

ADMIRAL DENHAM AND THE APPROACHES TO THE PORT OF LIVERPOOL

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Read 17 April, 1952

HENRY MANGLES DENHAM volunteered for the Royal Navy in April 1809, and during the last five years of the Napoleonic Wars served in ships of the line, first as volunteer and then as midshipman. From 1814 to 1817, under the command of Captain Martin White, his former commander, he helped to survey the Channel Islands, and in the 'twenties, in the more responsible capacity of lieutenant, he engaged in survey work in the English and Irish Channels and off the south-west and north-east coasts of Ireland. In 1827 Denham was given command of the *Linnet*, a 10-gun ship, and instructed to survey first the Bristol Channel and then the Port of Liverpool. The approaches to this Port had long been giving anxiety to far-sighted men, and it was Denham's work during the 'thirties and 'forties which made Liverpool the great terminal port which the rapidly swelling trade of industrial England so urgently required.

During the immediate post-war years Liverpool Docks were the property of the Dock Trustees, a permanent committee of the Liverpool Corporation, not yet possessed of any great degree of autonomy although separately named as the trustees of the Liverpool Docks in statutory documents. In 1825 an act of Parliament limited the Corporation's powers of annulment, and gave representation to those who paid dock rates by permitting them to elect eight of the twenty-one Dock Trustees. Liverpool's trade was increasing fast. The town dues, which in 1704 had produced a mere £255, in 1829 produced £22,000; regular steam packet services were sailing to and from the port, and over 11,000 vessels used the Mersey each year. But the deterioration of the Formby and Rock Channels, the two principal approach channels to the port, was causing anxiety. With the terrifying example of a destroyed navigation and a dead port on the other side of the Wirral, the Dock Trustees realised the seriousness of the movement of the sandbanks in Liverpool bay, and were logical and responsible enough to know that it was useless planning dock extensions for Liverpool's growing trade if the approach channels were silting up. Already, in 1822, three eminent engineers, Whidley, Chapman and Rennie, had reported to the Trustees that the secret of good approaches lay in the upper estuary, which, acting as a storage bottle, forced the ebb tide through the narrow neck of the river to scour the outer channels. On 1 April 1829 the City Council

resolved that they were strongly of the opinion that the conservancy of the River Mersey should be vested in some body or person. The Admiralty was approached, and Denham in 1833 was ordered to go from his survey of the Bristol Channel to the Mersey. The position had become so acute that the port was effectively "shut up for four hours out of every twelve", but within six months Denham's survey, to use his own words, "set every speculation or doubt at rest". He had discovered the New Channel.

In a great tidal delta such as the outer estuary of the Mersey and Dee, there is a constant relationship between the heights of the banks and the course and the depth of the channels. As the sandbanks such as East Hoyle, Great Burbo and the Taylor Banks increased, the inshore channels, Formby and Rock, deteriorated. Yet Denham knew that the tidal stream had to find its exit somewhere, and the result was his finding the New Channel, afterwards in 1846 to evolve into the Victoria Channel, and later when that channel deteriorated, to merge into the Queen's Channel, the present entrance to the Port. There was, however, a tendency for a Bar to form at the seaward entrance to this Channel. To avert this calamity Denham suggested using a steamer to tow "a flexible harrow made of lengths of old chain cable spiked at intervals and spread on a beam of African oak". The experiment was tried and was the only mechanical means of dredging used in the estuary until 1890, when A. G. Lyster's scheme for dredging the Bar began. Denham was therefore the forerunner of those men who have since trained the fierce tidal Mersey stream to do their bidding.

Denham's survey was the sixth which had been made of the approaches to the Port of Liverpool. Those preceding his were made by Grenville Collins in 1689, Lt. Thomas Evans in 1813, Captain George Thomas in 1813, Francis Giles in 1820, and Alexander Nimmo in 1832. Collins' survey, part of the survey of the coasts of the United Kingdom undertaken on royal command, was the child of Charles II's interest in navigation. Unfortunately Pepys's *Naval Minutes* reveal that Collins was not promptly paid (if at all) for his labours. Pepys had doubts whether one man alone should have been entrusted with the business, as there had been many criticisms by Trinity House, although the work had been dedicated to it as well as to the King. It is of interest to read Collins' *Sailing Directions*.

