

Early Hydrographic Work of the Royal Navy in the Red Sea

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Introduction

In 1829 *Benares* and *Palinurus* of the Bombay Marine were despatched to complete a survey of the head waters of the Red Sea to facilitate a steam ship route for communication between India and Europe. In his account of the voyage, Lieutenant James Wellsted commented that navigators had hitherto been directed by the charts of Sir Home Riggs Popham, who had commanded a Royal Naval squadron in those waters in 1800–01.¹ The survey efforts of Popham and his officers will be discussed in the final part of this article. There had, however, been earlier hydrographic work by the Royal Navy in the theatre during the conflict with Revolutionary France, and this will be described first.

The Red Sea had been very much the domain of the East India Company, and interest extended beyond an opening for trade. In 1776 Alexander Dalrymple, future Hydrographer of both the Company and the Admiralty, was despatched in the cruiser *Swallow* to test the route as an option for rapid communication with London. Landing at Suez, he travelled overland to Alexandria and thence to England. He produced a report in which he calculated that an urgent despatch could reach London in seven weeks.² Amongst the first charts that he published after appointment as the company's Hydrographer in 1779 were two surveys by the ship's master, George Trotter, one of Suez and the other of Tor on the west side of the Sinai peninsula.³

Before the return of the *Swallow* another employee of the Company, Eyles Irwin, had been sent along the Red Sea route with further despatches for the Court of Directors. His troublesome voyage by country ship to Jeddah and local boat to Kosseir, followed by an equally problematic descent to Cairo and Alexandria, indicated the drawbacks of the route.⁴ Below Jeddah the prevailing winds between October and March were southerly, but with the onset of the South West Monsoon northerly winds prevailed from April to September, making entry in a sailing vessel virtually impossible. Above Jeddah the winds were northerly all year round, hence navigation was usually in smaller ships, such as the local boat in which Irwin took passage, staying close to shore and exploiting land and sea breezes.

There were political as well as practical obstructions. Both the central government of the Ottoman empire and local rulers discouraged the presence of Christian merchants and seamen in the upper part of the sea because of sensitivity over the important passage of Egyptian grain into Arabia and of Hajj pilgrims in the other direction. Hence the route was largely given up by British ships in the early 1780s. The only other recorded transit of a company ship to Suez in this period is that of the cruiser *Panther* in 1795.⁵ In the summer of

¹ Wellsted, *Travels in Arabia* II, 1–2.

² Fry, *Alexander Dalrymple*, 228.

³ Copies at British Library (hereafter BL) Maps SEC.11.(734.) and (735.).

⁴ Irwin, *A Voyage up the Red Sea*, 127.

⁵ Markham, *The Indian Surveys*, 7.

the same year a rare Royal Naval deployment is recorded, with the sloop *Swift* (14) patrolling the southern part of the sea and calling at Mocha and Jeddah.⁶

In the meantime a voyage had taken place, the consequences of which would later draw the Royal Navy inexorably into the theatre. During the mid-1780s French authorities had begun to consider Egypt and the Red Sea as a route to India.⁷ In 1787 the frigate *La Venus* (38) explored the Red Sea under the command of Capitaine de vaisseau François Étienne de Rosily-Mesros, an experienced and most competent hydrographic practitioner who conducted a chronometric survey. By 1795 Rosily had been promoted contre-amiral and appointed as director of the Dépôt des cartes et plans de la Marine. In 1798 the Dépôt published a fine chart of the Gulf of Suez from Rosily's survey. The year was significant. Rosily had been advising General Napoleon Bonaparte as he planned his expedition to Egypt as a first step towards a decisive re-entry of France on the Indian subcontinent and adjacent regions.

British first responses in the Red Sea to the French invasion of Egypt

Rear Admiral Peter Rainier had arrived as senior officer in the vast Indian Ocean station shortly after the outbreak of hostilities with Revolutionary France. With arrangements in hand to blockade the French naval base at Île de France and to protect the China trade, he had moved swiftly to mop up Dutch possessions in the theatre after the puppet Batavian Republic had declared war on Britain. In 1797 Spain joined the enemy coalition. Rainier planned a similar descent on Manila. But this was called off when news was received of French victories in Europe and the likely pursuit of a long-held plan for an attack on British possessions in India in concert with Tipu Sultan, ruler of Mysore. The naval cordon round Port Louis, Île de France, ensured that news of the arrival there of envoys from Tipu reached Rainier swiftly. Hitherto he had regarded the prospect of a threat from the Red Sea as remote, and the East India Company residents at Basra and Bussora had reported that the French had made no attempt to penetrate through Persia. But as news reached India of Bonaparte's Egyptian expedition and of preparations in England for a deployment of a squadron to the Gulf of Suez, he took swift action.⁸

On 5 November 1798 he issued orders to his nephew, Captain John Spratt Rainier, to prepare his ship, *Centurion* (50), with 'the utmost expedition' and to proceed to Mocha. There he would find Captain Samuel Wilson of the Bombay Marine, aide du camp to the governor of Bombay, who had been despatched with a company frigate. They were to confer on the best means of thwarting a French armament, especially by preventing them from procuring local vessels as transports. Before departure from Bombay he was to obtain pilots and a linguist from the government. He was allocated an armed pattamar to serve as a despatch vessel or gunboat and was ordered to put onboard 'an active mate and a midshipman and 12 men with swivels and small arms, and ammunition in proportion'.⁹ Two days later his force sailed. He would soon be pursued by further orders from his uncle, dated 5 December, instructing him to put in, if opportunity arose, at Qeshm, Mukalla or Aden, ports where the Company had agents for the country trade. There he might pick up intelligence from Captain

⁶ United Kingdom Hydrographic Office (hereafter UKHO) Miscellaneous Publication (hereafter MP) 62 (2B), Remark Book No. 35, 418–9, remarks of Mr J. C. Hunt, Master.

⁷ Ward, *British Naval Power in the East*, 89.

⁸ Northcote Parkinson, *War in the Eastern Seas*, 132–48.

⁹ The UK National Archives (hereafter TNA) Admiralty Papers (hereafter ADM) 1/169, 298, 300v–301v.

Wilson, particularly of any indication that the enemy had descended the sea and fortified Perim (Mayyūn) Island or the opposite coast. Once at the straits of Bab el Mandeb he was to ascertain whether a squadron despatched from England under Commodore Blankett had arrived. If so he was to join him. If not, he was to open the accompanying orders for the commodore.¹⁰

On 22 December Captain Rainier arrived at Mocha where he found *Albatross* (18), Commander Charles Adam, who had established an excellent relationship with Wilson. There was, however, no news of Blankett's squadron. He opened his uncle's orders, which included a direction to assess a proposal from the Governor General that a British battery and military post be established on Perim Island which flanked the Small Strait of Bab el Mandeb. He therefore took station there and sent Adam to procure a pilot and cooperate with Captain Wilson and the East India Company cruisers to destroy any craft which the French might have procured and prevent them making progress down the sea.¹¹

Admiral Rainier followed his predecessor Cornwallis in encouraging his officers to gather hydrographic information. John Spratt Rainier had conducted two surveys whilst serving in his uncle's flagship during operations on the east coast of Ceylon in 1795, one of them in teamwork with Thomas Hayward, a survivor of Bligh's famous boat voyage after the mutiny in *Bounty*. Rainier, and afterwards Hayward, had subsequently been given command of *Swift*, and both had rendered reconnaissance surveys from the East Indian Archipelago. Rainier had described his survey of the south coast of Manipa Island as an 'eye sketch' stating that 'By an Eye Sketch, I mean what is designated by Land Surveyors a survey by plain [*sic*] table'.¹² What he was probably indicating is that this was a 'running survey' with points of land and conspicuous features intersected by bearings taken from the ship as it progressed alongshore. Such work depended on great care in laying down the ship's track between astronomical observations for position. During the first week on his station at the entrance to the Red Sea he began the work shown on the sheet which he rendered to the Admiralty: *A CHART of the STRAITS of BABELMANDEL on Mercator's Projection*.¹³

On this there is very careful comment on the plotted tracks of *Centurion* and *Albatross* between anchorages, and this would indicate running survey based on astronomical observations for the position of those anchorages. Thus a track of *Albatross* on 5 February extends from an anchorage at noon, where meridian passage of the sun would have been observed, to which she returned at 6 pm in time for an evening star sight. Rainier would return for five days in June and for a week in August, and on each occasion he laid down *Centurion's* track along which regular soundings had been taken in depths less than 40 fathoms. He took the ship into the vicinity of the island group known as 'The Brothers', which lie on the flank of the Large Strait, reporting that he could see no dangers or any appearance of a shoal. This is corroborated on today's charts. Leaving the Red Sea in October, when the southerly winds had set in, he took the opportunity to add invaluable information, tacking through the Small Strait, going about quite close to the shore and slipping in an extra tack to define the southern tip of the Middle Ground (see Figure 1). This feature is well-delineated and his soundings agree well with modern surveys.

¹⁰ TNA ADM 1/169, 315v–319r.

¹¹ TNA ADM 1/169, 419.

¹² UKHO B643 on Bb3.

¹³ UKHO B652 on Cu.

