the new dockyard at Plymouth, viewed from on board a vessel moored offshore (fig. 26). Almost everything on the plan had been built since 1688 although the works had yet to be completed. The dwelling houses of the officers, built to a French or Dutch influenced design as a single terrace, are the model of orderliness compared with those in the other dockyards.¹⁰¹ Each has its own porch, privy, brew- and wash-house, yard and garden, with none of the sties &c. to be found at Chatham. According to Dummer, works on new docks cost a total of £34,891 9s 8d, the single dry dock costed at £12,245 and the wet dock £17,489 9s 8d, as well as £5,157 for the gates. They are represented in a more pictorial version of the third draught appended to his 1694 Account of the dockyard (fig. 27 – compare with fig. 11). Again all the works are detailed in meticulous plan and section although some major elements such as the great square store house and the ropewalk had still

¹⁰⁰ Arthur MacGregor, ‘The Tsar in England: Peter the Great’s Visit to London in 1698’, *The Seventeenth Century*, xix (2004), pp. 116–47. See BL, King’s Top., XVIII-17, -18, for surveys of the Manor of Sayes Court in the 1690s. Dummer’s Survey, ff. 65–6, 70, features a new South Gate, large double gates with a small door alongside, constructed at some point between 1688 and 1698 for a cost of £60, but it looks rather grand to be described as a hole in the wall.

¹⁰¹ Dummer seems to claim the design for himself, but the roof-line and pediment were influenced by that of Bethlem Hospital, designed by Hooke. Coad, p. 194. Giles Worsley, ‘Taking Hooke Seriously’, *The Georgian Group Journal*, xiv (2004), pp. 16–17.

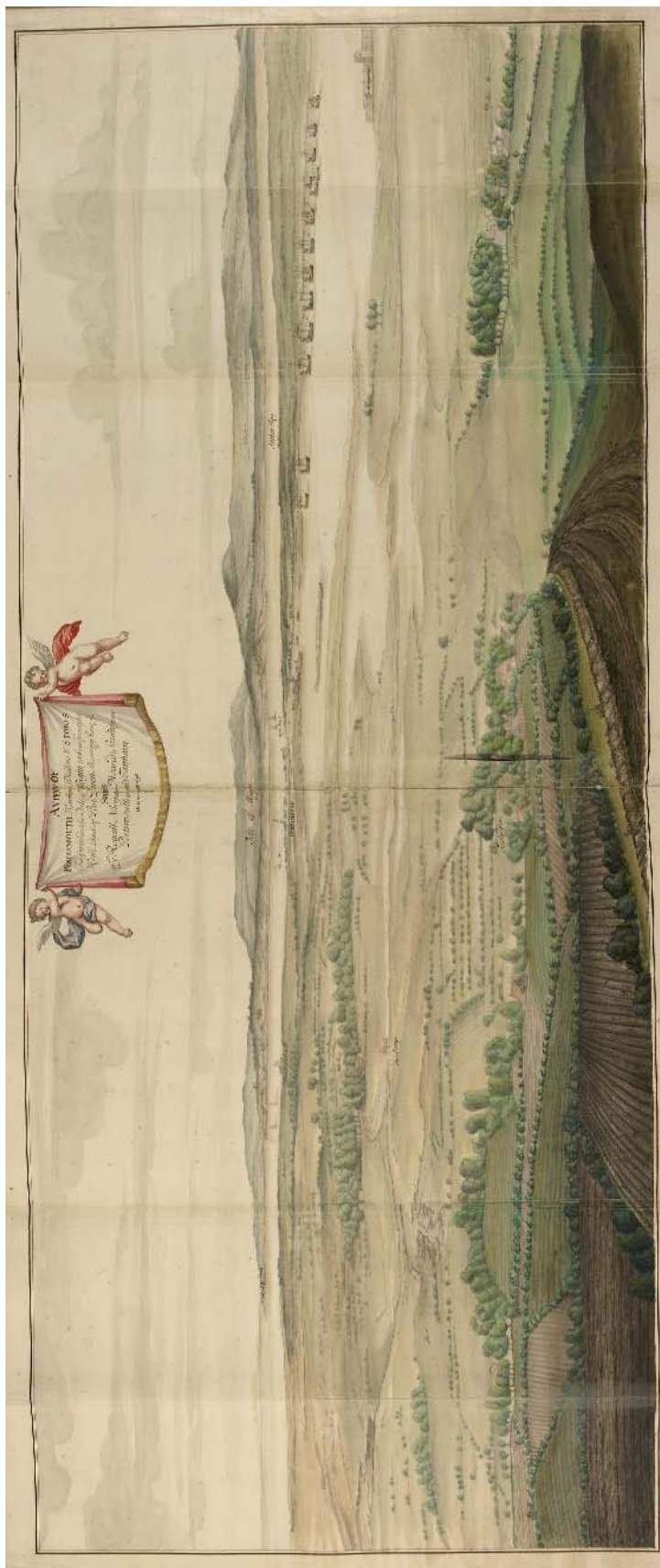


Fig. 21. A View of Portsmouth Harbour. King's MS. 43, f. 91.

