

Article

Early Observations on the Steamer *Bengala* (Formerly Named *Mecca* and *Livorno*) Sunk off Capo Rizzuto (Crotone, Italy) in 1889

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Abstract: In the waters of the Calabrian Ionian Sea, off Isola di Capo Rizzuto (Crotone, Italy) and at a depth of 26–29 m, lies the wreck of *Bengala*, an iron screw-steamer foundered in 1889. She was built and launched in 1871 in Sunderland (Great Britain) in the yards of Iliff, Mounsey, and Co. (Sunderland), with the name of *Mecca* and her British owner was Mr. Ralph Milbanke Hudson Junior. In 1872 she was sold to the *Lloyd Italiano* company and was rechristened as *Livorno*. In 1876 her ownership changed once more and she became part of the fleet of the Genoese shipping company *Rubattino and Co.* with the name *Bengala*. The steamer was sold for the last time at the launch of the *Navigazione Generale Italiana* in 1881, one of the largest shipping companies in Europe. Until now, no scientific study has been dedicated to this topic and the few references in the literature are often incorrect. For this reason, in the pages that follow, a broad historical account of the events concerning the steamer is offered for the first time, linking them to the complex events of the Italian merchant navy of that period. This is followed by the analysis of underwater archaeological evidence, with a view to carrying out more detailed investigations in the near future.

Keywords: underwater archaeology; underwater cultural heritage; steamer; iron screw-steamer; shipwreck; Italian merchant navy; Sunderland; 19th century; shipping companies; *Lloyd Italiano*; Genova; Genoa; Mumbai; Calcutta; Suez; Ionian Sea; Regno d'Italia; Raffaele Rubattino; *Navigazione Generale Italiana*

1. Introduction

This work presents the first results of a complex historical and archaeological research on *Bengala* steamer. It should be noted that this study is still in its initial stages and aims to shed light on the history of an iron screw-steamer which, at the end of the 19th century, tragically foundered in the waters of the Ionian Sea near Crotone (Italy), only 18 years since her launch (Figure 1). The *Bengala* steamer changed names and owners several times during her life and modern scholars have written about her only occasionally. The latter sometimes show inaccuracies that prompted us to dedicate her the first organic study. For example, the shipwreck date is often brought forward, or the construction is attributed to a shipyard other than the one in which it was actually launched [1,2].

The history of *Bengala* embraces not only a number of technological aspects linked to the development of the naval industry and steam propulsion, but also the history of the Italian merchant navy. In particular, the vicissitudes of this steamship are entangled with the changing economic and financial fortunes of some shipping companies of the time, among which is the *Navigazione Generale*

Italiana (NGI), the leading provider of maritime services of the *Regno d'Italia* and one of the major shipping companies in Europe.

Although there are overall studies, often very accurate, concerning the history of the 19th-century Italian steam merchant shipping (such as the recent and well-structured cataloging of Raffaele Rubattino's fleet by P. Piccione, or those of T. Gropallo, D. Haws; of U. Marchese for Liguria, of R. De Rossi for the *Regno di Sardegna*, of C. Perfetto for the Kingdom of the two Sicilies) [1–6], we must point out that from the archaeological point of view there are still few studies concerning the individual steamships. Among the better studied ones is undoubtedly the famous wreck of the *Pollux* (1837–1841), which was at the center of an international controversy and whose depredation by British treasure hunters was fortunately foiled by the Italian authorities in Tuscan waters [7,8]. Research on the *Bengala* steamer, currently limited more than anything else to historical events, in the future may constitute an interesting test both in terms of archaeological investigation methodology, and for the contribution it can offer to the debate on technological and naval aspects of the steamships of the time.