"Being on the back of the Hoyleland, bring the Mill and the wood one on the other and run in keeping close along Hoyleland and so into Highlake and anchor.

"Here the great ships that belong to Liverpool put out part of their loading till the ships are light enough to sail over the Flats to Liverpool.

"There is a channel near Formby to go into Liverpool where is 3 fathoms at low water . . . but this place is not buoyed or beaconed and so not known.

"The ships lie aground before the Town of Liverpool, bad riding by reason of the strong tides. Therefore ships ride up at the Sloyne where is less tide."

It was much this world into which Denham came.

In November 1833 the court of inquiry of the Municipal Commissioners into the state of the Corporation of Liverpool, an inquiry which covered among many topics the surveying of the estuary, brought Lieutenant Evans' survey into prominence. Some months earlier Askew, the harbour master, a gentleman who seemed to have his hand in a great deal of private business, had been accused of inefficiency by the pilots and masters of packet boats. Accordingly in 1832 a sub-committee had called on Lieutenant Evans, whose survey was in general use at that time, to give assistance. This greatly offended the harbour master, whose evidence at the court of inquiry of the Municipal Commissioners disputed in the strongest terms the accuracy of Evans' work. The scene laid for the future labours of Denham was already a stormy one, rife with conflicting personalities and differences of strong-minded men. The sub-committee in fact "had the mortification to find, in general, a great unwillingness on the part of the Harbour Master, to accede to any opinions of Lieutenant Evans". That officer was soon to find a stronger challenge.

On 18 August 1833, Denham, presumably with the concurrence of the Lords Commissioners, presented his chart to the Dock Trustees and attended upon them to explain his ideas. His active, probing intelligence made an immediate impression. In October the Trustees upheld his complaint that the lighthouse keepers at the Rock Lighthouse had wantonly neglected to keep accurate tide gauge records, records which Denham showed were of paramount importance to shipmasters and pilots. During the winter months Denham and the Trustees worked harmoniously together, and on 24 June the Trustees formally resolved to convey to the Admiralty their appreciation of the valuable services rendered to the Port of Liverpool by Lieutenant Denham. On 2 July the chairman wrote to the Lords Commissioners of the Admiralty praising Denham's work "in perfecting so excellent a chart" of the port's approaches, and the next day the Liverpool town council bestowed on Denham the freedom of the borough. The mayor, John Wright, wrote, "I have great pleasure in acquainting you that the Common Council were pleased at their meeting yesterday unanimously to present the Freedom of this Borough to you, in testimony of the high sense entertained by the Council of the valuable services rendered by you to the Port of Liverpool by your gratuitous but most important assistance rendered to the Survey of the Entrance to the Harbour."

On 21 October 1834 sounded the first discordant note. The Dock Trustees recorded this minute. "Rumours having been very industriously circulated tending to invalidate the correctness of the surveys of the channels leading into this Port recently made by Lieutenant Denham, the Dock Committee directed a particular inspection of them with a view of ascertaining their accuracy. For this purpose a steam boat was placed at their disposal. Lieutenant Denham laid before them a Chart challenging the strictest investi-

gation. With the exception of one or two persons all were highly gratified and expressed themselves fully satisfied of the accuracy of the Chart which bore evident marks of the labour, scientific ability and attention of Lieutenant Denham. So perfect is this Chart that the rumours are completely refuted. The Committee have now only to congratulate the shipping interests of the Port on possessing a chart of the entrances which can be relied on with perfect confidence." This high praise was followed up by a letter to the Admiralty from the succeeding mayor on 5 March 1835, asking to be favoured with a copy of the chart in order "to preserve it with other muniments of this Corporation". Whether spurred by these encomiums or not, the Admiralty on 20 March 1835 paid its own tribute to Denham. The Lords Commissioners "appreciating highly the talent which you have displayed and having a high sense also of the advantage accruing to the Public from the completion of the survey . . . have been pleased as an especial mark of their approbation to sign a Commission promoting you to the rank of Commander".