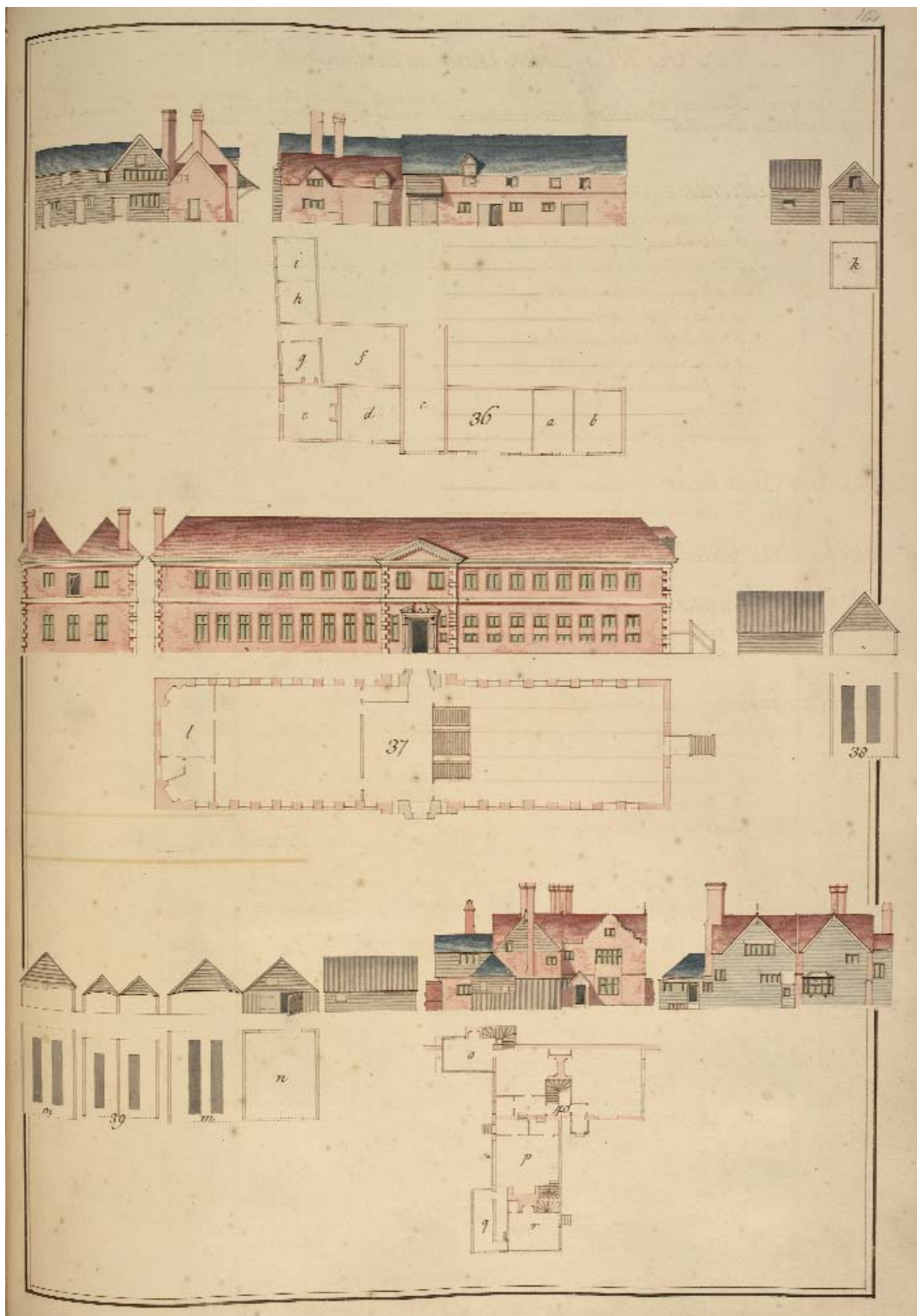


Fig. 22. Commissioner's Stable &c., [numbered 36], New Store-house [37], Saw-houses [37-38], Store-keeper's Dwelling-house [40] in elevation and plan, Portsmouth Royal Dockyard. King's MS. 43, f. 112.

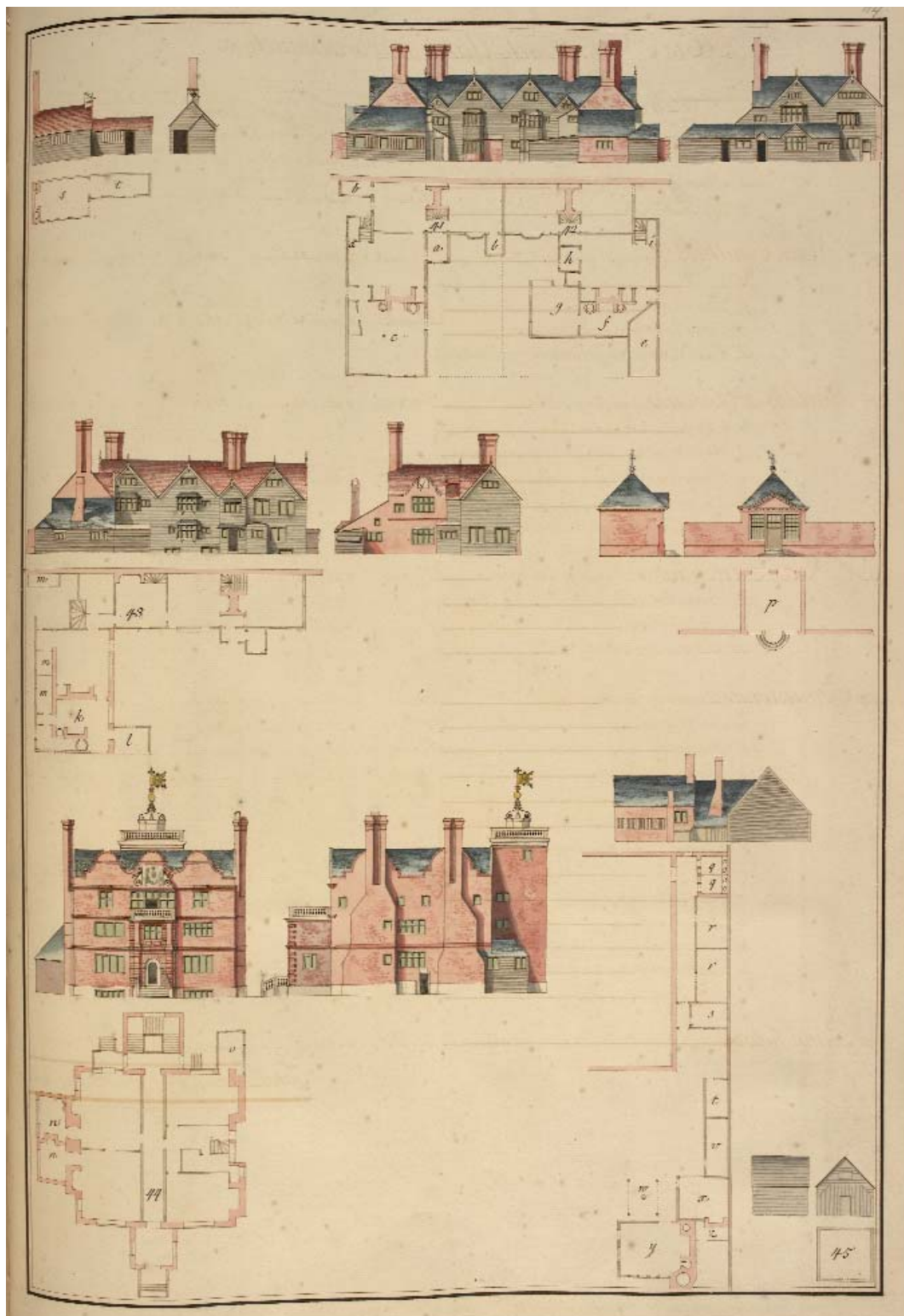


Fig. 23. Commissioner's Dwelling-house [numbered 44], other Dwelling-houses [42-44], Pump-house [45] and Banqueting house [p] in elevation and plan, Portsmouth Royal Dockyard. King's MS. 43, f. 114.