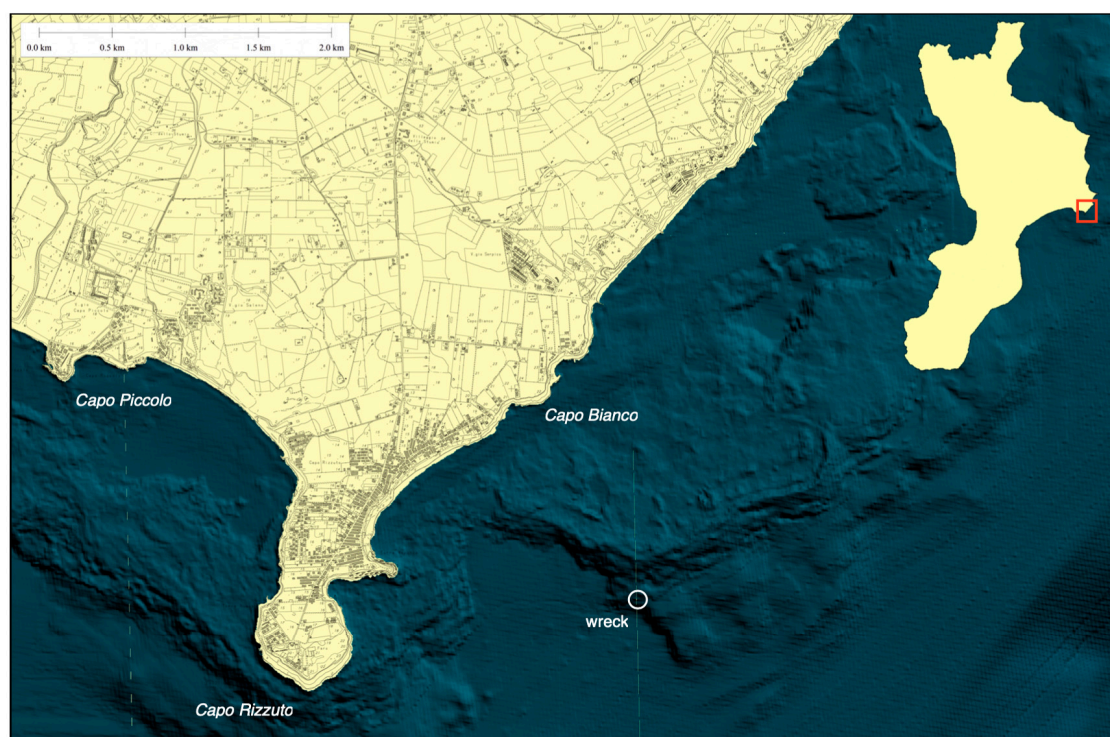


Figure 1. Position of the wreck on a multibeam acoustic bathymetry (MB credits: AMP Capo Rizzuto; GIS processing: Fabrizio Mauri).

2. Historical and Archival Research

2.1. *Mecca* (1871–1872)

The oldest document concerning the steamship that has been traced to date is a short article that appeared in the *North & South Shields Gazette and Daily Telegraph* of 10 May 1871 mentioning that on the previous Saturday, therefore on 6 May, “was launched from the iron shipbuilding yard of Messrs Iliff, Mounsey, and Co., South Dock, a large iron screw-steamer, 260 feet long, 32 feet beam, and 24 feet 6 inches depth of hold, about 1500 tons register” (Figure 2). The article specified that the ship was, “fitted with all recent improvements, has large accommodation for passengers, and spacious tween decks” and also that, “the vessel was named the *Mecca*, by Miss Byers, of the Esplanade, on behalf of Mr R. M. Hudson and partners, who own the vessel” [9] (p. 4).

The same news was reported a few days later, on 26 May 1871, by *The Mechanics' Magazine* in a less emphatic tone: “On the Wear Messrs. Cliff, Mounsey and Co., have launched an iron-screw

steamer 260 ft. long, 32 ft. broad, and $22\frac{1}{2}$ ft. in depth; 1500 tons register. The engines will be of 140 horse-power, and be supplied by Mr. George Clark, of Sunderland" [10].

The information that appeared in these two newspapers was confirmed by a documentary research carried out in the archives of the "Tyne and Wear Archives and Museums" in Newcastle.

Here, in a document of the "HM Customs and Excise registers" for the Port of Sunderland, drawn up on 7 July 1871 (n. 36/1871) [11] it is stated that a ship named *Mecca* with an official registration number 62626 was built in Sunderland, County of Durham; her date of appropriation was July 6 of the same year, while the date of registration was July 7 (Figure 3).



Figure 2. Short article from the *North & South Shields Gazette and Daily Telegraph*, of 10 May 1871, with the news of the launch of *Mecca* (Newspaper image © The British Library Board. All rights reserved. Courtesy of the British Newspaper Archive. www.britishnewspaperarchive.co.uk).

This important document contains some invaluable technical data on the configuration of the steamship. She was rigged as a brig and had two decks, two masts, and an elliptical stern. She also had an iron structure and was "clinker-built," i.e., with a partial overlap of the longitudinal elements of the planks and their fixing by nails, bolts, or rivets. The overall length of the steamer was 75.01 m (246.1 ft), it had a maximum beam of 9.57 m (31.4 ft) and a "depth in hold from tonnage deck to ceiling at midship" of 7.40 m (24.3 ft).

The gross registered tonnage (grt) of *Mecca* was 1436.64 and, by subtracting the services spaces amounting to 501.88 grt, including those for the crew, her net tonnage was equal to 951.81 grt. The single propeller was a 170 rated horsepower engine, twin-cylinder, 45-inch bore and 42-inch in stroke. The boilers and transmission parts were designed and built by the well-known British marine engineer George Clark (1815–1885) who had gained some fame since he announced in May 1851 the construction of the first iron ship on the River Wear (Sunderland) [12] (p. 5), an iron sailing ship named *Loftus*, of 77 tons [13] (p. 60) [14] (p. 103), then launched in February 1852 [15], and also one of the first marine engines built there.