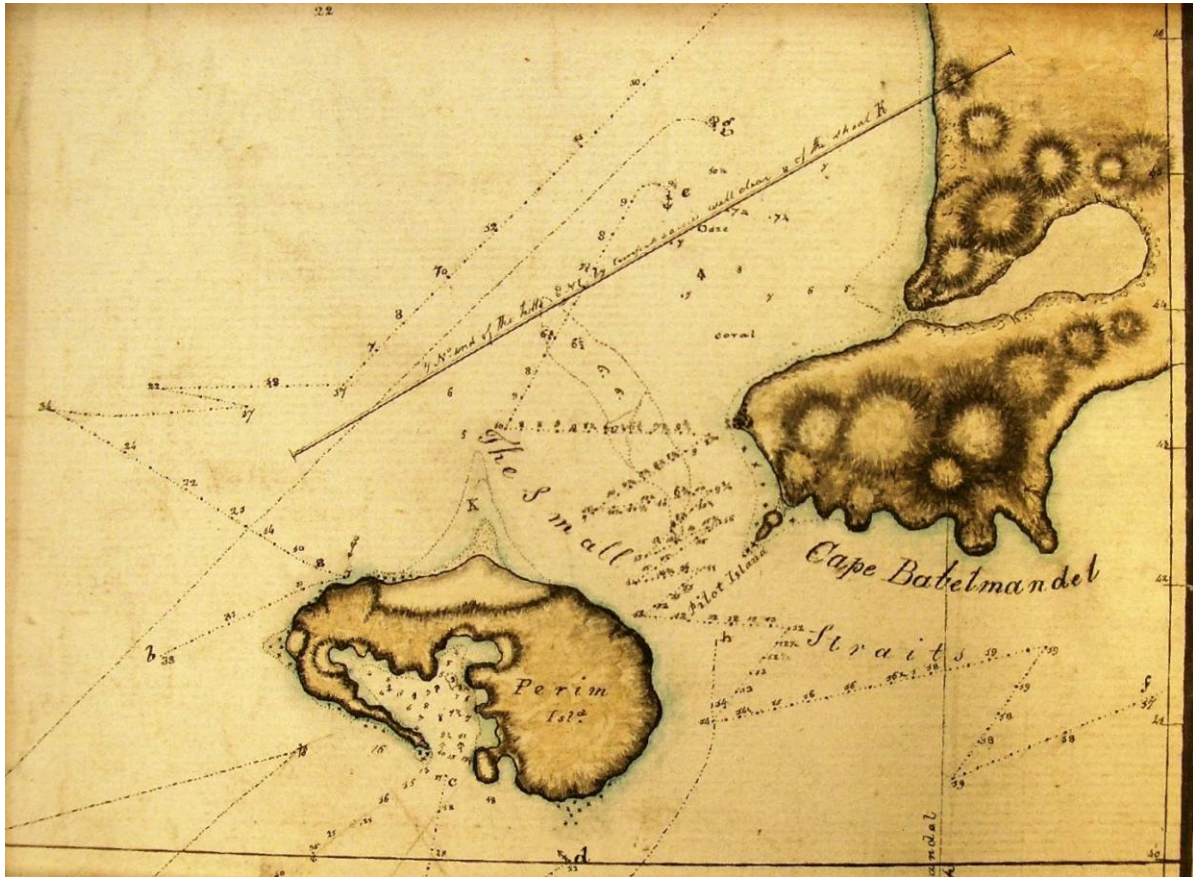


Figure 1: Detail from Rainier's chart of the Straits of Bab el Mandel (Courtesy UKHO reference B652 on Cu).

During the time on station in June and August he made the observations drawn up in *A CHART of the Harbour in PERIM*, where he had anchored *Centurion*.¹⁴ Here a force from Bombay under the escort of *Fox* (32) had been landed in May under the command of Lieutenant-Colonel John Murray, who was to assess the proposal for occupation. The position of his camp is shown on the chart at the head of the inlet now known as Murray Bay. A boat was deployed to take soundings along a zig-zag of profiles. Again these compare well with modern surveys and Rainier's chart shows the shoal extending from the western entry point to the bay, and those that impede access to the inlets on the eastern side. Remarks warn of a strong eddy across the harbour mouth, so that the shoal at the entrance should be given a wide berth. The bottom within the harbour was sandy and good holding ground. Four recommended anchorage positions are shown on Rainier's smaller scale sheet. Tidal observations had been made and the rise never appeared to exceed 9 feet. Rainier remarked: 'There is plenty of fish to be caught; but no water or wood to be found on the island.' The lack of water would be a major factor leading Murray to reject the option of occupation, especially since batteries would not have the range to command the entrances to the Red Sea.

Rainier has written on the bottom of his Perim chart: 'This is an actual and correct survey. I have the original by me.' The coastline and topography on both this and his smaller scale sheet are a great advance on the depiction on the East India Company chart of the

¹⁴ UKHO B641 on Cu.

strait.¹⁵ Khawr Ghurayrah is orientated too far to the north of east. Otherwise the survey compares very creditably with modern charts and maps, and the depiction of hills on mainland and Pilot Island compare remarkably well with the satellite imagery that is available today. He has drawn in a meridian running through a hilltop on Cape Bab el Mandel, and this suggests that he made astronomical observations there for longitude and for the variation of $8\frac{1}{2}^{\circ}$ W ‘allowed in constructing this Chart [which was] deduced from several observations’. A comparison of his plot with the highest summit shown on Google Earth suggests that he has placed it only four minutes of longitude (3.3 statute miles) too far east. Since we know that he was aware of plane-tabling procedure, it is also possible that he may have made such an observation from here and elsewhere on his plan. He may also have sought assistance from one of the engineers in Murray’s party.

Captain Wilson had meanwhile received reports from his correspondents in Mecca and Jeddah that Ottoman troops had completely vanquished the French army. Admiral Rainier would later report to the Admiralty that his nephew had listened too readily to this intelligence and so he had directed that a frigate and *Albatross* be despatched to Suez without delay to assess the situation there. In the meantime John Spratt Rainier had received more reliable ‘Extracts of Intelligence’ which Captain Wilson had gathered from arrivals at Mocha from Suez. These reported that, whilst the French had not been defeated in battle, they were losing many men to an outbreak of plague. They were, nonetheless at Suez, where their Maltese artificers were building transports. Rainier now appreciated that they could have commandeered many of the local craft which would be moving up the Red Sea with the south-east winds. On 6 March he detached *Albatross* to join with Captain Wilson’s two East India Company brigs at Jeddah, and on the 11th he determined to follow with the armed pattamar in company, reasoning that he could leave the Straits unguarded since the squadron expected from England should arrive before any French force could work its way down against the winds. By the 13th he was at Mocha.¹⁶

On 27 April *Centurion* and *Albatross* were sighted off Suez. They were believed to be the first ships of the Royal Navy to explore this far. The author of the classic account of campaigns on the East Indies Station declared: ‘To anything of a flotilla which anyone could conceivably build at Suez, they were the answer; the finish; checkmate.’¹⁷ Nonetheless they had discovered that the water was too shoal off the port for them to get close enough to cut out the few vessels that had been fitted as gunboats or to bombard the fortifications that the French were constructing.¹⁸ Rainier reported to his uncle that ‘the navigation of the Gulf [was] dangerous, and most of the charts and nautical description of it very erroneous’.¹⁹ There was certainly scope to act as pathfinders.

William Dobbie, first lieutenant in *Centurion*, had also received encouragement in this capacity from Admiral Rainier. Dobbie had rejoined the Royal Navy in the admiral’s flagship *Suffolk* (74) after six years service with the East India Company and quickly earned attention during the operations against the Dutch bases because of his local knowledge.²⁰ He was credited with extensive hydrographic work on the station. However, there is little evidence in

¹⁵ BL Maps SEC.11.(744.).

¹⁶ TNA ADM 1/169, 380–1, 396–8, 430–1.

¹⁷ Northcote Parkinson, *War in the Eastern Seas*, 146.

¹⁸ Richmond, ed., *Spencer Papers*, vol. IV, 79.

¹⁹ *Ibid.*, 197.

²⁰ TNA ADM 9/2, 371.

the early records of the Hydrographical Office. He drew up a track chart of *Centurion* in Jeddah Roads which has not survived.²¹ A sketch survey (Figure 2) does remain in the archive of the UK Hydrographic Office depicting the bay of Kosseir (Al Qusayr), the entry port which would prove to be the key to control of Upper Egypt.²² It gives every appearance of having been modelled on the work of his captain, and a plan attributed to Rainier was listed in the Admiralty.²³ Dobbie lists latitude and longitude and variation, presumably observed in the anchorage. Longitude is not as precise as that achieved at Cape Bab el Mandeb, probably reflecting the time available. There is no indication of how the work was controlled, other than the boat sounding, which will have been run along compass bearings, possibly with angles observed to *Centurion*'s mainmast head to give range. He has adopted a standard technique of starting from the ship's anchorage and then running a zig-zag of profiles along the adjacent coast as had been done in the surveys near Perim Island. The representation of the coast is generalised, but the depiction of the fringing reef is accurate and will have given adequate warning for approach to the anchorage and boat landing. The soundings give a good picture of the shelving seabed dropping off quickly outside the bay where a deep-sea line has been deployed and 'no bottom' found in depths greater than 30 fathoms.

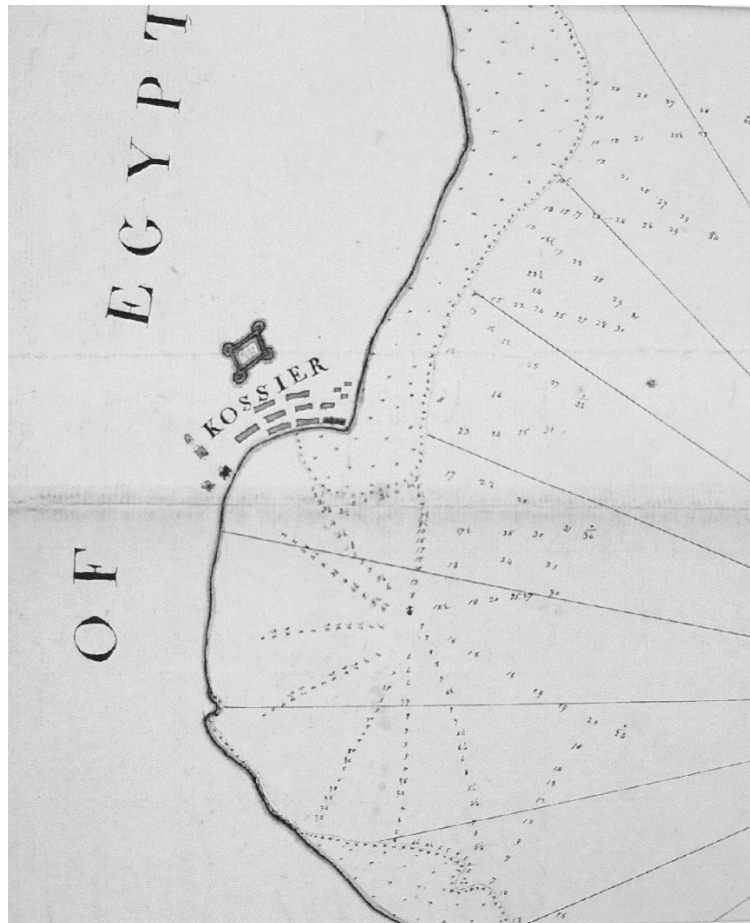


Figure 2: Lieutenant Dobbie's sketch survey of Kosseir (UKHO B906 in Red Sea Folio 1).