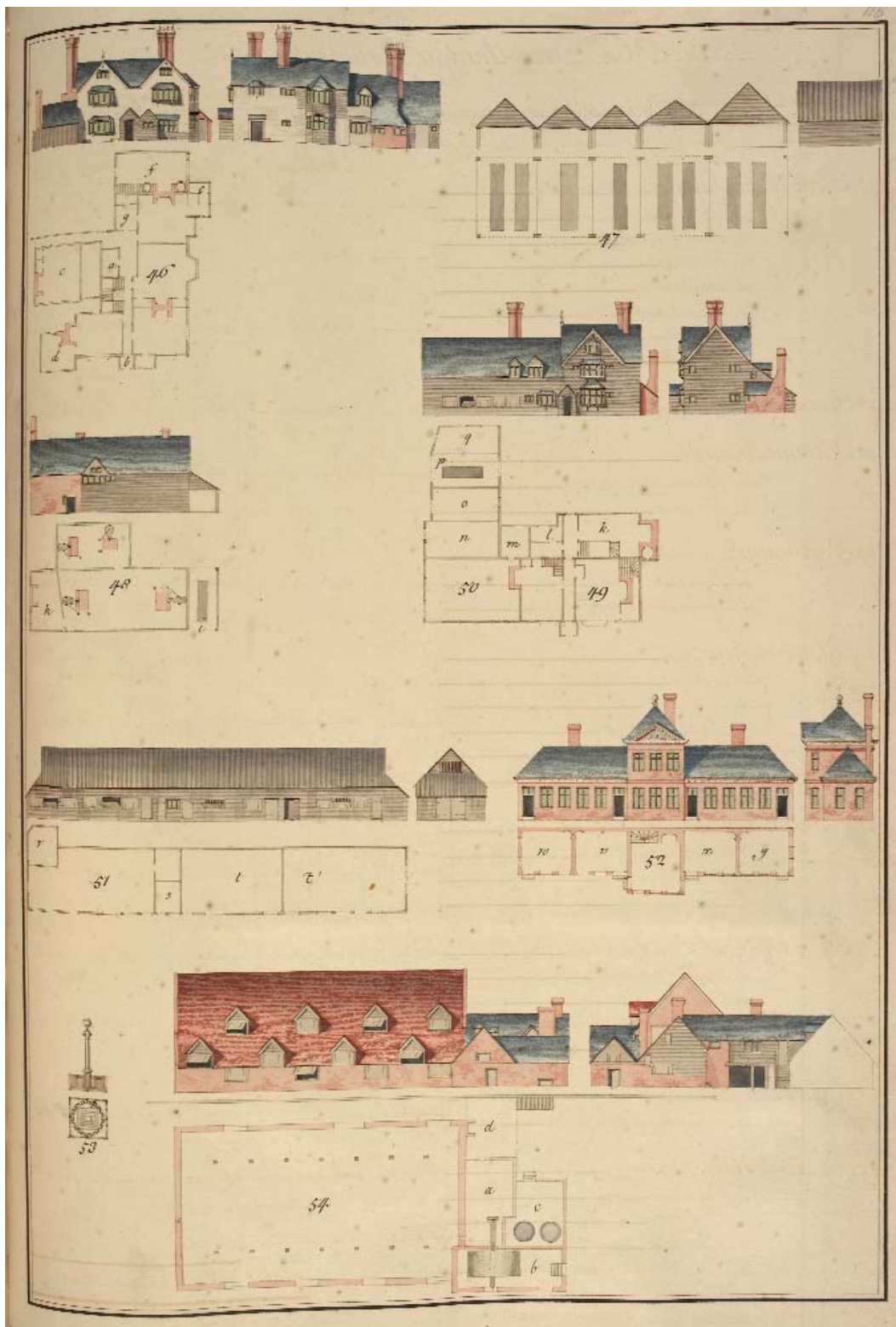


Fig. 24. New Offices for Clerk of the Cheque & co. [52], assorted shops and Dwelling-houses [47-51] and Dial Column [53] in elevation and plan, Portsmouth Royal Dockyard. King's MS. 43, f. 116.

