

The First Sydney/Brisbane Steamship Service

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SUMMARY Although the social contribution of the coastal steamship service to Australia's development has received some consideration, an assessment of the technological significance of the ships appears to have been largely ignored. The paper examines the technology of the ships which inaugurated the Sydney to Brisbane service in the early 1840s and assesses their contribution to the development of Australian engineering.

1 INTRODUCTION

One of the least documented aspects of the early colonisation of Australia concerns the impact of the steam engine on the development of the infant community. Rotative engines began to appear in Britain just at the time of the sailing of the First Fleet from Spithead in 1787 and yet by 1840 only 36 steam engines of all kinds had been installed in the whole of New South Wales. A couple of flour mills in Melbourne were steam powered but none was installed in the penal settlement at Moreton Bay (Linge, 1979). One of the applications of the steam engine which brought its value to the attention of the public was for driving the paddle steamer, the first of which (the *Sophia Jane*) arrived in Australia in 1831 (Parsons, 1967). By 1834 there was a service between Sydney and the Hunter River, and the first steam engine of any kind to reach Moreton Bay was probably the one driving the *James Watt* when she called in 1837 while under charter to the New South Wales Government (Davies, 1937). In 1841 a paddle-steamer service was started between Sydney and Melbourne, and a year later a regular fortnightly service was opened with the Moreton Bay settlement (McKellar, 1977). Over the next five

years two ships - the *Shamrock* and the *Sovereign* - became particularly well-known to travellers between Melbourne, Sydney and Brisbane, and it is with the technology of these ships and the impact they had on the communities which they served, that this paper is concerned.

2 THE SHAMROCK

The *Shamrock* was one of three iron ships of similar size purchased new from Britain in the early 1840s by the Hunter River Steam Navigation Company. Two, the *Thistle* and the *Rose*, were built on the River Thames but the third, the *Shamrock*, was constructed in Bristol by Messrs Bush and Beddoes, to a design by William Patterson (Bristol Journal, 1841). A (non contemporary) print of the ship is shown in Figure 1.

The reason for selecting a Bristol shipbuilder is unknown but it may have been influenced by the experience of the port in catering for the East Indian and Australian trades. William Patterson's reputation as a ship designer and builder was well-known; he had constructed the *Great Western* for Brunel in 1837 (SS Great Britain Guide, 1977), and he brought a great deal of fresh thought to ship-