²¹ UKHO 659, destroyed later in the nineteenth century.

²² UKHO B906 in Red Sea Folio 1.

²³ UKHO B658, destroyed later in the nineteenth century.

On 6 June Captain Rainier arrived back at Mocha, having left *Albatross* to cruise for a further six weeks off Tor. He reported to Commodore John Blankett, who had arrived there in mid-April, that there was no French squadron at Suez. Furthermore he confirmed the opinion of local pilots that the end of the period of south-east winds would make it impossible for any of the enemy's ships from Île de France to get up to Suez, at least from the beginning of March to the end of May. Blankett was not entirely persuaded, and considered that frigates or fast sailing ships could beat their way up wind.²⁴ He had little trust in the Shereef of Mecca, whose port of Jeddah was the main source of local shipping. When Adam arrived in *Albatross* with news that the French had occupied Kosseir and could now block the passage of reinforcements to their Mameluke opponents, he despatched two frigates which managed to reach Kosseir for an unsuccessful attack on the fort.

There is no record of when the surveys from Rainier's deployment into the Red Sea reached Whitehall. Only Dobbie's survey of Kosseir would be published by the Admiralty, and would remain in the catalogue long after all the others that will be described hereafter.²⁵ Probably the decision to move the British garrison from Perim to Aden, and the obvious choice of the Large rather than the Small Strait of Bab el Mandel, led to Rainier's good surveys being set aside. They were nonetheless valuable products, and local copies were retained, certainly by Rainier himself. It is now time to examine the extraordinary record of Blankett's squadron and the hydrographic output that it produced.

Commodore John Blankett's Deployment to the Red Sea

While Nelson was still hunting Napoleon's expeditionary force in the Mediterranean and its destination was yet to be determined, Henry Dundas, Secretary of State for War and President of the Board of Control of the East India Company was already lobbying for action to contain the threat of French exploitation of the Red Sea route.²⁶ On 19 June Alexander Dalrymple penned his advice on 'the probable length of the Passage of a Frigate or Sloop of War which should be despatched now from England to the Strait of Babelmandel or Mouth of the Persian Gulf'. Prophetically as it would prove, he noted that 'this is not the usual season for sailing from England for the Straits of Babelmandel' and much would depend on 'the first outset' and consequently the timing in the monsoon cycle when a force entered the Indian Ocean. He concluded that 'under the most favourable circumstances' the length of the passage would be 'at least three months'.²⁷

Dalrymple would certainly have approved the selection of the officers for the deployment that was now set in train. The commodore, John Blankett, had been amongst those advising the First Lord of the Admiralty on the means of responding to Napoleon's Egyptian expedition and any larger plan for French operations in the Indian Ocean.²⁸ Throughout his career he had shown a deep interest in exploration, twice taking leave to travel to Russia to gain information of recent voyages on the Pacific coast. He had made proposals for British probes into the Pacific, and had passed information on activity in the

²⁴ TNA ADM 1/169, letter dated 5 Aug. 1799.

²⁵ UKHO Old Copy Bundle (hereafter OCB) 733, still in the Admiralty catalogue in 1860.

²⁶ Richmond, ed., *Spencer Papers*, vol. II, 449–50, letter dated 9 June 1798.

²⁷ TNA ADM 1/3522, 61.

²⁸ Richmond, ed., *Spencer Papers*, vol. IV, 172–5.

Pacific to Dalrymple. He had operational experience of the East Indies and China Sea.²⁹ He had urged occupation of the Cape of Good Hope, and served as second in command of the squadron which put the conquest into effect and subsequently set about surveying the coast. This background stimulated Dalrymple's efforts to supply as full as possible a set of East India Company charts and directions, not least in the expectation of new reports and surveys.³⁰

Blankett's flag captain in *Leopard* (50) for the Red Sea deployment was Thomas Surridge. He was an accomplished navigator and surveyor, who, as master in *Seahorse* (24) on the East Indies station some twenty years earlier had given Midshipmen Horatio Nelson and Thomas Troubridge an appreciation of the importance of hydrographic data-gathering that they never lost. He had passed for Lieutenant in the same year as his old pupil Nelson and thus made the transition to commissioned status. In the 1799 deployment, as well as ensuring that Mr Briggs, the master, submitted comprehensive remarks in the approved format³¹, Surridge is likely to have once again inspired his junior officers to make hydrographic observations.

The man who caught Dalrymple's particular attention was Austin Bissell, first lieutenant in *Daedalus* (32). He had the interest of Earl Spencer who had commended him to Blankett and to the commander-in-chief on station, remarking that he hoped that the voyage would produce 'some useful information from a part of the world with which our Navy is in general but very little acquainted'.³² Bissell had served under another accomplished surveyor, Captain John Knight, in Hood's flag-ship *Victory* during the armament of 1791. Hood had doubts that Bissell was fitted for small ship service.³³ Any such reservations that remained would be thoroughly dispelled during Blankett's deployment.

Blankett's squadron left England on 9 July, but did not round the Cape of Good Hope until October, long after the tail end of the favourable season that Dalrymple had indicated. Though Blankett had personal reservations about the likelihood of rapid access of the French to Upper Egypt, he was in no doubt of the concern of Dundas and expectation that he would make every effort to reach the Red Sea as soon as possible. In what Dalrymple described as a 'very curious and instructive Journal', Bissell recorded:

... one of the most perplexing and tedious voyages ever made by any ships. It is, I believe, the first attempt ever made to beat up the coast of Africa against the East Monsoon, and it is to be hoped nobody would ever attempt it again. We were 40 weeks on this voyage, and ran 18,029 miles.

The journal reached Dalrymple by courtesy of Thomas Troubridge together with Bissell's fully graduated manuscript chart showing his running survey of the east coast of Africa from Zanzibar to Somaliland.³⁴

²⁹ Oxford Dictionary of National Biography Vol. 6, 177; Fry, *Alexander Dalrymple*, 197.

³⁰ TNA ADM 1/3522, 59–60 is a list of remarks and charts, including those from *Swallow*.

³¹ UKHO MP 63(B3), 759–80.

³² Richmond, ed., *Spencer Papers*, vol. IV, 178 and 198.

³³ National Maritime Museum (hereafter NMM) HOO/102, Hood to Knight, 5 September 1791, 'I shall be glad you will send Mr Bissell to the *Alcide*, as I understand he will do better in a guard-ship than a frigate ...'.

³⁴ Dalrymple's description of Bissell's journal appears in the introduction to the abstract published in 1806 by the East India Company in a *Collection of nautical memoirs and journals* produced to match 100 copies of the company's charts that were printed for the navy. A copy of this is at the Royal Geographical Society (hereafter

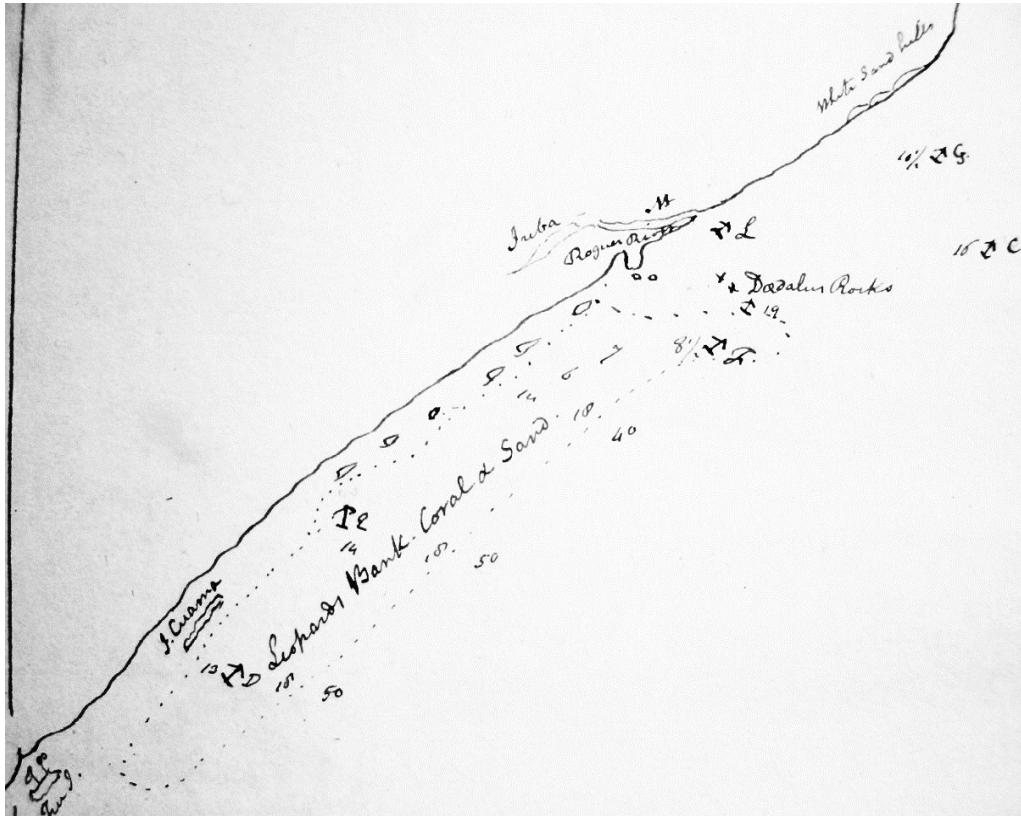


Figure 3: Detail from Bissell's running survey of the coast of Africa (Courtesy NMM reference DUC 252: 4/1).