In 1835 it became apparent to the Dock Trustees that some re-organisation of duties was necessary amongst their nautical officials, and they came to the conclusion that the work of the harbour master should be divided, and a new appointment made of an expert officer to watch the channels and conservancy of the port. The minutes do not reveal exactly how the matter was broached to Denham and to the Lords Commissioners, surely a difficult undertaking, but on 10 March 1835, the Trustees passed this Resolution:—"That it is the unanimous opinion of this Committee an Officer to "be named the Marine Surveyor of this Port should be appointed " . . . and . . . that in the event of Lt. Denham accepting the office "abovementioned he be paid a Salary of £700 per annum."

Denham accepted the office on 17 March and the great tradition of marine surveyors of the Mersey began. His employers were at first willing that others should have the benefit of his services and in the autumn of 1835 he was given leave to survey Douglas Bay. At the commencement of 1836, however, a request from the Duke of Bridgewater's Trustees for Denham to survey on their behalf was refused.

During the next eighteen months the minutes make many references to Denham's unceasing activity. There were constant movements of buoys and reports were made on every phase of the work and organisation of his department. But on 15 June 1837, came the first hint of tension with criticism of his hiring a tender, as the Trustees deemed it, unnecessarily. Also about this time Denham protested unsuccessfully against a decision of the Trustees to reduce the crew of the tender *Liver*. This was followed by an inquiry into the reasons concerning his dismissal of his clerk, George Warner, and the recording of his vivid protest at the reduction of the crew of his department's cutter. The history of the George Warner episode has not been recorded, but one may well

imagine the conflicts with dissident Trustees, who were eager to find causes of offence.

There may well have been some deeper tension. As we have seen, the Dock Trustees in 1829 had adopted the idea of the conservancy of the river being vested in some one body or person,⁽¹⁾ and but for the death of the local Member of Parliament, William Huskisson, at the opening of the Liverpool and Manchester Railway, a bill to this end would probably have been promoted. There seems, however, to have been some distrust of this plan for, in a publication which appeared in 1856 over the name of Harriet Martineau, putting forward the case for the creation of a Dock Trust, there is the following statement. "Up to 1840, the Corporation "had managed the Mersey as they had managed the town; and "how long they might have been left to their own devices, but for "the intervention of a scientific observer there is no saying. At "the meeting of the British Association in 1837 Captain Denham "read a paper which exhibited the danger of the estuary being "closed from the sea by the deposit made by every tide." Miss Martineau claims that this paper was one of the prime agents leading to the setting up of the Mersey Conservancy Commissioners by the act of 1842. These Commissioners, whose powers are now vested in the Minister of Transport, had certain jurisdiction over works constructed below high water mark of a 31-foot tide. It may well be that powerful public men amongst the Dock Trustees resented the intrusion of a "scientific observer" in public affairs. There seems no doubt that the Corporation had originally intended that they should be the Commission of Conservancy for a letter of 11 May 1830, written by Huskisson shortly before his death, stated that, ". . . the Attorney General . . . is decidedly of opinion "that without an Act of the Legislature the Corporation or any part "of it could not be invested with the powers of such a Commission ". . . I remain of the opinion . . . that everything which tends to "obstruct the course of the Tidal Waters of the Mersey ought to be "guarded against . . . and that this duty cannot so properly be "committed to any other Body as to the Corporation of Liverpool."

Possibly the intervention of Denham may have complicated at a later date the long term plans of his employers to be complete controllers of the Mersey Estuary, a matter of very real import at a time when the plans of Liverpool's rival on the Cheshire side for the development of its recently purchased land were being discussed. Furthermore, discussions had already taken place on Denham's project for the continuation of the river wall on the Liverpool side and its effect on the conservancy of the river, and technical opinion was not unanimous. In fact a sub-committee on this question of conservancy had reported on 9 December 1836

⁽¹⁾ The attention of the Corporation seems first to have been directed to this question of a separate conservancy authority in 1755, and again in 1758, when Captain W. Hutchinson urged the Corporation to acquire such powers to preserve the navigation, and to ensure the laying and breeding of oysters.