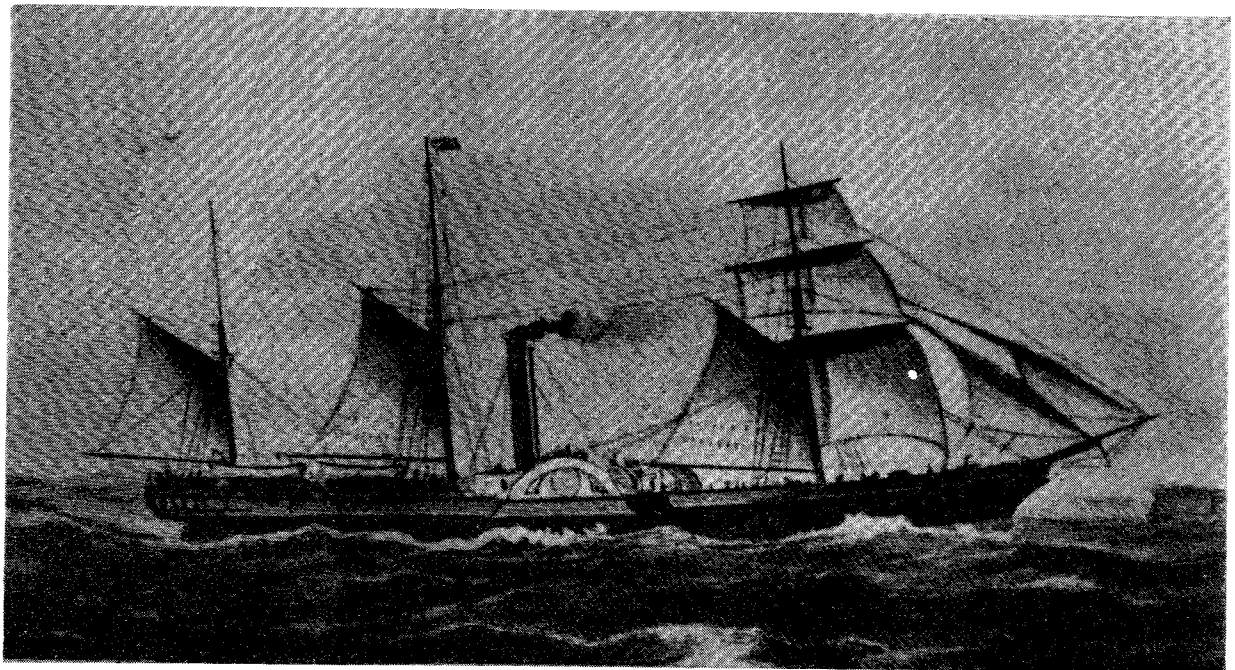


Figure 1. The Steamship *Shamrock* (courtesy Oxley Library, Brisbane).

building in Bristol where he had his yard. Brunel harnessed him to a team designing the much larger *Great Britain* and when a small iron boat, the *Rainbow*, visited Bristol in 1838, Brunel was sufficiently intrigued to arrange for Patterson to join her for a voyage to Antwerp. The report was so favourable that Brunel decided to build the *Great Britain* in iron instead of wood, and Patterson immediately began to design other ships in this material, one of the first being the *Shamrock*. However, he did not have the facilities to build it in his own yard (Farr, 1971) and he was heavily involved in supervising the construction of the *Great Britain* so that the task was given to Bush and Beddoes who, up to that time, had been chiefly known as engine builders.

Unfortunately, all plans or contemporary drawings of the *Shamrock* have been lost but it is known from the builder's certificate that the hull measured 44.9 m in length, with a beam of 5.9 m and a depth of 3.6 m. The central 13.7 m contained the engine room and she had 3 watertight compartments. Following sailing-ship practice and like

all ships of the period she was flush decked, and she carried a quarter deck with sham quarter galleries terminating in a square stern. At her prow was a female figurehead, while the three masts were schooner-rigged.

In the engine room the two cylinders of the side-lever engine had equal diameters and strokes of 1.07 m, and were supplied with low-pressure steam at 60 kPa from a square, iron boiler which operated on sea water. Waste steam was exhausted to a simple jet condenser, giving the engine an output of 75 kw which drove the 5.6 m diameter paddle wheels at up to 21 rpm through shafts coupled directly to the engine crankshaft (Votes and Proceedings, 1854). Two bunkers accessible to the engine room but filled from on deck each held 13 tonnes of coal, and a further 60 tonnes could be stored in the hold but it was difficult to recover when the ship was at sea, the usual policy being to carry additional supplies on deck adjacent to the funnel where it was protected from the heat of the flue by the steam chest (Votes and Proceedings, 1852).