The record of observations as the squadron attempted to beat through the equatorial zone shows the young lieutenant assessing existing charts and adding new detail based on careful astronomical work including lunar distances. During the passage along the African coast Bissell was transferred to *Leopard* at Blankett's request after a lieutenant and part of his boat's crew were murdered by natives whilst seeking water at the mouth of the Rogue's River (Jubba) near Kismayo. Murder Hill is still shown on the present day chart. So too is Leopard's Reef, just one of the shoals upon which the ships touched, and the scene of a 'serious scrape' when 'the *Leopard* got aground and lay for near 7 hours'.³⁵ Bissell noted that no dangers were shown in this area on the highly regarded chart of M. D'Après-Manneville. In his journal he suggests that Blankett had courted risks by keeping the squadron close inshore, especially at night, but he acknowledged the necessity of skirting the coastal reefs 'which the squadron constantly kept working upon to avoid the strength of the current as laid down in any Chart I have seen of the coast'. Bissell reckoned that this actually set WSW at a rate of 2½ to 3 knots, which with a 'fine turning breeze' drove them 30 to 40 miles to leeward each day. They were experiencing the monsoonal Somali Current, and Bissell's estimate compares well with the information on modern charts. Eventually, Blankett anchored for the twelfth time, now just south of the equator in the vicinity of the Hawaween

RGS) mg NO7/331. A manuscript copy of Bissell's chart is at NMM DUC 252: 4/1. Quotations from Bissell are taken from *A Voyage from England to the Red Sea*, here on 47.

³⁵ Bissell, *op. cit.*, 26–8. His account was studied by the officers on Captain William Fitzwilliam Owen's famous voyage, Thomas Boteler identifying the site of the ancient port of Malindi inside Leopard's Reef. See *A Narrative of a Voyage of Discovery to Africa and Arabia*, vol. I, London (1835), 395–6.

Reefs, which Bissell named ‘Leopard’s Bank’, with ‘Daedalus Rocks’ (Daedalus Knoll or Doodaali Noo on today’s chart) at the north-east extremity where the frigate had touched (Figure 3).³⁶ They lay there for 20 days before one final attempt to make ground to the northwards was abandoned and they ‘were obliged to bear up for the island of Zanzibar for provisions’.

Bissell continued his observations as they resumed the voyage to the Red Sea, noting that they were alarmed frequently by irregular soundings where the adjacent land was low and sandy, whilst, where small islands or high mountainous terrain lay close at hand the soundings were regular and the coast bold to. ‘We always tried the current, when we had an opportunity.’³⁷ In his journal he does not hold back from critical comment on precursors:

In conformity with the East India Directory, we ran down the African coast to the Island of Mette before we shaped our course across; but neither the Directory, nor any of the former Journals of Voyages to the Red Sea, give any reason why we should not steer directly from Cape Gardafui to Cape Aden when the wind is fair instead of making the angular course we did.³⁸

On 14 April the squadron anchored in Mocha Roads where Blankett gave orders for the concentration of all ships on station following receipt of information that the French Brest fleet was at sea and possibly bound for the Red Sea and that the French army at Suez was making great efforts at embarkation. The sloop *Orestes* was despatched to keep a lookout at the Straits of Bab el Mandel. Meanwhile Mr Stephen Stead, the master of *Daedalus*, was busy sounding around the sandbanks to find a place into which *Leopard* could be hauled if required. Bissell later ‘sounded over the sands a great deal and with much attention’, finding that his results differed from the plan that had been supplied to them. He could ‘certainly point out the least water, with marks to avoid it’ and he concluded that, once known, the banks were ‘a means of shelter rather than danger’. His sketch survey shows the positions of three marks that were undoubtedly used, the Grand Mosque and the North and South Forts between which he and Stead had measured the distance ‘with a line of 200 fathoms’. His plan shows the *Leopard* and *Centurion* in the anchorage that he recommended south of the northern shoal.³⁹ Blankett would make Mocha his main base. There were attractions. Many of the inhabitants, who spent all day fishing, spoke English. Bissell noted that the best grapes were from Sana’a, ‘where the Immaum resides’.

On 8 May *Leopard* anchored in Perim Harbour, where Bissell recorded that:

The natives frequently swam off to us 4 or 5 miles with strings of fish round their necks for sale. They are a poor, harmless race of people.

He could not understand the purpose of occupying the island since the Large Strait provided an alternative passage. He saw the soldiers succumb to sickness. All their water supplies had to come from Mocha. His manuscript, described, like all his other harbour surveys, as a

³⁶ Purdy’s nineteenth century sailing directions named Daedalus and Blankett Shoals and Bissell and Blankett Islands in this area.

³⁷ Bissell, *op. cit.*, 43

³⁸ *Ibid.*, 46; the conspicuous Island of Mette, ‘known by a remarkable top, like a cap or Scotchman’s bonnet’ is Jasiired Maydh off the N coast of Somalia.

³⁹ Bissell, *op. cit.*, 47–9, NMM DUC 253:2/15.

sketch, shows where they had ‘tried for water’ and also the location of the army camp.⁴⁰ He does not emphasise the shoal off the western point at the entrance but otherwise his survey compares well with Rainier’s results. He was able to observe lunar distances over three days to establish longitude.

The muster books of *Leopard* show that Bissell was ‘absent on duty’ during much of the subsequent first deployment in the Red Sea. In the summer of 1799 he served as Acting Commander in *Orestes*,⁴¹ in which he searched for shoals in the vicinity of Jabal Zuqar Island and the nearer Hanish Islands.⁴² Penetrating further into the sea he used a tracing of a chart by de la Rochette to delineate reefs extending from the Dahlak Archipelago towards Jabal at Tair.⁴³ He considered that ‘the most dangerous part of the navigation in the Red Sea’ lay between that island and Jeddah because ‘the Arabian shoar (*sic.*) is one continued range of shoals all the way’. ‘All the small vessels navigate inside the shoals, and anchor in the night, but this would never do for a ship of any size.’ The large country ships from India and the Persian Gulf ‘seldom go higher than Jeddah, they always keep in the mid-channel and never come into the shoals till they get into the latitude of it.’ In his journal he listed the uncharted dangers that he encountered in this and subsequent passages. He concluded: ‘I do not think there is any place, of large extent, so ill-surveyed, or known, as the Red Sea.’⁴⁴

Bissell may have been back onboard *Leopard* when Blankett arrived at Jeddah to persuade the Sheik to declare against the French. He may have begun to compile the substantial remarks in his journal at this time. The following year he was operating in ‘the *Clarence* schooner, tender to Admiral Blankett’ and ‘had a good opportunity of surveying the shoals’.⁴⁵ He would witness the danger that they represented. He was present and rendered assistance when the frigate *La Forte* (44), which was carrying important army stores, grounded and sank there in 1801 (Figure 4). Later he assisted to extricate *Leopard* from one of the shoals. His survey showed the recommended track into the inner anchorage finally occupied by *Leopard*. He made observations for latitude, longitude and variation. Coastline and sounding were probably laid down by compass control.⁴⁶

In the autumn of 1799 the squadron left the station to effect repairs at Bombay. A strong adverse current brought a similar experience to that off the coast of Africa. The voyage took two months from the Straits and they arrived with ‘provisions [...] just out, and we were obliged to send on shore the day we anchored for more’. Once again Bissell was blunt in his conclusion:

I have no doubt but that this squadron is the first that ever worked all along the Coast of Arabia in the middle of the Easterly Monsoon, and it seems too tedious ever to attempt again.⁴⁷

⁴⁰ NMM DUC 253:2:14MS.

⁴¹ TNA ADM 36/15210–1 Bissell is Number 1110 in *Leopard*’s muster book. No muster book for the *Orestes* survives from this period. She was lost in the Indian Ocean a few months later.

⁴² UKHO B907 in Red Sea Folio 1.

⁴³ NMM DUC 253:2/4. The de la Rochette chart, dated 1781, had been published by Faden.

⁴⁴ Bissell, *op. cit.*, 66–8.

⁴⁵ Memoir to the chart of Jeddah published by Dalrymple on 31 May 1806.

⁴⁶ NMM DUC 253: 2/16.

⁴⁷ Bissell, *op. cit.*, 79.

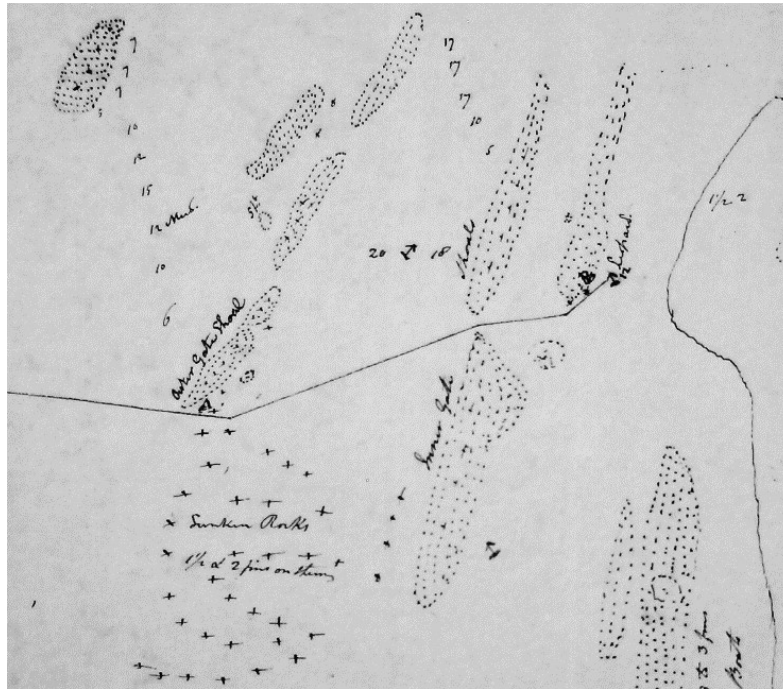


Figure 4: Detail from Bissell's sketch survey of the complex shoals off Jeddah, showing where *La Forte* grounded (A) and sank (B) (NMM DUC 253: 2/16).