to the effect that James Walker, civil engineer, treated the "wall proposed by Capt. Denham as a measure which ought to be avoided". This wall was the subject of Denham's Report of 27 September 1836, and was in effect an extension of the Otterspool embankment northwards until it joined up with the wall there erected by the Harrington Dock Company, whose property was later acquired by the Dock Trustees in 1844.⁽²⁾ The sub-committee's report however stressed that Walker's opinion in most respects coincided with that of Denham. The real point at issue was that although the bill proposed that the powers of the conservancy of the river, vested in the King as the conservator of all navigable rivers, should be exercised by commissioners, these commissioners were to be appointed by the Corporation and by the Dock Trustees; that is that they should be a domestic tribunal. This the eventual negotiators were careful to avoid, for the bill as finally passed into law in 1842 provided for the appointment of three commissioners, namely, the First Commissioner for executing the office of Lord High Admiral of the United Kingdom, the Chancellor of the Duchy of Lancaster and the Chief Commissioner of Woods and Forests. The powers exercised by these commissioners passed to the Minister of Transport in 1919. They have always been exercised through an acting conservator, by tradition a retired hydrographer of the Royal Navy, and it is a matter for some surprise that Denham never succeeded to it, but perhaps subsequent events would in any event have rendered this impolitic. In the main the powers have resolved themselves into control over working in tidal waters, and thus serve to prevent encroachment upon the storage capacity of the upper estuary, which as we realised earlier is vital for good approach channels.

During June 1838 Denham reported very extensively on the progressive alterations in the New Channel since his general survey of 1834. He stressed that 12,000 vessels passed through the channel every year, two-thirds of them during the tidal period of each day, and that the "Rock and Formby Channels are closed against intercourse with the Port". He spoke of changes having become very sensible during the last nine months, and so sudden within the last three months as seriously to indicate that a simultaneous eruption had and was taking place in the twelve square mile region, comprising the Formby, Burbo, and Jordan Flats. The surveying of these changes he stated "involves considerations which will not allow the Marine Surveyor to hesitate apprising the Committee that they cannot be done prompt justice to, if subjected to the dilatory, and he really believes impracticable process of uniform accuracy by sailing or boat means of obtaining data". In more direct language

⁽²⁾ The line of this contemplated wall upon which the Dingle Jetty was built some thirty years ago is still known as the Denham line, and was continued to form a building line to the south twenty-five years ago when the Otterspool project was under consideration. It is now known as the Mostyn Field line, that being the name of the then acting conservator.

Denham wanted a steam vessel, and the custodians of public money were not prepared to give him one. A small steam vessel of 12 h.p. and 17 tons burden called *Cupid* was offered to them for £200, but they still refused. This seems to have been the focal point of the difficulties which ensued and which ultimately led to Denham's separation from the Dock Trust.

It was upon the absence of a steamer under his constant control that Denham blamed the chain of casualties which occurred during the great gale of January 1839. In words as vivid as any used by Pepys, Denham has recorded that at daybreak on 7 January "the first effects of the tempest discoverable was the Cutter buoy tender's loss of rudder, in the Brunswick Basin, the gates of which could not be closed", owing it seems to a sunken flat. Wishing to attain a central point of control and finding the semaphore signal system broken down, he climbed to the roof of the custom house "and from thence measured pretty well the devastation going on and to be anticipated". He dispatched the master of the Formby duplicate vessel to Crosby in a coach to trace the existence or not of that Lightvessel. He found his staff too few for such an emergency, but hired certain seamen to serve on the duplicate vessels for North West and Formby. Then he went to the Steam Tug Office to engage their tugs before any other parties hired them. Difficulties arose over indemnity, and in the meantime Leathom, the chairman of the Dock Committee, forbade Denham to hire steamers, as he intended, upon any terms.