The first owner of *Mecca* was Mr. Ralph Milbanke Hudson Junior (1849–1938) who had her built at the age of 22 (Figure 4). The son of R. M. Hudson Senior (1813–1908), founder of R. M. Hudson and Son Ltd. (Sunderland), Hudson Jr. was a native of Boldon, north of Sunderland, who later became a member of the River Wear Commissioners in 1882 and was elected Unionist MP for Sunderland in 1918, sitting until 1922 [16] (p. 248).

NAME OF SHIP <i>Mecca</i>		Class				
Whether a Sailing or Steam Ship; if Steam, how propelled	<i>Steam</i>	Where built.. <i>Sunderland in the County of Durham</i>				
When built.. <i>5 July 1871</i>						
Measurements { Length from the Forepart of the Stem under the Bowport to the Aft Side of the Head of the Stern post <i>246</i> Feet Main Breadth to Outside of Plank <i>31</i> Feet Depth in Hold from Tonnage Deck to Ceiling at Midships <i>24</i> Feet						
Additional Particulars for Steamers.		Tons.				
Deduction for Space required for propelling Power (as measured)		<i>465.18</i>				
Length of Engine Room (if measured)	<i>36</i> Feet	Tenths. <i>and 5/100</i>				
Number of Engines	<i>Two</i>					
Combined Power (estimated Horse Power)	<i>140</i>					
<i>Direct acting, Surface Condensing</i> <i>Best made, in 1871, By George Clark, Manchester</i> <i>45 Inches Diameter of Cylinders</i> <i>42 " Length of Stroke</i>						
(Signed) <i>W. Milner</i> Registrar.						
Col. 8.	SUMMARY.					Col. 11.
Number and Amount of subsequent Transaction, showing how Interest disposed of	Col. 9. Number of Transactions under which Title acquired.	Col. 10. Names of Owners.	Col. 11. Mortgages and Certificates of Mortgage.	Col. 12. Names of Mortgagees or Assignees under Certificates of Mortgage.	Col. 13. Number of Shares.	REMARKS
	<i>M.O.</i>	<i>Ralph Milbank Hudson</i>			<i>60</i>	
		<i>John Crozier</i>			<i>4</i>	
			<i>Total 17 Aug. 1871</i>		<i>64</i>	<i>W. Milner Reg</i>
	<i>M.O.</i>	<i>Ralph Milbank Hudson</i>			<i>59</i>	
		<i>John Crozier</i>			<i>4</i>	
		<i>James Ritchie</i>			<i>1</i>	
			<i>Total 31 Aug. 1871</i>		<i>64</i>	<i>W. Milner Reg</i>
	<i>M.O.</i>	<i>Ralph Milbank Hudson</i>			<i>56</i>	
		<i>John Crozier</i>			<i>4</i>	
		<i>James Ritchie</i>			<i>4</i>	
		<i>John Watson</i>			<i>4</i>	
			<i>Total 1 Sep. 1871</i>		<i>64</i>	<i>W. Milner Reg</i>
	<i>M.O.</i>	<i>Ralph Milbank Hudson</i>			<i>53</i>	
		<i>John Crozier</i>			<i>4</i>	
		<i>James Ritchie</i>			<i>1</i>	
		<i>John Watson</i>			<i>4</i>	
		<i>John Forster</i>			<i>2</i>	
			<i>Total 6 Sep. 1871</i>		<i>64</i>	<i>W. Milner Reg</i>
		<i>Ralph Milbank Hudson</i>			<i>51</i>	
		<i>John Crozier</i>			<i>4</i>	
		<i>James Ritchie</i>			<i>1</i>	
		<i>John Watson</i>			<i>4</i>	
		<i>John Forster</i>			<i>2</i>	
		<i>George Milner Hudson</i>			<i>2</i>	
			<i>Total 17 Sept 1871</i>		<i>64</i>	<i>W. Milner Reg</i>
						<i>W. Milner Reg</i>

Figure 3. Document with the official registration of *Mecca* steamer. HM Customs and Excise, Newcastle Customs House, Register of shipping (Sunderland), June 1870–June 1872, EX.SU/1/43. By permission of Tyne and Wear Archives.