Blankett's squadron would be sent back to the Red Sea in 1800 during the truce which Sir Sidney Smith had concluded at El Arish, and Bissell made his first acquaintance with Suez and Kosseir. The following year they would return. The concern of Dundas over the continued presence of the French in Egypt extended beyond any threat to India. He could see them extending control over the commerce and trade of North Africa and Asia Minor.⁴⁸ They must be removed. Hence he finally achieved the despatch of an army to land on the Mediterranean coast. This, he insisted, must be supported by landings in the Red Sea. At the end of December 1800 Blankett left Bombay with *Leopard*, *Fox* and five vessels of the Bombay Marine, a number of small vessels to use as fireships or blockships, and a force of 300 soldiers. Also in the force was a vessel commissioned as His Majesty's Armed Ship *Babelmandel* under Bissell's command.⁴⁹

He now had the opportunity in the northern part of the Red Sea to complete his meticulous record of dangers that were sighted, and their deduced positions and the type of observation on which they were based.⁵⁰ The dangers included Daedalus Shoal, nowadays a much-favoured dive-site, 'first seen by her [...] in sight [...] going up and down the Gulf in 1800 and 1801'. He reaffirmed his conclusion that it was much safer to work up 'on the Abyssinian shoar; as you cannot approach the Arabian side in any latitude without falling in with very dangerous shoals constantly'. In *Babelmandel* he was able to emulate the practice of the small local vessels and to run inside the dangers leading north from Jeddah as far as 22° 10' North, 'leaving 27 shoals on the outside of me and 7 inside; and then we were 8 or 9

⁴⁸ Mackesy, *War Without Victory*, 145.

⁴⁹ *Babelmandel's* muster book, commencing 17 November 1800, when hands were entered from the *Orpheus*, is at TNA ADM 36/15188, and Bissell's log is No. 3 in TNA ADM 51/1461.

⁵⁰ Bissell, *op. cit.*, 83–4

Leagues off the shoar with fine smooth water to work in'.⁵¹ His small vessel would also enable him to build up a store of knowledge of the Gulf of Suez, where he made several runs between Tor and Suez, noting that in June to August cargoes from Jeddah were landed at the former port and carried onwards by camel because the northwesterly winds made it almost impossible to beat up the gulf. He had made two vain attempts in *Babelmandel*.

Blankett's squadron arrived at Tor in March 1801 after battling with the northerly winds. The coastline on Bissell's sketch of the harbour is less accurate than on Trotter's plan, but the delineation of the shoals and the representative depths along the tracks to the anchorages of the ships agree well with modern charts.⁵² As well as showing the crumbling ruins of the town Bissell has plotted the three wells, 'not more than 200 yards from the beach' where they baled out 'the best water of any place in the Red Sea'. There were no refreshments of any kind to be had in the town 'but there is a Monastery on Mount Sinai from which we, now and then, got some fruit brought down by a Greek Padri [*sic*] or Priest'.⁵³ Bissell includes the profiles of Mounts Sinai and Horeb on his sheet.

On 22 March Blankett arrived at the ruined and desolate town of Suez which the French had evacuated to respond to the landing of General Abercromby's army at Aboukir. He remained there until early June, when the small contingent that he had carried from Bombay departed on a gruelling march to join the main army. During this time Bissell continued his survey activity. The shallow water in the roads of Suez again hampered operations. On his survey he plotted where *Leopard* 'run aground in stays, and had 6 fathoms with helm down'. She lay there for four hours in soft mud. During their earlier visit boats had been employed to sound in the roadstead and around the entrance to the 'River of Suez', the channel to the inner dhow harbour, which Bissell now surveyed 'completely, from the town to the bar. [...] I measured all its turnings very accurately.'⁵⁴ Coopers from the ships had made buoys to assist in the operation.

Copies of Bissell's survey sheet have not survived. The plan of *Suez Road and Harbour, Red Sea by Austin Bissell R.N. 1800 & 1801*, published by Dalrymple as an insert on the plate showing Bissell's survey of Tor (Figure 5), records observation for position ('Long. by many observations of lunar distances'), variation, and tidal data. As in the case of the other surveys, no information is given on control of the survey. Representative soundings in the roadstead have been run from *Leopard's* grounding position and anchorage to the shoals which Bissell has located. At the scale of the plot, no soundings are plotted in the entrance channel, where dhows are shown at anchor. The bar is marked with a line and the annotation '4 feet LW'. The vital information on sources of water is amplified in a key, including '5 wells of excellent water, where the caravans always halt on their way to Suez and Cairo'.⁵⁵

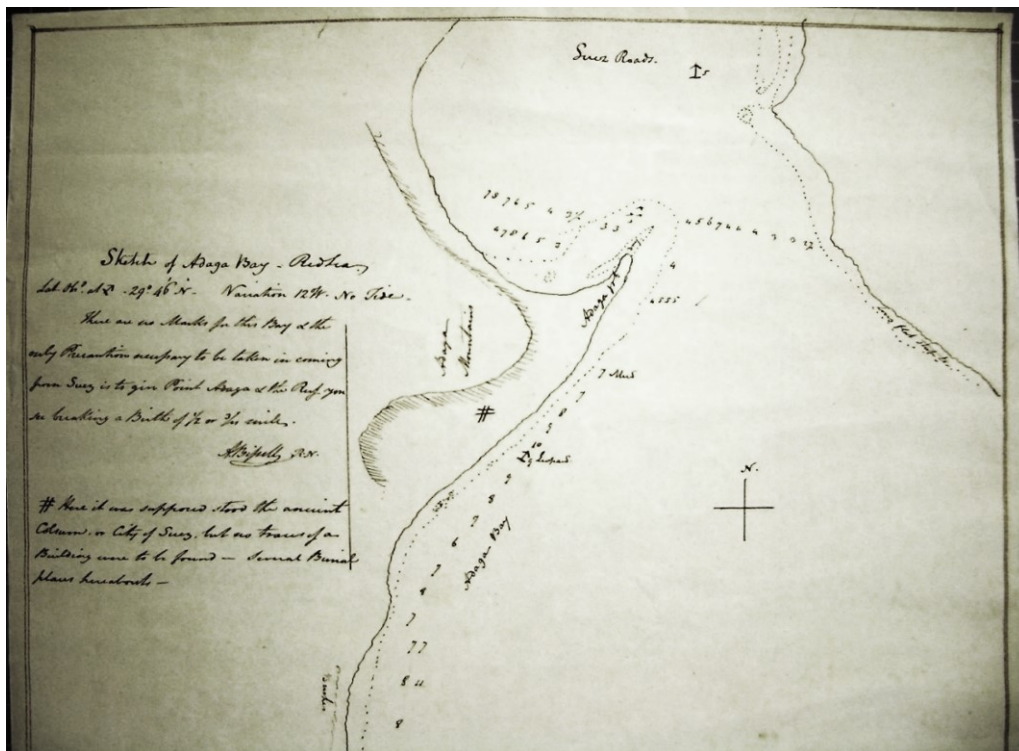
⁵¹ *Ibid.*, 54.

⁵² NMM DUC 253:4/8.

⁵³ Bissell, *op. cit.*, 57.

⁵⁴ *Ibid.*, 63, 68

⁵⁵ Chart published by Dalrymple on 31 May 1806.



Figures 5 and 6: Details from Bissell's surveys at Suez (Open Source and NMM DUC 253: 4/1).

It was not till 1800 that Alexander Dalrymple was given the clearance and facilities to publish charts as Hydrographer to the Admiralty. Initial focus was on the Channel theatre and adjacent waters. In the earlier years of the renewed war with Napoleonic France Dalrymple had enthusiastic support from Thomas Troubridge on the Board of Admiralty as he applied his practice with the East India Company, speedily publishing incoming surveys from the Mediterranean Station as the Trafalgar campaign unfolded. Meanwhile he obtained permission from the Admiralty to publish incoming work from Royal Naval units in eastern seas in the Company series. This included the surveys made in the Red Sea, which he began to publish in 1806. As East India Company Hydrographer his practice was to publish any plans that came his way, including different surveys of the same location, on the grounds that it gave navigators all available information. This is apparent with the Red Sea material.

The resultant charts show that Blankett took a hand in encouraging data-gathering, not least during the protracted stay off Suez. One of several charts whose titles include ‘From a MS in Admiral Blankett’s collection’, indicates that Blankett anchored *Leopard* in two stations off the fringing reef at Ras Muhaggara, to enable control for boat survey.⁵⁶ Bissell was also sent to test an anchorage along this coast to the south of Adaga Point, which he calls Adaga Bay (Figure 6). He had time to note burial grounds near the supposed site of the ancient city of Suez.⁵⁷ John Ellis, the third lieutenant in *Leopard* was also deployed on the same coast. His survey was listed in the Hydrographical Office as *Adaga Point and Swallow Bay*.⁵⁸ Swallow Bay may be a reference to the soundings in the southern part of Suez Bay, which Trotter had surveyed. Ellis continued his soundings along the coast whilst delineating the fringing shallows. He denotes an anchorage just north of a sandy shoal with a depth of 13 fathoms, in the position of a group of patches on today’s chart off Wadi Bad.