The North-West Lightship was then seen to be coming up the Rock, parted from her moorings. Hard on this bad news came word that the tug owners would only loan a ship on a Dock Trustees' guarantee of 10,000 guineas. "I here found myself not admitted as the contracting party and felt the force of a verbal interdiction within that hour." Worse was to come. At 3 p.m. Denham saw the Magazine lifeboat trying to get round the Rock but drifting to the north-east, but "it was a mitigation of unspeakable anxiety under our utter helplessness of position" to discern the lights of the Formby lightship at 8.30 p.m. The following morning the Formby ship was back on station, and the most urgent tasks were the replacing of the North-West ship, the re-erecting of landmarks, the preparation ashore of duplicates of buoys and the directing of the lifeboats. Denham himself prepared to take the *Shamrock* of the Dublin Company with twelve hired men to tow out the North-West ship. At 1.30 "my promiscuously collected crew said they were not prepared for that night—no grub. I saw the drift and preferred sending for provisions to letting them go. At 2 p.m. we floated and fairly started—heavy squalls with snow and hail". But the Master of the *Shamrock*, although he "participated in all my fevered arguments", delayed the dangerous enterprise again. His responsibility was to his owners, "mine the pressing exigency of the Port, the key of which was in my command, without means of turning it but hampered with that annihilation to

energy and enterprise, caution. That was certainly the darkest night of my professional career". At length Denham got away at midnight and moored the lightship by 5.30 p.m. on the 9th. On the 10th he went out again, the offer of a second steamer having been declined by his chairman, and finally secured the North-West ship. Next day certain buoys were replaced but after that the *Shamrock's* owners would not continue her hire. On Saturday, 12 January, he was unable to get afloat at all and had to rest content.

In his report to the Dock Trustees about this week of storms, Denham delivered his ultimatum. "The previous two months have been mortifying enough, kicking about in chance steamers, one of which sank under our feet at the only spot which can save the Port of Liverpool from being pronounced a bar harbour at half tide next June. The weekly applications to be allowed to proceed in this rigorous season were as replete with cold receptions and reasonings as they ought to have been with cheering on. . . . The vital exigencies of the Port have been this awful week the sport of chance and official helplessness. . . . In a word then, if the local revenue of the Port cannot afford better means I or any person of my pretensions would be robbing it as well as destroying himself morally and physically by remaining." He ended his report by stating that the rejection of any of his conditions "will be tantamount to a forthwith acceptance of my resignation of office and the instant dissolution of all reserve on the part of, Gentlemen, Your very obedient servant, H. M. Denham". A truly Micawberish flourish in that ending! These were strong terms, and the Dock Committee was equally definite in dealing with the matter, for on 24 January 1839, "it was Resolved, unanimously, that Captain Denham be apprised that this Committee dispense with his further services". It is of interest to note that his successor was appointed at but £400 per annum, a significant indication of the influence of personality and genius on position.

A sub-committee was appointed to investigate the circumstances in which the North-West lightship had broken from her moorings, and the charges which had been made against the Lifeboat crews. Circumstantive accounts were given by the crew of the lightship that cables had broken, and subsequently recovered portions indicated that this was indeed the fact. They had certainly not abandoned station. The Master considered that "he and his crew did their utmost: does not know that he ever experienced such a gale". As concerns the Magazine lifeboat it appears that "no reluctance whatever was evinced by the men but, on the contrary, the greatest willingness". One witness declared he never saw men behave better. With regard to the Formby lifeboat, however, there seems to have been some hesitation, and the sub-committee found some difficulty in coming to a correct conclusion, realising that a serious accident had occurred in this vicinity some three years before. It concluded its report that if "some attempt had been made on the Tuesday afternoon or on the Wednesday such an

attempt—even if unsuccessful—would have been more creditable to the Lifeboat's crew, and more congenial to the feelings of your Sub-Committee". But the whole story is of a tempest of almost unparalleled ferocity and duration.