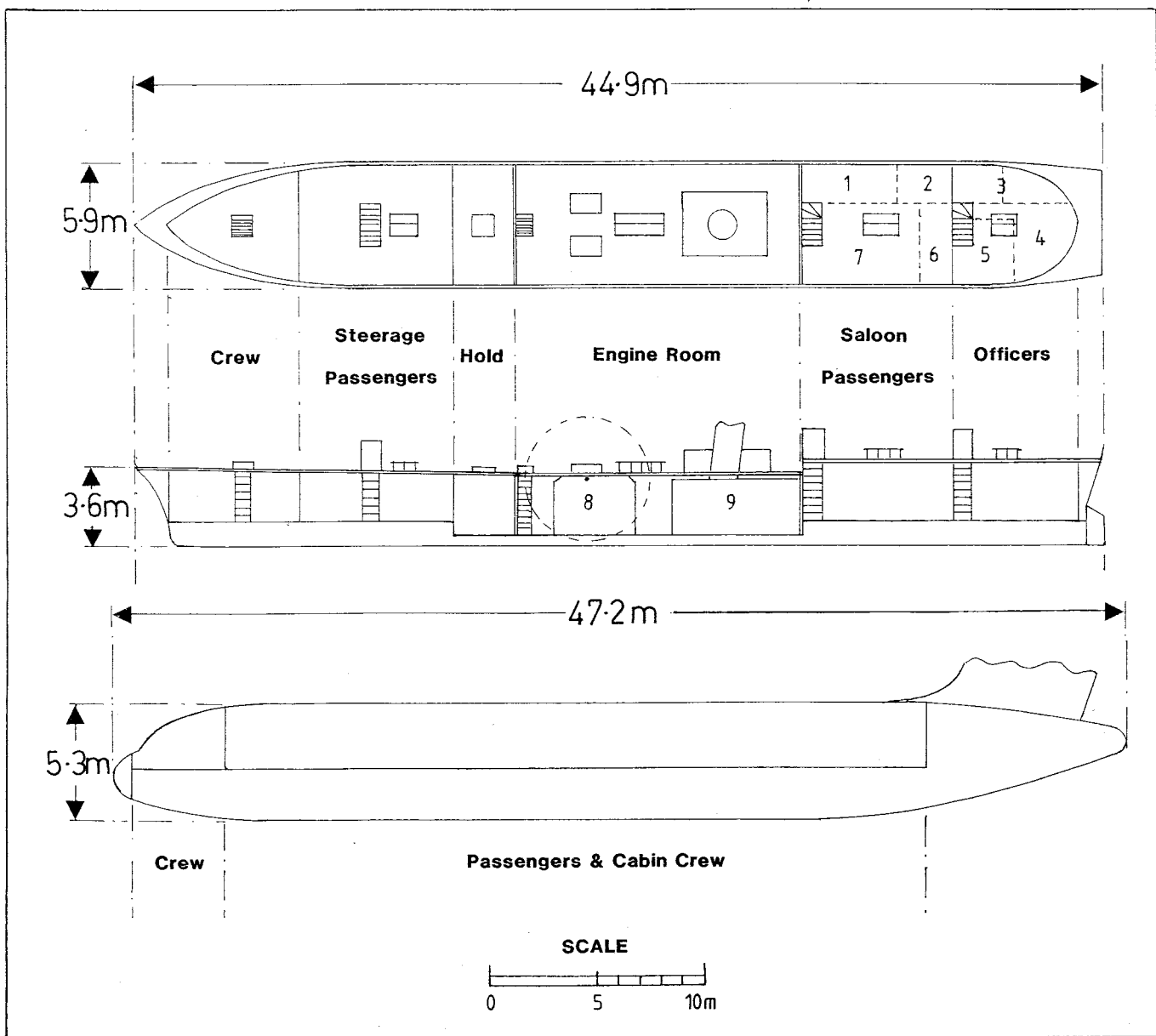


Figure 2. Tentative layout of *Shamrock* and comparison with Boeing 767 - 200.

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|------------------|------------|-----------|
| 1. Ladies cabin | 4. Captain | 7. Saloon |
| 2. Private cabin | 5. Store | 8. Engine |
| 3. Officers | 6. Pantry | 9. Boiler |

Aft of the engine room were the saloon and cabins, steerage accommodation being located forward. Berths were provided for 34 cabin or saloon passengers with 45 in steerage; cargo was carried in the hold or on deck where there were pens for 8 horses. A lifeboat, a cutter and a small dingy could provide accommodation in an emergency for almost one half of the total complement of the ship. Figure 2 indicates the kind of general arrangement which might have been expected; it is based on written accounts of the ship and detailed plans of the *Wilberforce* which was a contemporary of the *Shamrock* and similar in general dimensions. The plans were kindly provided by the British National Maritime Museum, Greenwich.

The gross (or builder's) tonnage was 322, but the steam (or registered) tonnage was 200 and this was used for entering and clearing her at the Custom House in Sydney. The total complement was calculated on the gross tonnage, and for voyages of less than 21 days she was permitted to carry one person for every two registered tons: this gave an official capacity of 160 persons (including the crew) but it was frequently exceeded (Votes and Proceedings, 1852).

After *Shamrock* was completed in March 1841 she ran some trials in the Bristol Channel where she was greatly admired for her speed and comfort. She sailed for Sydney later in the year under the command of Captain George Gilmore (Bristol Journal, 1841), and made her first trip to Moreton Bay in January 1842 carrying 78 passengers and numbers of horses, bulls, cows and rams as additional deck cargo (Sydney Morning Herald, 1842a). A few days later the return journey to Sydney was made in 49 hours (Sydney Morning Herald, 1842b).

THE SOVEREIGN

As with *Shamrock*, there are no plans or contemporary drawings of the *Sovereign* but by a fortunate chance full details of her engines and boilers are available.