The earliest ledger of holdings in the Hydrographical Office lists five manuscript surveys by Ellis, four of which, all from the Red Sea, were destroyed at some stage in the nineteenth century. The survival, a later track chart in the Andaman Sea, and Dalrymple’s published version of his work near Suez, indicate that he was a competent surveyor. Dalrymple has been selective in reproducing work from Blankett’s men, and seems to have favoured Bissell. The young officer may have called on the Hydrographer, and received advice from him, during preparations for the voyage. On his manuscript survey of Zanzibar, where the enforced call for water and provisions gave him the luxury of six days for his observations, he uses notations, particularly for astronomical work, which Dalrymple would later promulgate for general use in the fleet.⁵⁹

Whilst all the work near Suez was in hand, Blankett received news that displeased him. He had directed that a further division of troops which had been despatched from Bombay under General Craig should join him at Suez. Now he learnt that they had been landed at Kosseir, and he sailed for that anchorage, arriving on 15 June. Here he found that Craig was already leading his troops to the Nile, and another force was preparing to land, one whose story will be picked up in the next section. On the survey that Bissell had started in 1800, employing the same techniques as William Dobbie, he showed the surf which pounded on the reefs flanking the bay. This was not the only challenge in a crowded anchorage that Captain

⁵⁶ Chart published by Dalrymple on 16 May 1806.

⁵⁷ NMM DUC 253: 4/1.

⁵⁸ Chart published by Dalrymple on 31 May 1806.

⁵⁹ NMM DUC 252: 4/2.

Surridge and Mr Briggs described as confined and foul.⁶⁰ Many of the transports had dragged on the bad holding ground and ‘several of them much damaged from falling onboard each other’. With a very heavy swell constantly setting in, ‘all the men of war left one or two anchors behind them’. Bissell plotted the fort which *Daedalus* and *Fox* had battered to no avail earlier in the campaign. Annotations marked where General Baird’s troops encamped before beginning their march across the desert.⁶¹ Blankett was happy to depart, leaving further conduct of operations to the man sent to relieve him. He had declared himself ‘worn to the stumps’.⁶² He died onboard *Leopard* at sea on 14 July 1801.

All in all, six of the surveys from the Red Sea campaign which were published by Dalrymple in the East India Company series were attributed to Bissell. His hydrographic efforts during a testing campaign will have commended him to the Hydrographer: all his manuscript sheets carry information on longitude and the astronomical observations from which it was derived, variation, and tidal information. His journal, published by Dalrymple and financed by the East India Company, contained substantial comment on navigation in the sea that would have stood successors in good stead. Later in his career Bissell would be back on the East Indies station as flag captain to Thomas Troubridge in the elderly *Blenheim* (90). When they deployed, Dalrymple opined that ‘the public may reasonably expect much useful information’ from them, and noted that ‘The East India Company with their usual liberality presented Captain Bissell with a compleat copy of my Nautical Publications’. He kept in touch, sending out copies of newly published charts for both men ‘with my best wishes’.⁶³ This network of hydrographic interest was terminated tragically when the ill-found *Blenheim* was lost in the Indian Ocean in 1807 with all hands.

Home Riggs Popham in the Red Sea

The man who had been despatched to relieve Blankett was Commodore Home Riggs Popham. Connections with the East India Company, and logistic support to the British Army in the Low Countries in 1799, had earned him the particular patronage of Henry Dundas. In September 1800, arguing for the despatch of troops from the Cape of Good Hope to open a front in the Red Sea, Dundas persuaded Lord Spencer to appoint Popham, who ‘was fully in the knowledge (beyond what any official instructions can give) of the full extent of my ideas upon it’.⁶⁴ With the landing in Egypt complete, Popham would spend the next eighteen months pursuing a secondary task from Dundas and the Secret Committee of the East India Company of seeking to reopen commerce with the coastal Arab states.⁶⁵ He used this time to deploy another skill for which he had a justified reputation. He had acquired an interest in hydrography from early in his career and had taken every opportunity to gather data. He was now to make, on his own initiative, his most significant contribution in that field.

He would complain later that: ‘although the Admiralty were officially acquainted that I had completed charts of the Red Sea, they neither thanked me for my labours, nor had they

⁶⁰ TNA ADM 36/15376 Ship’s Book No. 5.

⁶¹ NMM DUC 253:4/9MS.

⁶² C. Lloyd, ed., *Keith Papers*, vol. II, 287.

⁶³ Bissell, *op. cit.*, Dalrymple’s introduction, xii; Cook, *Dalrymple*, 197 and 199.

⁶⁴ Richmond, ed., *Spencer Papers*, vol. IV, 129–30.

⁶⁵ Two comprehensive reports to Governor-General Wellesley are contained in his *Concise Statement of Facts, relative to [...] his command in the Red Sea, and his subsequent embassy to the states of Arabia*, published in London in 1805. A copy is at BL General Reference Collection 10815.c.2(2).

the curiosity to request a sight of them'. Since Dalrymple had the substantial body of information from Blankett's officers, which he would assess and publish in the course of the next four years, it is possible that he showed little interest in Popham's work. It was, however, significantly different from that of his precursors in the sea, which had largely been rapid sketch surveys of specific locations, made in the course of high-paced operations. Popham addressed a real need for safe navigation, namely a more accurate depiction of the whole sea area.

His awareness of this need was apparent in the preparations that he made before the deployment:

As I knew I was to traverse a tract of unexplored seas, I procured a Draughtsman in England at my own expense, and taught him, as well as numerous Quarter-deck, Hydrography and Practical Astronomy, which enabled me, with the assistance of eight chronometers, and some very expensive instruments, to form a chart of the Red Sea.⁶⁶

He claimed that his outlay on his survey outfit was upwards of £1,200.⁶⁷ He highlighted the efforts of his squadron, submitted in a large chart of the Red Sea, divided into a northern and southern sheet:

Having had the honor of commanding a Squadron of H.M. Ships in the Red Sea in the Years 1801–2 I very soon perceived that there was no accurate Chart of that dangerous and intricate Navigation, which induc'd me to avail myself of the situation I held to inform the present one.

I acknowledge with gratitude the zealous and liberal assistance I derived from every Officer on this station not only of His Majesty's Ships but those charter'd by the Hon'ble East India Company most of whom were in possession of Time pieces and many fully competent to superintend this task.

I had in the *Romney* Eight Chronometers made by different Artists principally by Arnold which were constantly used in small Vessels under the direction of such officers who had qualified themselves by unremitting attention to this Science since we left England.⁶⁸

He took justifiable pride in the proficiency of his officers, including the midshipmen, whom he had drilled throughout *Romney's* passage in observation for latitude by equal altitudes of a star crossing the meridian e.g. as they neared the Red Sea on 1 May 1801 his log records: 'latitude by *Antares 16° 46' N', with similar sights on succeeding days.

Popham made a close protégé responsible for the chronometers. David Bartholomew was a mariner from Scotland who had probably benefited from the mathematical education widely available in that country. When press-ganged his evident competence had earned rating as master's mate.⁶⁹ He had caught Popham's eye during amphibious operations in the Low Countries. His navigational accomplishments are made clear in a track chart which he

⁶⁶ Home Popham, *Concise Statement*, 19, 26–7.

⁶⁷ Popham, *A Damned Cunning Fellow*, 87.

⁶⁸ Memoir on the southern sheet of *A Chart of the Red Sea by Sir H. Popham K.M. F.R.S. 1802*.

⁶⁹ TNA ADM 9/3, 807.

prepared from his journal record of the voyage of the *Romney*, homeward bound with a convoy of East Indiamen from Bombay in the spring of 1803.⁷⁰ This shows comparisons of observations for variation with different compasses, and a regular observation of temperature. It also lists the sights that he took to compare with Home Popham's. He had clearly acquired a taste for surveying work as well as being anxious to please his captain. He was probably the author of remarks published in the *Naval Chronicle*'s 'Philosophical Papers' on the performance of the Arnold chronometers throughout the deployment.⁷¹

Popham's acquisition of these chronometers was remarkable at a time when, as Dalrymple lamented, there was very limited provision of time-keepers to the fleet. After the deployment Popham would be praised for the 'attention you have paid to the improvement of navigation by bringing into practice an additional mode of ascertaining the longitude'.⁷² It was an improvement that was crucial if the Admiralty's portfolio of charts was to support the ongoing operations in what was a world war. His survey campaign in the Red Sea would earn him a reputation as a pioneer in determining longitude by the 'meridional distance' method, requiring precise rating of chronometers i.e. the amount, if any, by which they ran fast or slow each day.⁷³ The procedure involved the observation of the difference between the local mean time of an event calculated from astronomical observations and the time shown by a chronometer at two successive locations. Hence the 'meridian distance' or 'difference of Longitude in Time' between the two places was obtained. For the method to give good results, especially over longer distances, the surveyor needed to amass a good number of high quality observations at his starting point, usually of the time at which a heavenly body crossed his meridian. This would normally be done by the method in which Popham had schooled his officers: 'equal altitudes', the measurement of the altitude of the body at a time some 3 to 5 hours before it reached its highest point and a record of the time at which it reached the same altitude afterwards. Half the time elapsed between the measurements added to the time of the first measurement gave the observed time of meridian passage. The observation would be made by as many people as possible, and the mean of their results would be accepted. Once corrected for the equation of time (in the case of solar observations), the result could be compared with the time given by the chronometers.⁷⁴

A much more testing observation involved the measurement of 'lunar distances' i.e. the angular measurement between a limb of the moon and another heavenly body. The necessary tables of the moon's motion and of the positions of the stars, together with the necessary trigonometric tables, were now available in *The Nautical Almanac and Tables Requisite*. Since the procedure required simultaneous measurement of the two bodies as well as the lunar distance, and careful recording of time with a pocket watch, teamwork was vital for good results. The subsequent complex computation demanded real mathematical competence, especially in spherical trigonometry, and mastery of the tables in order to apply corrections

⁷⁰ UKHO 945 on Hg. An annotation refers to 'a number of Astronomical Observations I made some years since', and the date of receipt in the Hydrographical Office suggests that the track chart was drawn up whilst between appointments in 1813.