Denham was not long without compensation. He was almost contemporaneously elected a Fellow of the Royal Society and signed the Charter book on 28 February 1839. Doubtless he busied himself collecting together his papers relating to the surveys of the Mersey and Dee and kindred subjects of interest to the navigator, for these were published in 1840 by J. & J. Mawdsley of Liverpool, under sanction of the Admiralty. The full title was *Sailing Directions from Point Lynas to Liverpool with Charts, Coast views, River Sections, Tidal Courses and Tide Gauge Table for navigating the Dee and Mersey*. It may well be that time healed the breach between Denham and the members of the Dock Committee, or that in some individual cases no breach ever occurred. On 17 January 1848 Denham wrote to Sir John Tobin, a member of the Dock Committee, referring to his gratifying interest and forwarding with reverence and esteem a copy of his book. In his preface Denham summarised the benefits derived from his survey of the New Channel, "13,000 sail provided for at all hours night and day, hitherto shut out for four hours out of every twelve". He went on to refer to his work of forcing and opening (*i.e.* by harrowing) another line of entrance into the New Channel, thus justifying his erection of a lighthouse on Crosby Shore. He expressed some disappointment in not receiving support to continue his work to its full fruition but what was done proved efficacious. Then he added, and it is here that modern generations have found the moral that constant attention is imperative, "Spurts of zeal and occasional lavishment of money will not do. . . . A steady and liberal appropriation can alone sustain for a time the naturally languishing gutter escapes of the Mersey at all subservient to the purposes of the second emporium of the kingdom. Nor is it seaward alone that the mind's eye of a spirited and confiding community must be invited". His preface also detailed the following "several aids to the present maritime safety":—

"A permanent steamer for instant need (January 7, 8, 9: 1839) as well as "for constant harrowing—a floating Depot of buoys and moorings at the "sheltered side of the river—screw pile lighthouse on spits, instead of light-vessels—screw pile beacons instead of spit buoys—screw pile refuge fabrics "for the shipwrecked, with means of showing a lantern and containing restoratives—screw moorings in the river—duplicate lightship—a rocket every two "hours from N.W. Lightship and blue light every hour—a telegraph on Crosby "Point—a subsidiary light for the Crosby Channel and Rock Channel . . . "harrowing in the New Cut, &c. . . . an observatory . . . and taking the dock "mud elsewhere instead of casting it into the River abreast of the docks."

His prose has a singularly vivid touch, typical of the period. After a circumstantial account of the course by which a navigator might find himself approaching from the westward at a time of tide in a

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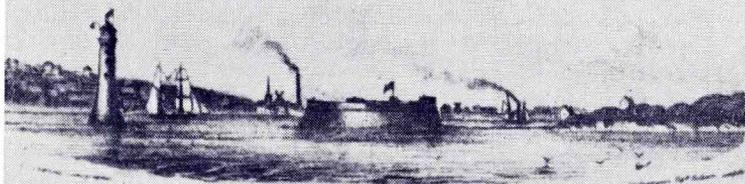
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COMMANDER

H. M. DENHAM. R. N.

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Appearance of Liverpool when rounding the Rock Light house

Printed & Published as the Act Directs for H. M. Denham by J. & J. Mawdsley, Liverpool 1840.

Sold by R. B. BATE, Poultry, London. & J. & A. WALKER, Liverpool,
and by all Chart Sellers at the Sea Ports of the United Kingdom.

PLATE 9 : TITLE PAGE FROM ADMIRAL DENHAM'S
SAILING DIRECTIONS

westerly gale, he went on "The distressed, despairing voyager clings to Hope, for 'tis too late to haul Northward, and is only convinced of the appalling fact, when in the breakers of Burbo Banks, in the bight of Liverpool Bay". And in a footnote when speaking of these dangers Denham makes this apt commentary on the seamanship and general outlook of the time. "Little does the merchant think of this in his calculations when stopping the insurance on learning his cargo is off Point Lynas; why 'tis then the risk commences."

From January 1842 to July 1845 Denham was at sea once more, in the *Lucifer* and *Royal Sovereign* yacht, defining the coasts of Lancashire and Cumberland. Subsequent service took him on surveying expeditions to the coast of Guinea and the mouths of the Niger and later to the Fiji Islands. His prowess continued to win him the approbation of senior officers. Sir Francis Beaufort, the hydrographer under whose auspices Darwin made his memorable voyage, said of one piece of Denham's work "that no man could have achieved that great work with more skill", and again "that a more complete and masterly work had rarely been sent to the Admiralty office". His work on a survey of the Bight of Benin, made despite "a deleterious climate, an impracticable coast and a treacherous population", could not have been bettered if made under the most favourable circumstances. Beaufort was no mean judge of a man. Commander Dawson in his *Memoirs of Hydrography* alludes to his "remarkable power of discerning and appropriating ability to its right object whenever it came in his way". He must have been a stern taskmaster, whom to please was indeed a sign of merit, for he worked long and rigid hours and had such an idea of official rectitude that he even carried his own letter paper and pens to the Admiralty for his private correspondence. For his work on the Bight of Benin Denham was promoted to post rank.