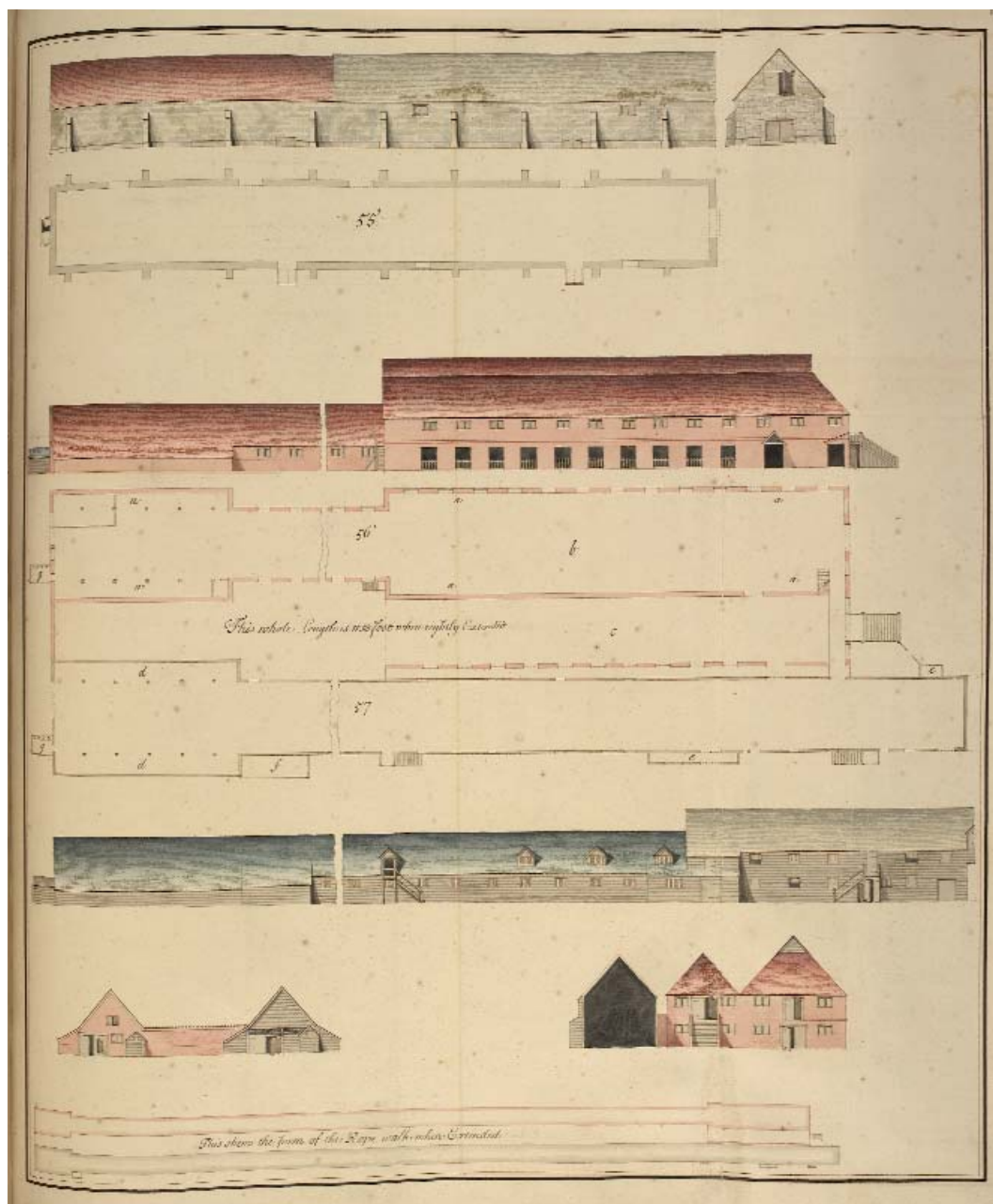


Fig. 25. Hemp Store-house [55], New Rope Walk [56] and Old Rope Walk [57] in elevation and plan, Portsmouth Royal Dockyard. King's MS. 43, f. 118.

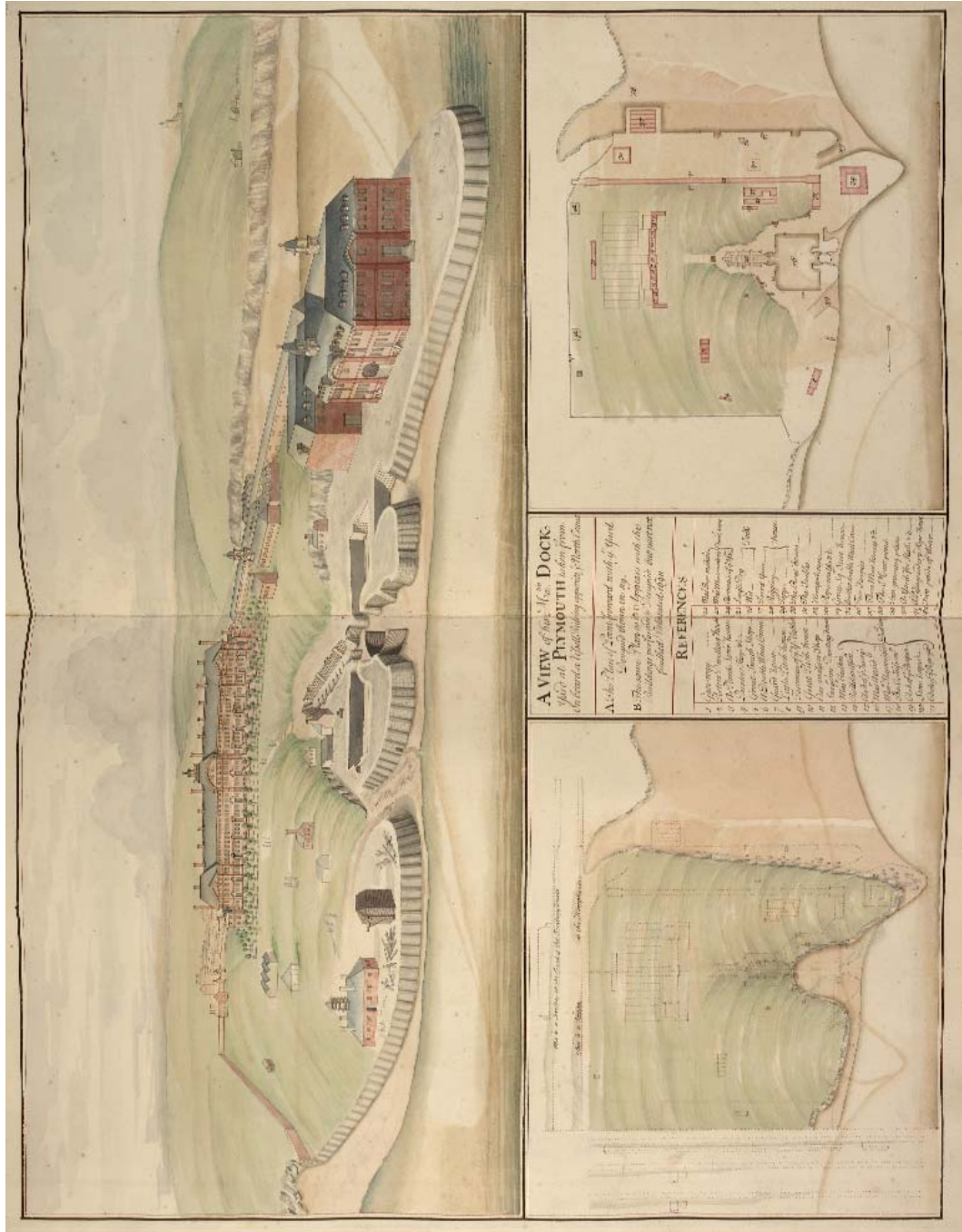


Fig. 26. A View of his Maties Dock Yard at Plymouth. King's MS. 43, f. 130.