Between 1814 and 1828 steamboats were introduced in large numbers on the River Thames to serve the towns which were rapidly developing between London and the open sea (Rowland, 1970). In 1830 the London and Margate Steam Packet Company which operated one of the services ordered a new addition from Elias Evans of Rotherhithe, and the directors named it *William the Fourth* (Banbury, 1971). The wooden hull was 34.9 m in length according to the ship's register, with a beam of 4.9 m, a depth of 3.2 m and a draught of only 1.1 m, making it particularly suitable for river work (Boulton & Watt, 1830). The side-lever engine possessed cylinders 0.78 m in internal diameter with a stroke of 0.69 m; it developed 37.5 kw and contained a number of unusual design features including geared drives from the crankshaft to the paddle-wheel shafts. The engine and the square-section iron boiler were built at Boulton & Watt's Soho Foundry and a plan and cross-section of the engine room, together with other details, survive in the company's archives held by the City of Birmingham Reference Library (Figures 3 and 4 respectively).

In 1837 *William the Fourth* was re-registered in London with Thomas Street and Joseph Grose as her new owners and she was immediately prepared for the voyage to Australia (Parsons, 1967). Despite her diminutive size and shallow draught she completed the journey safely, arriving in Sydney in January 1838 where she was acclaimed as a "splendid vessel" (Sydney Morning Herald, 1838). At the time there was already a locally-constructed steam boat operating out of Sydney under the name of the *William the Fourth* and the new arrival was therefore renamed *King William the Fourth* in order to avoid confusion. Grose put her to work on the east coast of Australia where she was the first steam vessel to enter the Clarence River (Parsons, 1967). Her active life was cut short after 18 months, however, by striking Coal Island at the entrance to Newcastle Harbour and becoming a total loss, although there were fortunately no casualties. By a stroke of good fortune the "boilers went out on the off side"

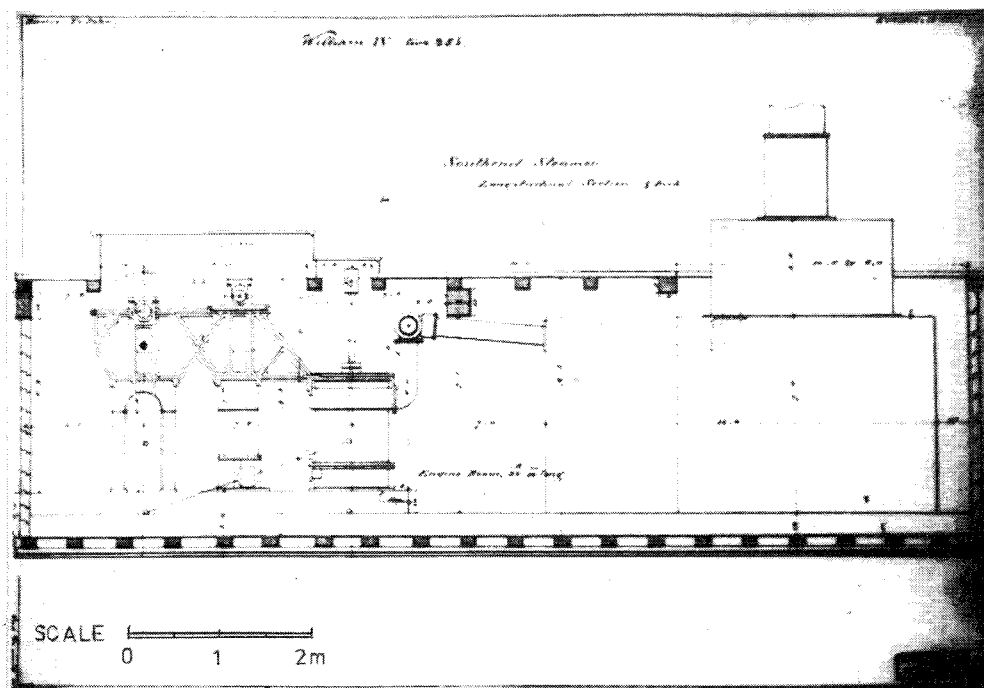


Figure 3. Section of Engine Room of *William the Fourth*

and were recovered, together with the engines (Sydney Morning Herald, 1839).

At the time of the accident, Joseph Grose was having a boat constructed at Pymont by Chowne and Thompson for coastal service and the design was hurriedly adjusted to accept the boilers and engines of the ill-fated *King William the Fourth*. The new ship was shorter, wider and heavier than the *King William*, and carried two masts and a schooner rig. The hull dimensions are given variously as between 33.8 m (McKellar, 1977) and 37.2 m (Hocking, 1969) in length, with a beam of 5.4 m and a depth of 2.9 m. The draught was increased to 1.7 m giving a gross tonnage of 214 and a steam tonnage of 119. The large hull and small engines gave her a maximum speed of only 8 knots, and she normally carried a crew of 23, divided between the various offices as shown in Table 1 (Sydney Morning Herald, 1847).