A word must be said on behalf of the Dock Trustees. The half century which succeeded the Napoleonic Wars was an age of almost unbridled individualism. Men tended to hammer out conclusions for themselves, and to assert those conclusions with little regard to the views of others. Denham was as emphatic as anyone in his judgments and opinions, and in the opinion of eminent engineers time has proved that his ideas were fundamentally sound. But he was not, judging from the writings and reports which he has left to posterity, a very tactful man. Few bodies or trustees would have received well such observations as, "conditions which I ought long ago to have demanded, which any successor must stipulate for and which I now do late as it is in justice to the community whose interests have been by misplaced patience so miserably carried out". Certainly the Horsfalls, Tobins, Shands, Holts and Gladstones of the period did not. They were grave, responsible men these Liverpool merchants, with that acute dislike of interference by clever young men from the south which has always

marked the men of that city, a distrust no doubt emphasised by the relative isolation of their city at that time from London interference. Even so it is a matter of some surprise that in so short a period as four and a half years the attitude of the City Fathers should change from a bestowal of their city's freedom to curt rejection of a subordinate's views. There are no records of mistakes or misjudgments made by Denham. His clear record of the great gale in January 1839, in spite of the subsequent probing by the sub-committee makes it self-evident that the measures he had consistently urged should have been effected. Where he erred was in diplomacy, for no trustees like to be confronted by their officers saying "I told you so", and their attitude in such circumstances is apt to be more dogmatic and stubborn than if the officer had in fact been at fault. Particularly is this the case when the officer concerned issues an ultimatum as did Denham. In such circumstances it is natural for proud and independent men to accept the challenge.

One wonders what would have happened if Denham had been more moderate in tone, if he had not pressed his own views and had adopted those diplomatic technics which when used by skilled hands procure for the prudent officer the most bountiful gifts. In such circumstances would he have urged seventy or eighty years ahead of his successors a training of the channels which would have established the "New Channel" on a straighter and more effective line than the channel which has succeeded it. We do not know the answer, for although commission after commission heard evidence on the problems of the Mersey and its conservancy, and scientists and engineers investigated its mysteries, we do not seem to have found until the last half century that comprehensive outlook which took in, as Denham's did, the problem of the estuary as a whole. Years after he had left the Mersey he reappeared as an expert witness, and he gave evidence before the House of Commons Committee on 25 May 1852 in reference to the Birkenhead Docks Bill. With an emphasis which the years had not softened he reiterated the experience gained in the great gale of 1839, pre-facing his remarks with the statement that he was under sailing orders for the South Pacific. Broadly his advice was all to the danger of trusting to safe anchorages in Liverpool Bay or on the East side of the river in westerly gales and the necessity for maintaining shelter on the lee or Birkenhead side of the river.

Denham was knighted for his long and meritorious service in the *Herald* on the Pacific Station, and was considered to have been mainly instrumental in bringing to fruition the Australasian surveys, therefore playing a vital part in the great work of charting the seas of the world which Beaufort had commenced. He became Rear-Admiral in 1864, Vice-Admiral in 1871 and Admiral in 1877. To appreciate fully the period of navigation in which he lived one must remember that it was the transition time. One of Denham's inventions was a jury tiller "for steering a ship on fire abaft and when

twisting her rudder ahead, breaking her tiller in a gale of wind or receiving the enemy's shot". Very different were the conditions with which he had to contend from those with which his present day successors grapple. It is perhaps no idle reflection to wonder if Denham's keen spirit ever ponders over the timeless ebbing and flowing of his Mersey, and over what the great line of his successors, who owe so much to his work, have made of the Royal Highway committed to their charge.

The author gratefully acknowledges his indebtedness to the Mersey Docks and Harbour Board for the privilege of consulting the minute book and other valuable records in its possession.