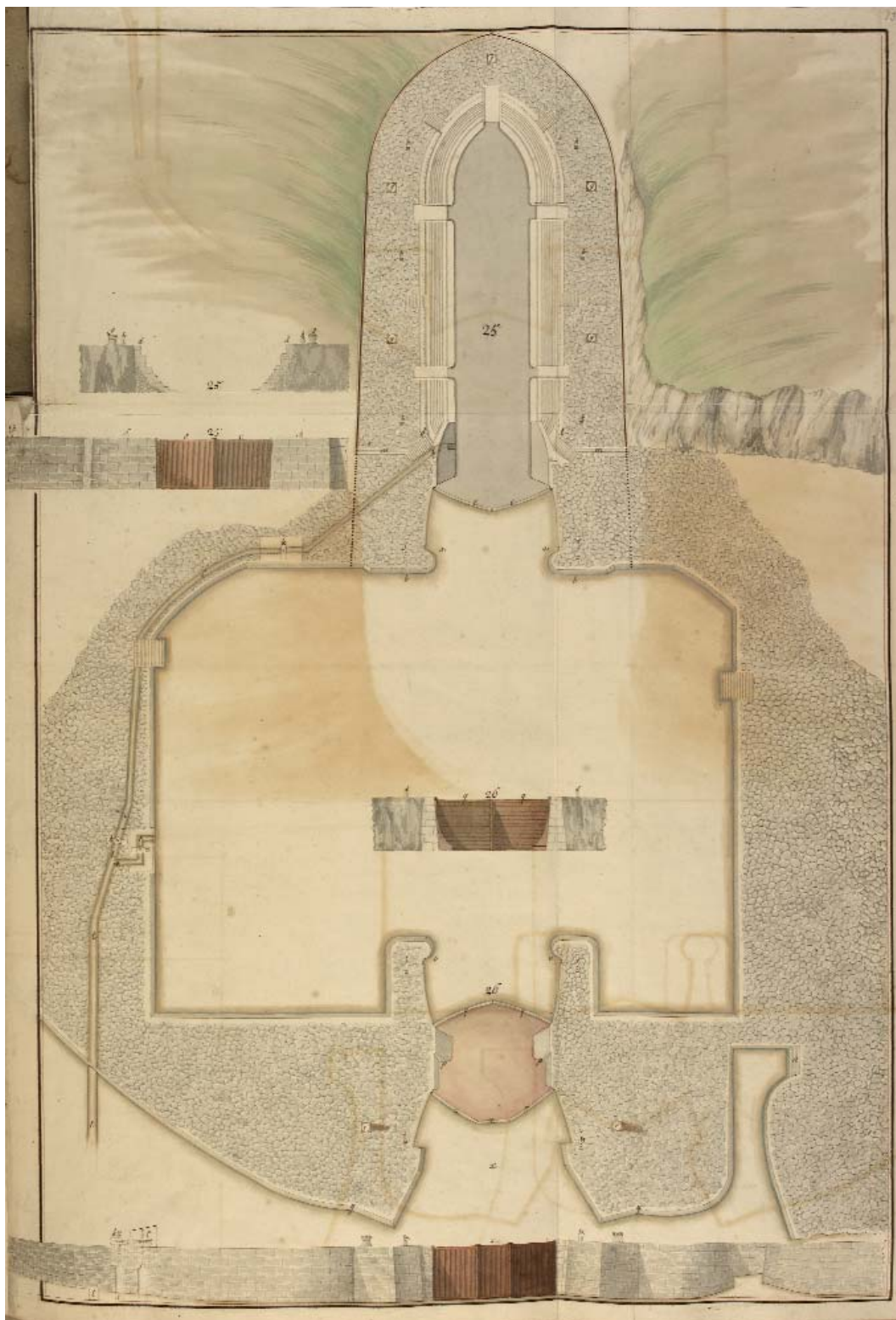


Fig. 27. Dry [25] and Wet [26] Docks in plan and section, Plymouth Royal Dockyard. King's MS. 43, f. 138.

to be finished. Thus Dummer glossed over the difficulties he had encountered on the building works: the ropewalk needed to be rebuilt and the outer gates of the dock were not successfully closed until 1700.¹⁰²

The work was completed with a view and plans of the relatively new (1674) Navy Office in Crutched Friars, for which Sir Christopher Wren as Surveyor-General was ultimately responsible although it was possibly designed by Robert Hooke (fig. 28).¹⁰³ Here there were only small additions: a marine regimental office and an office for the Controller of the Stores. In total it was estimated that the value of His Majesty's Dockyards was £291,124 2s 8¾d, of which £166,799 had been spent in the previous ten years, more than doubling the original value. The greatest investment had been made at Plymouth – from a standing start – of £67,095 6s, followed by Portsmouth (£63,384 18s 7¾d), Deptford (£12,880 9s 4¾d), Chatham (£11,155 11s 9d), Woolwich including the ropewalk (£10,477 13s 10½d), Sheerness (£1,566 14s 8d) and finally the Navy Office (£239).

*

Dummer's career in the Navy came to an abrupt end when he was suspended without warning on 24 December 1698. The situation to which he had obliquely referred in his account of the new docks at Portsmouth was the root of the problem. The main contractor for the building works was John Fitch, a long established supplier of New Forest timber to the Navy. At first, Dummer seems to have been pleased with his work, writing in January 1693 to Thomas Deane, the overseer at Portsmouth, that it was moving on 'like German clockwork'. On 14 February, he refused to take sides when Deane expressed severe doubts about Fitch's working methods, not to mention the surliness of his men: 'this short advice I give you, let Mr Fitch do what he pleases, and which works he pleases so he carries on the work in general – but let it according to contract, and without loading the work with any new charges. Don't you pretend to command his men – saying you shall work here or there, which he calls domineering, and what belongs not to your office, give him no ill words. Don't be provoked to passion. What you mislike if it is not amended on your addresses, lay it directly before the Board, without a word of contention or reflection.'¹⁰⁴

By 13 April 1693 he appears rather more wary, writing to Deane: 'As to the business of a certificate, I told Mr Fitch that about the latter end of this month, I would have all his work solemnly measured by men that should be sent down on purpose, to join with the officers and you, that thereby all things of that nature should be put out of dispute for the future.' With regard to the 'over works' Fitch had done, 'without known rates as to the admeasurements of others', for which he demanded certificates, Dummer advised, 'you may do well to answer, you have no order for it.' In the meantime, he asked Deane to recommend an 'able honest man,

¹⁰² Coad, 'The Development and Organisation of Plymouth Dockyard, 1689-1815', p. 194. Duffy (ed.), *The Naval Miscellany*, vol. vi, p. 121, n. 1, gives a technical explanation for the problems with the gates. Basically, the lack of bonding between the stone sides of the dock and the timber plank floor caused the latter to buckle upwards at the point of greatest pressure, at the entrance apron, so that the gates could not close tight. In 1697 Dummer provided the Navy Board with a detailed account of the phenomenon occurring at Portsmouth, with a diagram annexed, 'the apron from the centre A by the pricked circle C swelled like a camel's back about eight inches from its former level...' Ever the optimist, he maintained the damage was not much 'tis entirely in command and easy to be performed, but I shall not presume any further without such assistance and justification from mature advice, as may be capable at least to preserve the Board from any blame, whatever may be thought due to me.' NA, ADM 106/502, 3 October 1697.

¹⁰³ Worsley, pp. 1-2.

¹⁰⁴ NA, ADM 91/1, ff. 230, 262.