⁷¹ *The Naval Chronicle*, Vol. 10 (1803), 202–4.

⁷² BL Add. MSS. 31168, 146.

⁷³ Bazley, A. G., 'An Early Hydrographic Surveyor', *Empire Survey Review*, No. 58 (Oct. 1945), Vol. VIII, 154.

⁷⁴ A concise explanation of the procedure can be found in W. J. H. Andrewes, 'Finding Local Time at Sea, and the Instruments employed' in the collection of essays edited by him, *The Quest for Longitude*, Harvard (1993), 396–7.

for atmospheric refraction, lunar parallax and semi-diameter, and to interpolate the given values.⁷⁵ Even then, owing to imprecision in the astronomers' predictions of the lunar orbit in that era, the inaccuracy of the lunar tables often exceeded the errors in observation.

The memoirs on Popham's charts provide detail of these measurements for control of his survey. He declares that he 'took great pains' to ascertain the longitude of the ports of Kosseir, Jeddah and Mocha, 'and particularly the latter as a basis for all ships to carry on their difference of longitude by chronometer to any shoals they might make on their passage up the sea'. The longitude for Jeddah was determined by the meridional distance method using the well-regulated chronometers in the ships, setting out from Mocha and Kosseir where longitude had been established 'by the mean of many lunar observations and the eclipses of Jupiter's satellites taken at Kosseir'. Popham would become a vigorous proponent of the observation of Jupiter's satellites for determining absolute longitude, whereas others, less confident of such measurements in the field, continued to prefer observation of equal altitudes. Mr James Downie, the master in *Romney*, was left at Mocha as harbour master for most of the deployment. He had the benefit of a Scottish mathematical education, and throughout his subsequent career rendered surveys in which longitudes were established 'by chronometer'. A priority task for him will have been to build up a body of observations. With the rates of their chronometers determined more precisely during their stay in Mocha or Kosseir, Popham's ships would produce better results when sketching in the coast by running survey. A comparison of positions for Kosseir, Jeddah and Mocha on today's charts and on those of Popham and Rosily show similar, variable errors, reflecting the technology of the day.

At first sight, Popham's sheets appear sparse compared with contemporary compilations, such as de la Rochette's 1781 chart published by Faden. King George III's map collection includes an edition of Rosily's *Carte Générale* published in 1800, but it may have been acquired later. The French government was highly likely to limit the distribution of the chart to the Marine Nationale, and neither Dalrymple nor Popham give any indication of awareness of Rosily's detailed compilation sheets.⁷⁶ There was a significant difference between the two contemporary productions. Rosily included detail from other charts, including two East India Company plans of Tor. Popham's sheets set out to show only what his squadron actually observed, together with comment where they did not find features shown on 'the old charts'. The limitations of the work are clearly and honestly described. All in all, the published chart is a compendium of the sketches and remarks obtained by the squadron. The sailing directions that Popham has distributed across the two sheets, placing them adjacent to the relevant coast, are complemented by views. These may well have been made by Bartholomew, who included one showing the great peaks of the Old Testament in a fine set which is preserved in the National Maritime Museum.⁷⁷

⁷⁵ The late Derek Howse provided easily assimilated descriptions of this method in 'The Lunar Distance Method of Measuring Longitude' in Andrewes (ed.) *op. cit.*, pp. 150–61, and in the Appendices to his own *Greenwich Time and the Discovery of Longitude*, Oxford (1980), pp. 192–8.

⁷⁶ BL Maps K.MAR.VI, 1-17 contains Popham's charts (16I and II) alongside those of de la Rochette (14/2) and Rosily (15I-III and 17). Popham's two sheets are also held in the Bodleian Library at (E)D2:6(1).

⁷⁷ NMM 912.43(267.5):094 BAR B8409.



Figure 7: David Bartholomew's view of Mounts Sinai and Horeb from off Ras Jihan (NMM 912.43(267.5):094 BAR B8409).

Popham was rigorous in checking information from the charts held onboard. A note on his chart explains his reasoning for discounting the existence of a bank (marked A in figure 8) which the old charts placed in what is now known to be a deep trough running down the centre of the Red Sea. A separate note remarks that the Musmara (Shi'b Mismārī), marked B, 'was supposed to be a sand island and rendezvous for the Pilots, but I found it to be a small shoal and took much pains to ascertain its true situation'. The dangerous reef is nowadays marked by a light. Two officers had been sent away in a cutter to survey it.⁷⁸



Figure 8: reefs off Jeddah (UKHO u7/2 on Cu).

One of the officers sent to the Musmara may well have been Lieutenant Francis Mason. He was frequently chosen by Popham for similar tasks. On 19 May 1802 he was sent away with Mr James Crawford, who had joined *Romney* as master, on survey work in the schooners *Fury* and *Wasp*. The two sloops returned during 9–10 June. They were amongst the 'small Cruisers' sent for the 'express purpose' of examining the coast, and their delineation work, together with observations from 'ships having good chronometers' was laid down as a firm line on the charts. A note adjacent to the long inlet of Sharm Abhur, north of Jeddah, reflects this task:

From the report of an Officer of the *Romney* the suppos'd River Charles is only an Inlet, the Entrance full of large rocks, and the channels scarce wide enough for the Arab Dows to pass.

⁷⁸ TNA ADM 51/4493, No. 5, *Romney*, entry for 25 Feb. 1802.

The brig *Expedition* traced much of the coast from Mocha to beyond Camfidia (Al Qunfudhah), but her results were spoiled when the time-keeper onboard stopped. The *Duchess of York*, a schooner which had been built and purchased in 1801 for the squadron in the Red Sea, was deployed south of Mocha, with two time-keepers to check results obtained during *Romney*'s passages and to confirm the longitude of Cape Israel and Perim.

Popham made use of all the talent in his squadron. Thomas Curtis was master in *Wilhelmina* (32) which had been fitted out as a troopship. He had been press-ganged in 1793 at the age of 19. He was a good catch since, as he recorded in later statements of service, he had been 'carefully brought and trained to the art of navigating a ship from my infancy, by my father, an experienced Ship Master from the port of Lynn in Norfolk'. His competence was soon noted, and in 1796 he was given his first local warrant as acting master in the squadron which defeated the Dutch at the Cape of Good Hope. In the brig *Hope* he observed, and may have assisted in, surveys along the South African coast. He would prove himself a most competent surveyor throughout his career. His alertness is commemorated on Popham's southern sheet, which shows Wilhelmina Rock (Three Foot Rock on modern charts) northeast of the Haycock Islands. Curtis rendered five fair sheets to the Hydrographical Office from the Red Sea, including surveys of Tor Harbour and the Road of Suez. The other three sheets related to the task for which he would claim that he 'was preferred by Sir Home Popham [...] to any other officer on that station', namely the survey of the Strait of Jubal, 'one of the most difficult navigation in the Red Sea, at the entrance of the Sea of Suez'.⁷⁹ Their titles indicate that he surveyed the 'dangerous reefs' on either hand and that he examined the vicinity of 'Fair Island' (Jazīrat Qaysūm al Janūbiyah). On his chart Popham labelled the deep water between Fair Island and Tawila Island as 'Fair Haven', perhaps a good anchorage in which to wait for daylight before beating up into the Gulf of Suez. The note on figure 9 indicates that Curtis may have conducted the work from a country ship whose officers had some experience in this part of the sea.



Figure 9: survey work in the Strait of Jubal (UKHO u7/2 on Cu).

⁷⁹ TNA ADM 6/141, 42; the fair sheets, listed in the Hydrographical Office as 904-7 and 9, were all destroyed during the nineteenth century.

The log of *Romney* for 15 March 1802 provides a graphic description of Popham feeling his way into the Strait of Jubal along the track shown in figure 9, noting the bearings of shoals, rocks and breakers, whilst the carpenter was busy making a replacement after the mizen topsail yard carried away.⁸⁰ The ship was tacked towards Jubal, and at sunset the captain recorded the sighting of a large sandy key in the Shadwan Channel. The topsail was reefed in, the ship tacked again and a series of soundings were taken as the ship ran along the east coast of Jubal until a sample of sand and shell indicated good overnight anchorage in a depth of 11 fathoms ‘offshore about $\frac{1}{3}$ mile’. At five in the morning they weighed and sailed for Tor, observing regular bearings of the extremities of the islands and of Ras Mohamed in the routine of a running survey.

Romney’s tracks throughout her deployments into the sea are shown on Popham’s two charts. He comments in his memoir that ‘particularly to the northward’ of Jeddah, ‘she travers’d the shoals sufficiently near to ascertain their situation’. He discounted one shoal which he was convinced ‘was only a collection of reddish spawn or blubber which floats on the surface and resembles a shoal so much that I have more than once sent a boat to examine it’. He approached the chain of islets and reefs off Hanak that are now being developed into exclusive resorts, noting that there appeared to be anchorage within them but ‘as it was near sunset before I got close in I could not explore further and was obliged to stand off for fear of any other shoal which might lie without us’. Modern charts show only two narrow entrances and the warning within of ‘numerous coral heads’. His caution was merited, for Wellsted noted from his long experience on the coast that there was never a heavy surf on the reefs and thus no warning for the mariner, especially at night.⁸¹ Two surviving sounding collector sheets allow an assessment of Popham’s technique for laying down offshore features.⁸²



Figure 10: the shoal on the edge of the Dahlak Bank (UKHO u7/1 on Cu).