The *Sovereign* was registered in Sydney in 1841 and Grose put her on a regular service to Morpeth on the Hunter River (Sydney Morning Herald, 1841). In 1842 the Hunter River Steam Navigation Company purchased her and she was set to work on the Sydney to Brisbane run (Sydney Morning Herald, 1842c), where she replaced the *Shamrock* which was transferred to the newly-established Sydney to Melbourne run. The *Sovereign* maintained a fortnightly service until 1847 when she foundered with a heavy loss of life while attempting to leave Moreton Bay in a severe storm. The disaster was attributed to the failure of the engines; a contemporary account explains that "...the frames of both engines were broken close under the plummer boxes, which were turned upside down.". This suggests that a racking motion of the paddle-wheel shafts fractured the five supporting webs of the cast-iron entablature on which the plummer boxes were mounted (see figure 3). The plummer boxes then jammed and rotated on the paddle-wheel shafts, jamming the whole engine or forcing the pinions apart and disconnecting the paddle wheels from the engine.

TABLE 1

Crew of S.S. *Sovereign*

Position	Number
Captain	1
Officers	2
Engineers	2
Firemen	3
Seamen	6
Stewards	5
Stewardess	1
Cooks	2
Boy	1
Total	23

4 DISCUSSION

Before discussing the impact which the steamships made on the inhabitants of Brisbane and Melbourne it is necessary to appreciate their size and performance. The *Shamrock* represented the most recent technology of the time and in Table II and Figure 2 its dimensions and operational characteristics are compared with those of a modern, interstate passenger aircraft which today performs the same function of providing a regular service between the major Australian coastal cities. The hull and the fuselage are similar in size, and their passenger carrying capacities are comparable but there the similarity ends. Whereas the aircraft makes the journey between Sydney and Brisbane in about 50 minutes, the ship took 50 hours. The space provided for each passenger or crew member to eat, sleep, work and exercise during the journey was extremely cramped; it was not unusual for one half of the steerage passengers to have no berth at all, while there were frequent complaints of the saloon, cabins and deck space being filled with evil-smelling cargo such as animals or raw wool. Nevertheless these crowded, expensive, little boats were gratefully accepted by the public because they provided a regular service, and their steam technology was a continuing source of curiosity to the travellers.