Fig. 28 A View of the Navy Office in London in elevation and plan. King's MS. 43, f. 147.

expert in measuring masons and brickworks, with the other necessary qualifications this service requires.’ Finally he reassured Deane, ‘taking notice of your extraordinary care not to be imposed on, and your steady resolution to be just in the execution of what is entrusted to you, [I] shall make use of all occasions of supporting and defending you in it, and rewarding you for it, as far as I am able.’¹⁰⁵

There were endless construction problems, caused not least because the new docks were built on unstable reclaimed land. As Deane had realized early on, Fitch’s men damaged the entrance to the lower basin so its banks slid into the channel on the spring tide, leaving the piling exposed and vulnerable. On 20 June 1695, Dummer wrote from Portsmouth to Harley with the bad news that the dam constructed the previous winter to shelter the work on the new docks from the sea had been breached. The following January and February he was writing to excuse his attendance at Parliament on account of the need to secure the great dam in the face of terrible weather.¹⁰⁶ Before the end of the year Dummer had finally seen the light and ejected Fitch because of fraudulent claims for payment and terrible workmanship.

Fitch proceeded to bring a case for payment against the Crown, with the Attorney General, Richard Haddock, and Dummer himself named as defendants. It was first heard in the Court of Exchequer on 23 November 1696 and referred to trial. On 27 April 1697, the Court ordered that the matter be referred for arbitration to four referees, two appointed on behalf of the plaintiff and two on behalf of the defendants, with an umpire to determine between them if they were unable to agree.¹⁰⁷ The party arrived in Portsmouth on 2 June to examine the works and advise on repairs, accompanied by no less a luminary than Sir Christopher Wren, presumably in his capacity as Surveyor of the King’s Works, who, however, returned to London the following morning. Dummer gives a vivid account of the site visit undertaken by those who remained:

Mr Fitch who attended them all day was very impatient to be gone for London and to complete their arbitration there. Myself and our referees insisted on perfecting their report here, to which also the umpire was content. I spoke to Ogborne their last referee not to depart until it was concluded, and he promised me he would not hasten himself though his business is very much pressed, but observed to me he was in an ill cause and wished he had never come down. They continued on it all day Friday, examining only two or three the most material witnesses on both sides with relation to the pretences of extraordinary works. I gave them no personal trouble for they sent me for information when they needed it, nor did Mr Fitch for he hath carried himself wonderfully calmly.

Nevertheless, Dummer was clearly concerned that the referees would not get the full picture before they departed and the following morning, ‘not having as yet determined what to do with the imperfect work &c whereof Mr Fitch and his referees had no mind to consider, I got them early together therefore before they went for London, namely the umpire and four referees, and carried them to the wharfs and demanded of them in the King’s name to measure the length and compute the solidity of the imperfect works and showed them that it was impossible to repair the gates of the upper wet dock without making a dam and taking all the works down and rebuilding it and prayed them to determine it immediately and that I might have their counsel and direction to go about repairing it presently.’

For good measure Dummer pointed out, ‘his Majesty had paid Mr Fitch above £10,000 three years ago for the upper wet dock, for which he had never had 10 penny worth of benefit,

¹⁰⁵ NA, ADM 91/1, f. 311.

¹⁰⁶ BL, Add. MS. 70224/3, 2-7.

¹⁰⁷ NA, E127/20, f. 136.

but contrarywise the same being so falsely and inartificially done great part was already coming down, and the rest in probability would follow, hereupon they did measure it. Mr Sanders and some of Mr Fitch's people standing 40 or 50 paces from us, did not think fit to be nearer.' Dummer also asked the umpire and referees what to do 'with this troublesome man Fitch' and was advised to send Deane to London and to be himself there and press the thing to an issue for 'tis his [Fitch's] interest and they fear if he shall come to understand these sentiments his and our referees have of it, that he will prevent their judgement, by some trick or other.'¹⁰⁸

The report written by the referees (appended to a Navy Board warrant of 25 August) took 'a very strict view of the nature of the said defects' and confirmed Dummer's condemnation of the workmanship: 'Our opinions of the best manner the same may be repaired to make them substantial as followeth viz. we find the peers of the gates of the upper wet dock and the work on the south side of the entrance leading to the same so defective (some already tumbled down) that there is a necessity of taking down and rebuilding them to make the dock useful.' They went on to give precise instructions on the methods and materials to be used to carry out the works, with sections and plans appended.¹⁰⁹ By 3 September Dummer had issued the necessary directions to repair Fitch's defects.¹¹⁰ But the case itself dragged on in the Exchequer Court until the final decree in late June or early July 1698.¹¹¹ The ruling stated that Fitch should have been satisfied with what he had got for the work done to contract, £13,773 14s 6½d, and rejected his claims for payment on over work not included. Nevertheless, it allowed that he was still owed for further contract work completed before he was turned off site, valued at £8,757 1s 5d and £2,030 18s for materials, which presumably he had left behind. His Majesty received £100 'for works insufficiently done' and other discounts.

The final settlement was turned over to an auditor, but this was not the end of the matter. Fitch exacted his revenge by complaining to the Admiralty that Dummer had asked for bribes in return for awarding him Navy contracts, contending specifically that Dummer had told him he would get an immediate certificate for his bill if he made him a present of £100 and helped him with the sale of timber for Plymouth.¹¹² The case was not black and white because Dummer had been involved with Fitch in some financial dealings: he immediately conceded that he had borrowed £152 from Fitch (which he would repay upon demand), on behalf of William Wyatt, a Burseldon shipwright, ship builder and owner, but he denied the other charges.¹¹³ The Navy Board was understandably anxious to resolve the situation and over the months that followed appealed to the King for a decision. Accusations flew back and forth. Having himself been refused leave to appeal directly to the King, Dummer wrote to the Lords of the Admiralty on 8 and 15 March 1699 setting forth Fitch's accusations and refuting them point by point with testimonies. It was a case of deliberate malice and revenge, against which should be weighed his thirty years' service, 'his conversation and business, and the marks of a steady integrity'. On 18 March both parties were called to the Admiralty and examined informally and inconclusively by Orford. Fitch said he was no informer. Dummer 'acquainted their Lordships he had said all he knew in writing and would ask no question of his accusers.'¹¹⁴

Matters came to a head in June 1699 when both parties were summoned once more before

¹⁰⁸ NA, ADM 106/502.

¹⁰⁹ NMM, POR/A1, 25 August 1697.

¹¹⁰ NA, ADM/502, Dummer to the Navy Board. The work was still going on in 1702 when the Navy Board ordered Elias Waff, Master Shipwright at Portsmouth, to resume the repairs, which had been interrupted, leaving the new docks at the mercy of the spring tides. NMM, POR/A2, 27 April 1702.