⁸⁰ TNA ADM 51/4493, No. 5.

⁸¹ RGS JMS/0/1, 69–70.

⁸² UKHO B918 and 919 in Red Sea Folio 1. These are office copies of Popham’s original manuscripts.

Like Bissell before him, he was attempting to delineate the edge of the great Dahlak Bank which extends from the coast of present day Sudan. He has anchored on a bank which he sounds thoroughly by boat, starting from the ship, and establishing a least depth of $3\frac{1}{4}$ fathoms. Working from his observed position at the anchorage he then took the ship in a pattern of tracks, with regular soundings, to follow the bank to the northwards. There are patches with similar depths on the edge of the bank, which does trend to the WNW as Popham indicates in the soundings and contour which he has transferred to his chart. But there is a major error in the longitude which he records for his anchorage, leading him to displace the shoal and edge of the bank some 30 nautical miles too far east and too close to the westward of Gebel Tor (Jazīrat aṭ Ṭā'ir). He does not appear to have sighted any of the low-lying islets on the Dahlak Bank. Bissell's plot does indicate awareness of those islets and he appears to have made a careful measurement between the edge of the Dahlak Bank and the same shoal depicted by Popham. He clearly indicates deep water in between, with a sounding of 40 fathoms. He too shows the shoal to the west of Gebel Tor in what is now shown to be deep water. The tracks shown on Popham's small-scale chart (figure 10) indicate that his investigation may have taken place on a passage between Mocha and Kosseir with a call at Jeddah, and possibly before the positions for these places had been refined. His final positions for Mocha and Jeddah place them five minutes of longitude too far east, whilst that for Kosseir is five minutes of longitude too far west. The efforts of the two practitioners indicate the challenge of offshore survey even for those who had equipped themselves most carefully.

Popham was well aware that much more needed to be done, especially along the west coast of the sea, and in his reports to the Governor General he urged the East India Company to construct and maintain on station 'two ships of easy draft of water', adding that 'it would be an advantage if the officers in the ships were acquainted with Marine Surveying'.⁸³ He rendered two sheets to the Hydrographical Office from the west coast, which appear to have arisen from a transit of *Duchess of York* amongst the reefs between Ras Abu Shagrab and Ras Qubbat'isa which is shown on the small scale chart.

Popham includes seven plans on his sheets, all with accompanying sailing directions: of Suez and Tor Harbours, the Straits of Jubal, the roadsteads of Jeddah and Mocha, the Narrow Strait of Bab el Mandel, and Back Bay, Aden. He had sent an officer to survey the latter anchorage, which he had urged the Governor-General to obtain as a naval station with far more potential than Mocha.⁸⁴ Insights into the techniques used by him and his officers for such larger scale work can be deduced from copies of two of his original manuscripts which have been preserved in the archive of the Hydrographic Office.⁸⁵ These depict the narrow southwestern entrance to Kamerān Bay (Madīq Kamerān) north of Hudaydah, and the harbour on the east coast of Kamerān Island. He has controlled his survey of the entrance by laying down the coasts by compass bearings from two ship stations. He has delineated the shoals on either hand and laid down courses and headmarks for safe passage. Modern charts show that the bar has shoaled in the intervening centuries.

⁸³ Home Popham, *op. cit.*, 85-6.

⁸⁴ *ibid.*, 166-73.

⁸⁵ UKHO B 923 and 924 in Red Sea Folio 1.

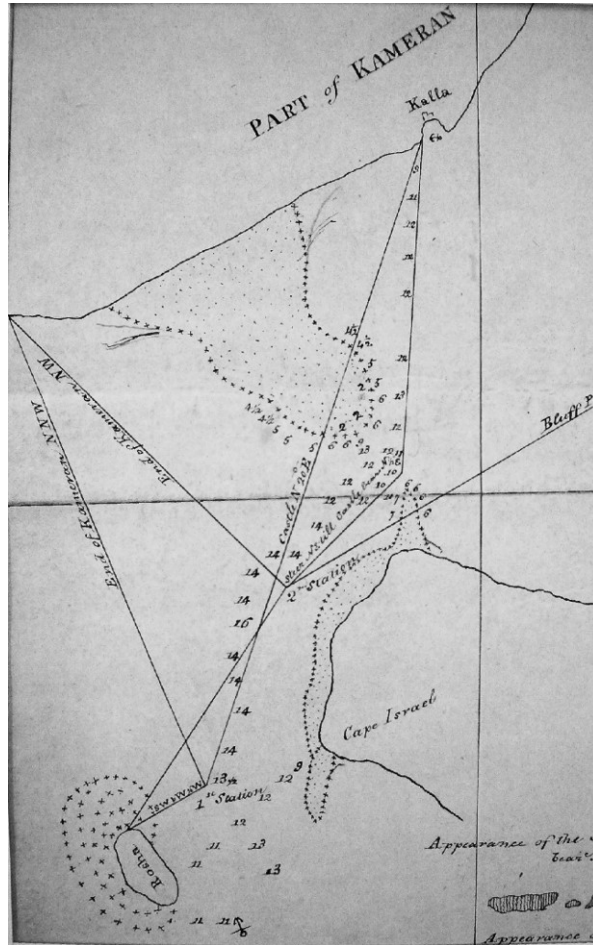


Figure 11: Popham’s survey of the narrow entrance to Kameran Bay (UKHO B923 in Red Sea Folio 1).

In the harbour *Romney* was moored with an anchor each way and a pattern of boat soundings was run to prove the absence of any dangers. Soundings compare well with modern charts. All essential information is recorded along the shore. He shows the watering place ‘containing above twenty wells of good water’. However, the nearby creek north of the town (which he calls Kalla) is ‘not deep enough for boats to go up’. The boat landing place is below the ruins of a mosque on the edge of the sandy desert. On the southern shore is a fort, the ruins of which are marked on the modern chart. He has transferred representative soundings in the entrance to his small scale chart, but with no labels other than ‘Cape Israel’, the peninsula now called Al Jazirah. Kameran was clearly judged of less value than other anchorages depicted in the bays to north and south.

The original manuscript sheets of the chart, or copies of them, were received in the Hydrographical Office, and are still there. They may have been deposited during Popham’s time on a chart advisory committee at the tail end of Dalrymple’s incumbency.⁸⁶ By this time Popham had had the two sheets of his Red Sea chart engraved at his own expense. They were published by Faden in 1804 as *A New Chart of the Red Sea* with a prominent dedication to Governor General Wellesley, to whom Popham had promised copies of the chart. The title of

⁸⁶ UKHO u7 on Cu.

the chart also expressed appreciation of the assistance of the company ships.⁸⁷ Four days after their publication, Popham wrote to the Secretary to a new Admiralty Board, headed by his old patron Dundas, now Lord Melville, asking him to show them the copies and commenting that ‘for the want of such a chart vessels to the amount of near three hundred thousand pounds were lost in the late expedition to Egypt.’ He drew attention to his clear explanation of the ‘principles on which the chart has been formed’ and he trusted that ‘they will be deemed sufficiently just by their Lordships’ and, if emulated, ‘prevent the recurrence of similar calamities by common attention to the general feature of the chart and the limits of safe navigation which is therein laid down’. The Board directed that the copies be sent to the Hydrographical Office.⁸⁸ The plates were subsequently purchased and Popham’s sheets appeared as an Admiralty chart which remained in the catalogues up to 1832.

Arguably the most important longer term result of Popham’s Red Sea deployment was the encouragement of hydrographic interest and practice in the Royal Navy. Francis Mason was promoted commander during the deployment and on return to England was given command of *Rattler* (16) with his old companion on the survey ground, James Crawford, as master. They baptised a number of young men in pathfinding observations in the complex waters off the coast of Flanders. Mason deployed the same skills in command of *Daphne* (22), back with Home Popham in 1806 during the expedition to the River Plate. In 1809 he commanded *Fisgard* during the Scheldt campaign, during which he drew the Hydrographer’s attention to the skill of the master, George Thomas.⁸⁹ Thomas was appointed as an Admiralty Surveyor, and became one of the most prominent Royal Naval hydrographic practitioners of the nineteenth century.

James Downie was rewarded for his efforts at Mocha by joining Admiral Rainier’s flagship *Trident* (64), where he earned Thomas Surridge’s respect and rendered surveys that were published by Dalrymple. He ended his career in command of the storeship *Coromandel*, taking her to Brazil and New Zealand in search for spars and ship timber and rendering surveys. His ship gave its name to the Coromandel coast. Thomas Curtis also remained on the East Indies station in the early years of the Napoleonic War. He emulated Popham: ‘I have provided myself with many useful and expensive instruments for the purpose of navigating a ship, such as a chronometer, artificial horizon, sextants etc.’. They had cost him more than £150.⁹⁰ In due course the Hydrographer noted the evidence of superior skills in the surveys that he continued to render. Appointed as an Admiralty Surveyor, he had a short command of a survey ship in the North Sea. Another Admiralty Surveyor would be David Bartholomew, now a post captain and veteran of Popham’s South American expedition, the Peninsular campaign and the war of 1812 with the USA. He lost no opportunity to pay tribute to what he had learned from Popham, and in *Leven* he followed his old mentor’s example and fostered a school of assistants, such as Alexander Vidal and William Mudge, who would go on to distinguish themselves in turn in the nineteenth-century RN Surveying Service.

⁸⁷ Copies are at the Bodleian Library (E)D2:6(1), RGS mr 14.c.78, no. 43, and NHB/AL Vz 7/45-6. They can be viewed on-line on by searching the website of the National Library of Israel at <https://www.nli.org.il/he/maps>.

⁸⁸ TNA ADM 1/2327, P188.

⁸⁹ TNA ADM 9/2, 348.

⁹⁰ TNA ADM 6/141, 42, letter dated 12 Jul. 1811.

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