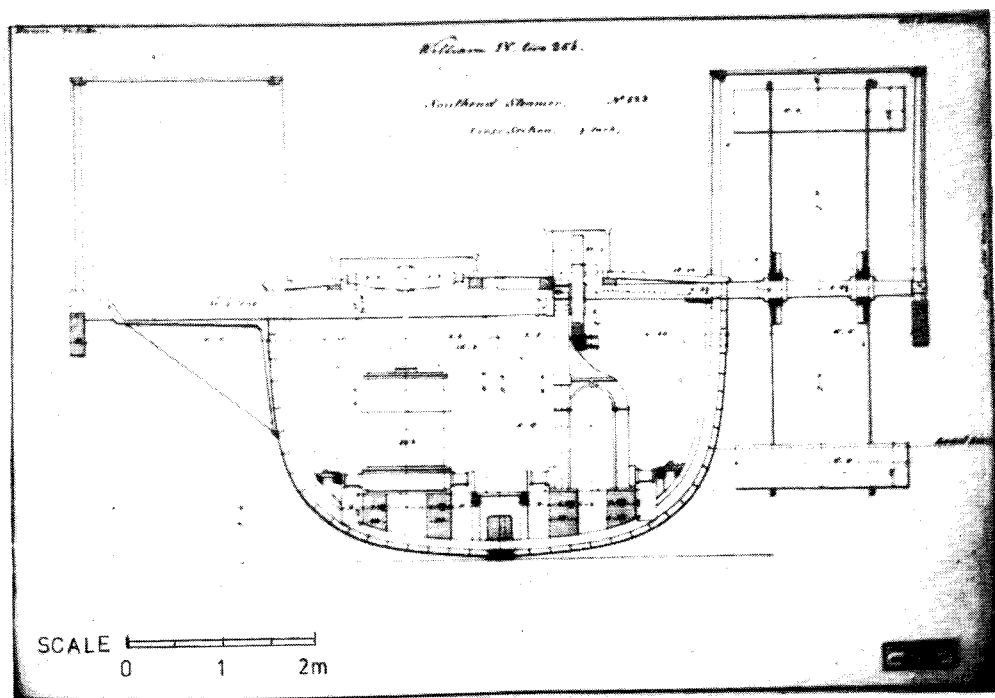


Figure 4: Cross-Section of Engine Room of *William the Fourth*

TABLE II

Comparison between Coastal Paddle Steamer
and Interstate Aircraft

	S.S. <i>Shamrock</i>	Ansett Boeing 767 - 200
	1841	1983
Year of construction		
Length	44.9m(hull)	47.2m(fuselage)
Width	5.9m(hull)	5.0m(fuselage)
Height	3.6m(hull)	5.3m(fuselage)
Manufacturer's or Builder's weight	327 tonnes	74.5 tonnes
Number of crew	30	9
Max. number of passengers	130	201
Time of travel Brisbane/Sydney	50 hours	50 minutes
Approx. weight of fuel consumed	25 tonnes	7 tonnes
Passenger fare, Brisbane/Sydney	4-18	\$117-\$218
Passenger fare as proportion of average weekly wage.	1.6-3.2	0.3-0.6

It could hardly have been otherwise because the central third of the hull was given over entirely to machinery which emitted a continuous stream of noise, heat, smell, smoke and steam. The engine casing was made as small as possible in order to conserve space and was surmounted by a skylight. The crankshaft, at deck-level, was supported on a heavy cast-iron frame, the entablature, which in turn rested on cast-iron frames from the engine bedplate (Figures 3 and 4). The seals between the cylinders and the pistons were made by lengths of tallow-impregnated rope (Australian, 1841); lubrication was by tallow, both inside and outside the cylinders, supplemented by sea water on the larger bearings. Shafts were built up out of separate forgings, the webs being keyed onto the journals and the crankpin being either bolted or collared into position between the webs (Guthrie, 1971). The engine room was completely decked over except for the skylight and the great, iron side-levers seasawed up and down in perpetual heat and gloom, their trunnion bearings adding their grunts to the cacophony of clicks and clanks from the air, bilge, feed and brine pumps cluttered round the baseplate. None of the machinery was fenced or guarded by handrails, and lighting was by a hurricane lamp; each duty watchkeeper carried out his duties by the light of a duck lamp consisting of a coffee-pot shaped vessel filled with oil, with a wick in the spout emitting a smoky, reddish glare. Boilers were large, stayed, iron boxes, rectangular in shape so that they would be fitted in the space below deck set aside for machinery. Maintenance went by default and they soon either scaled up or the bottom plating eroded away under the action of the sea water with which they were fed. Considering the levels of perfection to which the armourer and the silversmith had raised metal working in Europe or the U.S.A. in the 18th century, the technology was crude and cumbersome but it fitted the needs of the new country and made a major contribution to the social and technical development of the coastal fringe of the sub-continent.

The steamers drove Sydney into the age of technology: engines had to be repaired, boilers manufactured and hulls built. Eleven ships had been completed by the end of 1840, and in boats such as the *Sovereign* they provided evidence to settlers along the whole coast of what had been achieved. As early as 1837 J. Russell was building 45 kw marine engines locally at Pyrmont and by 1840 cylinders up to 1.1 m in diameter could be bored locally. Stationary steam engines were installed on land but they were smaller than their marine counterparts and provided a total power output of only 300 kw in 1840, which was less than the total power generated by the paddle steamers operating out of Sydney. Melbourne lagged a few years behind Sydney in developing the technology, while the Moreton Bay settlement had to wait a further decade before its first steam engine was installed (Linge, 1979).

Nevertheless the steam boats created a small but regular market for coal at the ports of call and led to the opening of local pits (Whitmore, 1981). There was also a stimulus to the construction of small river boats and steamers. A nucleus of marine and mechanical engineers was established which supplemented the supply of civil engineers trained in Britain who opted to remain in Australia after discharge from the army. When the demand for steam power began its rapid rise in the 1850s there was, therefore, a nucleus of local engineering to accept the influx of mechanical expertise which arrived from overseas. In view of the importance of the coastal steamers to Australia's history it is unfortunate that not a single example has survived, nor are there any plans of their design or details of the construction techniques employed.

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