¹¹¹ NA, E 126/16, ff. 442, 444v-5, 448; E 126/17, f. 33 (undated).

¹¹² NA, ADM 3/15, 15 June 1699.

¹¹³ NA, ADM 2/396, 24 December 1698. Wyatt contracted smallpox in June 1693 presumably leaving the debt unpaid; Wyatt's widow continued to run the shipbuilding business until she moved to London in 1705. A. J. Holland, 'Naval Shipbuilding on the Hamble River before 1815', *Mariner's Mirror*, xlix (1973), pp. 24-5.

¹¹⁴ BL, Add. MS. 70036, ff. 12-13 (Portland MS., ex Harley MS.).

the Board. On 15 June Dummer submitted an abstract of his response with a covering letter, in which he again reminded their Lordships that he had been in the service for nearly thirty years; that the manner of his life and frugality of his management were well known; that had he any inclination to build an estate by such practices, why was there no other evidence other than that of Fitch? He questioned Fitch's motives with particular reference to his work 'unfaithfully performed'. Was it because he would not comply with Fitch's 'unreasonable and unfaithful proceedings' that he had made the charge, out of malice or revenge? In the abstract he supplied, Dummer protested that Fitch ought not to be believed on his own evidence as he had sworn falsely in other cases and had often made malicious threats against Dummer. He had also attempted to persuade another to corrupt Dummer and to suborn witnesses. In sum if the only testimony the Board had was that of Fitch then none was safe.¹¹⁵ An affidavit was read from a Mr Richard Annott saying he was employed by Fitch to bribe Dummer. Dummer further alleged that Fitch had offered him £500 to 'take off' Deane, the Overseer of the works.¹¹⁶

The case ended in a tangle of lawsuits which were eventually decided in Dummer's favour, with an award of £500 damages.¹¹⁷ But meanwhile he was not reinstated and the Lords Commissioners, in answer to Secretary of State Vernon's enquiry on behalf of the King as to the course of action they recommended, responded in weasel words: 'We cannot think it for the good of His Majesty's Service, either to advise the taking of his suspension, or the employing him again, but shall wholly submit to His Majesty's pleasure therein. However, we think it our duty to remind you, for His Majesty's information, how absolutely necessary it is for the service, to appoint some fitting person to the care and charge of an affair of so great consequence.'¹¹⁸

This was gross hypocrisy coming from a Board notorious for lining its pockets at public expense. At that very moment the covetous and unprincipled Orford was holding down several offices which were, to say the least, inconsistent with each other: first Lord of the Admiralty, Admiral at Sea, Purser General in the Straits and Treasurer of the Navy. As one of his duties in the first position was to check on his work in the last, he was growing enormously rich. Moreover, 'his creature', Thomas Taylor, was Clerk of the Cheque while his steward, Thomas Reynolds, was receiving 6d a month from every seaman's pay. The Admiralty Office had been fitted out at vast expense and the house purchased at an inflated price of £3,000, on pretence of keeping the Admiralty Court there, was being used by another Commissioner, Sir Robert Rich, who meanwhile let his own house in Soho Square and was receiving £500 a year for alterations, furniture, heating and lighting.¹¹⁹ The long list of abuses, partiality and enrichment of private men at the public cost was detailed in a speech given by Dummer's patron, Robert Harley, in Parliament on 9 March 1699, in the hope of 'redressing those many evils which have so long reigned in that part of Government which we depend upon so much for our security. I must confess the disease is inveterate, the malady is obstinate and refuses any less cure than that of a Parliament.'¹²⁰

Somewhere in the Whig (Orford, Rich) – Tory (Harley) crossfire, Dummer was abandoned

¹¹⁵ BL, Add. MS. 70044, ff. 131-3 (Portland MS., ex Harley MS.).

¹¹⁶ NA, ADM 3/15, 15 June 1699.

¹¹⁷ House of Lords MS, NS, vol. 3, no.1255. NA, LR 4/1/9; C 5/207/25; C 10/295/18; C 5/207/25.

¹¹⁸ NA, ADM 2/364, 23 June 1699.

¹¹⁹ See Ehrman, pp. 270-3, 403-4. Though evidently efficient and conscientious, Rich continued to deal in cattle with the navy victuallers while on the Admiralty Board. Orford very narrowly escaped severe censure in 1699 and when forced to choose between the Treasurership and the First Lord of the Admiralty was inclined to keep the former lucrative post until persuaded that retention of the latter was more seemly. He resigned when his powers as First Lord were limited and was impeached in 1700 for naval mismanagement and speculation.

¹²⁰ BL, Add. MS. 70036 (Portland MS., ex Harley MS.), f. 10.

and the hint that he was unfit taken. On 31 July 1699, he came to take his leave of his colleagues at the Board 'and told us that he had left all the public papers, books, models and other things in that office, and that Mr Phillips and Mr Shoove would give an account there as there should be occasion, only some particular models of his own invention and not used, to be taken with him, of which he left a paper by way of to be delivered to the Surveyor's office for his successor.'¹²¹ On 10 August, exactly seven years after his appointment, Dummer was formally dismissed from the Surveyorship and Daniel Furzer, Master Shipwright at Chatham, was appointed in his place.¹²²

Dummer had defended himself by citing the greatness, novelty and danger of the works at Plymouth and Portsmouth. He had referred to the changeable nature of the work and the ill-performance of the contracts. Possibly he had attempted to deal with Fitch using some form of 'contracting in gross'¹²³ which failed through the changes the Surveyor or Overseer had been forced to make on the ground, or through the lack of constant management and supervision that would have been necessary to implement successfully such novel works. For whatever reason – technical over-ambition, bad man management, political intrigue – thus ended the official Navy career of a visionary inventor, sophisticated in his awareness of the desirability of applying reason to industry, highly skilled at expressing his schemes for design and control on paper, yet perhaps on account of these same remarkable qualities fatally flawed when it came to executing his plans in practice. Perhaps the Commissioners were simply fed up with hearing about the endless problems involved in building the new docks, not to mention Dummer's endless excuses and promises of what turned out to be false dawns.

Dummer did not entirely lose hope of returning to the Navy Board. Having heard rumours that Sir Cloudesley Shovell was going to quit his job as Comptroller of the Victualling Accounts he hinted at replacing him to Harley, but Shovell did not resign. On 24 September 1702 he wrote to Harley drawing his attention to the death of Captain Wiltshaw, the Comptroller of the Storekeepers' Accounts, the previous evening: 'Providence [has] opened the way wherein if (for what I suggested to you on the nature of that office but lately), I might succeed, I should be able to do much better service than ever I have done for the Navy and that is not a little if it were accounted to me in justice.' He had, he said, hinted indirectly to the Lord Treasurer (Sir Thomas Lyttelton) not to be too precipitous regarding the disposal of the office. In typical Dummer style he maintained, 'There is none at that Board understands it, nor hath it ever been understood rightly in my opinion.' Nevertheless, he understood, that very day the Navy Board had recommended one of their members, Mr Tymewell, for the office to the Admiralty.¹²⁴ 'Some time or other', Dummer mused, 'there will be a worse reflection upon that Board for having too great a balance of Clerk-Commissioners in that body. They may understand accounts, but the prudential judgement with relation to the bulk of that business is a science they are great strangers to, a knowledge of mechanics and crafts of various natures wherein the husbandry of great treasures consists. I speak this to you with great

¹²¹ NMM, Sergison Papers, Navy Board Minutes, 41. Dummer employed until August 1698 a model maker named Boneland at the Navy Office, 'in making models of docks, ships and vessels which, being new inventions, could not be managed without such instructions to the artificers that were to perform them.' R. D. Merriman, 'Gilbert Wardlaw's Allegations', *Mariner's Mirror*, xxxviii (1952), p.127, quoting the Navy Board's response to the Admiralty, regarding Wardlaw's allegations concerning the mismanagement of the Contingency Account, 8 February 1700.

¹²² NA, ADM 3/15, 15 August 1699.

¹²³ At the end of the eighteenth century the government used single building contractors for the construction of army barracks, giving rise to similar charges to those levelled at Dummer: high cost, poor workmanship & c. Thompson, pp. 82-5.

¹²⁴ Benjamin Tymewell was an Extra Commissioner but Dummer was misinformed: Henry Greenhill had already been appointed to the job, in August.

assurance, and if this occasion be not made use on to show me some countenance for my abuses [i.e. recognition of my ill-usage?], I shall never think anything else in the Navy worth asking for. If you shall think it proper to give My Lord Treasurer a word on this occasion, it will doubtless add great weight to what you have hinted at formerly.¹²⁵

No doubt embittered by his experiences, Dummer took a swipe at bigwigs and bureaucrats whose knowledge of ‘mechanics and crafts of various natures’ was so limited compared with his. But nothing came of his suggestion and, ever enterprising, from 1702 he initiated the first transatlantic mail service by packet boat, built his own ships and ran an iron business, albeit ultimately to his financial ruin.¹²⁶ When he died bankrupt in 1713, reputedly in Fleet prison, his widow Sarah wrote to Charles Sergison begging him, in memory of his deceased friend, to bring her ‘deplorable condition’ to Harley’s notice.¹²⁷ She and her only daughter Jane petitioned Queen Anne successfully for a pension.¹²⁸

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This article demonstrates the limited utility of the new science in the late seventeenth century to the massive task of running the Royal Navy. The circulation of speculative papers in Royal Society circles was a long way from the practical business of building real ships and dockyards. Although only on the fringes of Royal Society circles, Dummer was infected by the high ambitions its members had to be of use to the state. This was the language in which he couched his applications for preferment. Equally, he employed his superlative draughting skills, which combined geometric exactitude with polite embellishment, to attract the notice of the great powers in the land. Dummer’s visual surveys were not working drawings in the sense that they were utilized as instructions to further building in the dockyards: instead, they recorded his observations and rationalized his plans for presentation to his superiors and, one suspects, for posterity. As opposed to financial accounts of impenetrable comprehension and dubious relevance, they provided reassuring visual confirmation of where a high percentage of the country’s tax revenues had gone.

Today we might regard Dummer as a man who straddled the arts and sciences, the worlds of artisan mechanics and mechanical philosophers, but in the seventeenth century, as his career demonstrates, there was no rigid distinction between them. He was sufficiently genteel to move without too much difficulty among the nobility and newly ennobled, gentlemanly virtuosi, diplomats and top civil servants, but his day-to-day business would have been with Royal Navy captains and yard commissioners, master shipwrights, trade suppliers and skilled dockyard workers, no doubt switching persona as the occasion demanded. His methods only got him so far and he was constantly thwarted by the unmathematical and frankly corrupt nature of men. We still need to know more about him: where he received his artistic training and of course, the core motive behind his dismissal. Nevertheless, Dummer’s achievements as Surveyor for the royal dockyards are highly regarded by naval historians today,¹²⁹ fulfilling Sargison’s loyal prediction that the new docks at Plymouth and Portsmouth would be ‘lasting monuments of his great skill’.¹³⁰

Nor was Dummer’s magnificent Survey of his Majesty’s dockyards consigned thereafter to

¹²⁵ BL, Add. MS. 70037 (Portland MS., ex Harley MS.), f. 77.

¹²⁶ For Dummer’s later career as a shipbuilder and establishment of a packet boat service from Plymouth to the West Indies, see Philip Banbury, *Ship Building of the Thames and Medway* (Newton Abbot, 1971), p. 147 and J. H. Kemble, ‘England’s First Atlantic Mail Line’, *Mariner’s Mirror*, xxvi (1940), pp. 33-60, 185-96. Also, Jeremy Greenwood, *The Ironworks at Sowley, The Dummer Era* (www.hantsweb.org.uk/newforesthistor/ironsowl.htm).

¹²⁷ BL, Add. MS. 70267 (Harley Misc. 41).

¹²⁸ *Calendar of Treasury Papers 1708-1714*, 167, no. 6, 4 December 1713, pp. 529-30.

¹²⁹ Coad, *The Royal Dockyards 1690-1850*, pp. 92-7. Coad, ‘The Development and Organisation of Plymouth Dockyard, 1689-1815’, pp.192-5. Duffy (ed.), *The Naval Miscellany*, vol.vi, pp. 93-103.

¹³⁰ NA, T1/96, no. 53 (iv), 22 October 1705, cited in Kemble, p. 41.

the archives. In 1773 it was discovered in the royal library by George III, who brought it to the attention of the then First Lord of the Admiralty, the Earl of Sandwich. It provided the basis for a Supplement, which I have written about elsewhere.¹³¹ Sandwich recognized its merits, writing to the King in July 1773, to thank him for the loan of ‘a very curious and valuable work’ which would ‘be particularly useful in pointing out the original design of the several structures in the different yards; and give us better grounds for ascertaining the utility of the improvements that have been made from time to time since the Revolution.’¹³²

¹³¹ Celina Fox, ‘George III and the Royal Navy’ in Jonathan Marsden (ed.), *The Wisdom of George III* (London, 2005), pp. 290-312.

¹³² John Fortescue (ed.), *The Correspondence of King George III* (London, 1927-8), vol. iii, pp.1-2, letter 1290.