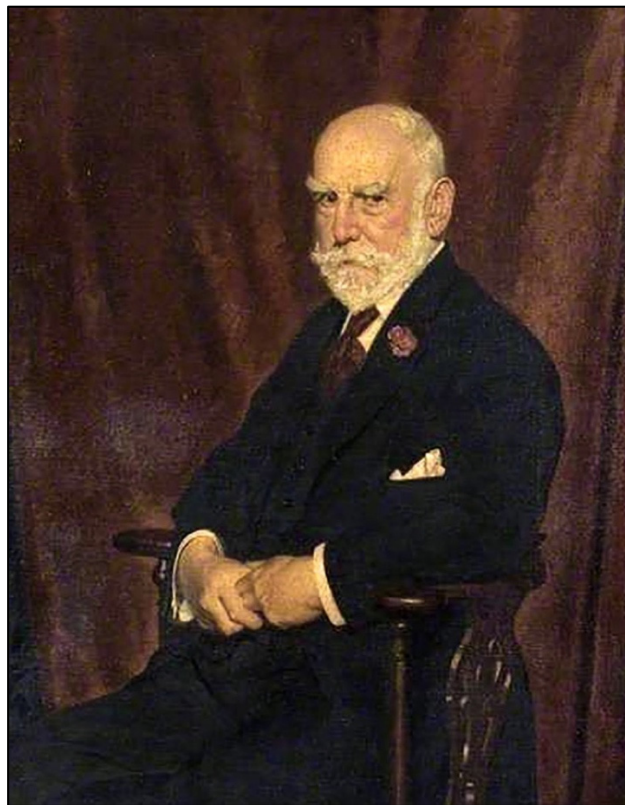


Figure 4. Mr. Ralph Milbanke Hudson Jr., the first owner of *Mecca*, in a painting by Howard Somerville (1873–1952). Photo credit: Sunderland Museum and Winter Gardens. © Art UK.

On 17 August 1871, a few weeks after the launch, R.M. Hudson Jr. sold 4/64 of *Mecca*'s ownership to Mr. John Crozier, also from Sunderland. This was the first in a series of reorganizations; others took place on August 31 and then three times in early September. The last company reorganization took place on 7 September 1871 when the owners became six and R.M. Hudson Jr maintained 51/64 of shares as the majority shareholder [11].

The shipyard entrusted by R.M. Hudson Jr. with the construction of the steamer was Iliff, Mounsey, and Co. based in Sunderland, in the South Dock, where *Mecca* steamer was built in Yard no. 48 [17].

Iliff and Mounsey Shipbuilding Yard was operating since 1866 [18] (p. 82) in an area that was previously owned by John Haswell who built wooden ships since 1837 and then, in the years between 1864 and 1866, also iron hulls that were launched into the south entrance [13] (p. 90) [14] (p. 107). After that, the area of Haswell's yard seems to have been divided between Bartram's and the company owned by Iliff and Mounsey partnership who, already in June 1866, built the SS Lasbrough, an iron steamer of 965 tons [14] (p. 107). From a piece of news of that time, we know that in July 1871, a few months after the launch of *Mecca*, Iliff and Mounsey "are going to re-open an old wood-ship building yard near Wreath's Quay, for the building of iron ships, until such time as their more extensive yard, located near Southwick Grazing Dock, be completed" [19] (p. 40).

However, in 1873, Iliff retired from the company and thus a partnership began between Mounsey and Foster which continued until 1879. When Mounsey was out of the company as well, Robert Foster founded in 1880 the "Sunderland Shipbuilding Company Ltd.," locally known as "The Limited Yard" [13] (pp. 90–91) [14] (pp. 107, 156).

In 1871, in addition to *Mecca*, Iliff and Mounsey, and Co. also built the iron screw steamers *Meredith* (cargo, 976 grt), *Marc Antony* (cargo, 1338 grt), *Fairy Dell* (coaster cargo, 312 grt), *Stephanotis* (cargo, 1042 grt), and *Nymphaea* (cargo, 1138 grt).

Mecca was a “hybrid” vessel in every sense: She was set up to be a passenger and cargo vessel at the same time and was “hybrid” because she was equipped with a mixed propulsion allowed with steam power and sails. The latter, mostly used as an auxiliary propulsion, was secured by a brig rig with a set of sails, probably square shaped, mounted on the two masts. The red mark on the Liverpool register, conferred by the “surveyors of the Lloyd’s Register of Ships” according to the specific rules, awarded the first-class classification (A1) to *Mecca* for 18 years [11].

The ship could accommodate 28 first-class passengers and 260 passengers in third class [3] (p. 174). The quality of the accommodation was emphasized since the beginning, as on 8 July 1871, in the section of the *Shipping and Mercantile Gazette* dedicated to the departure notices for the long-distance ships, regarding the first voyage of *Mecca* from Liverpool to Calcutta, it was stated that she was “built expressly for the trade [i.e., S.S. *Mecca*], ... has very superior accommodation for passengers” [20] (p. 1).

In July 1871, about three months after her launch, *Mecca* was assigned to the route of Southeast Asia, with Calcutta as her final destination. On her first route, the ship left Sunderland and reached Liverpool on 12 July staying at the Bramley Moore Dock on the River Mersey, where she received the aforementioned A1 classification (Figure 5).

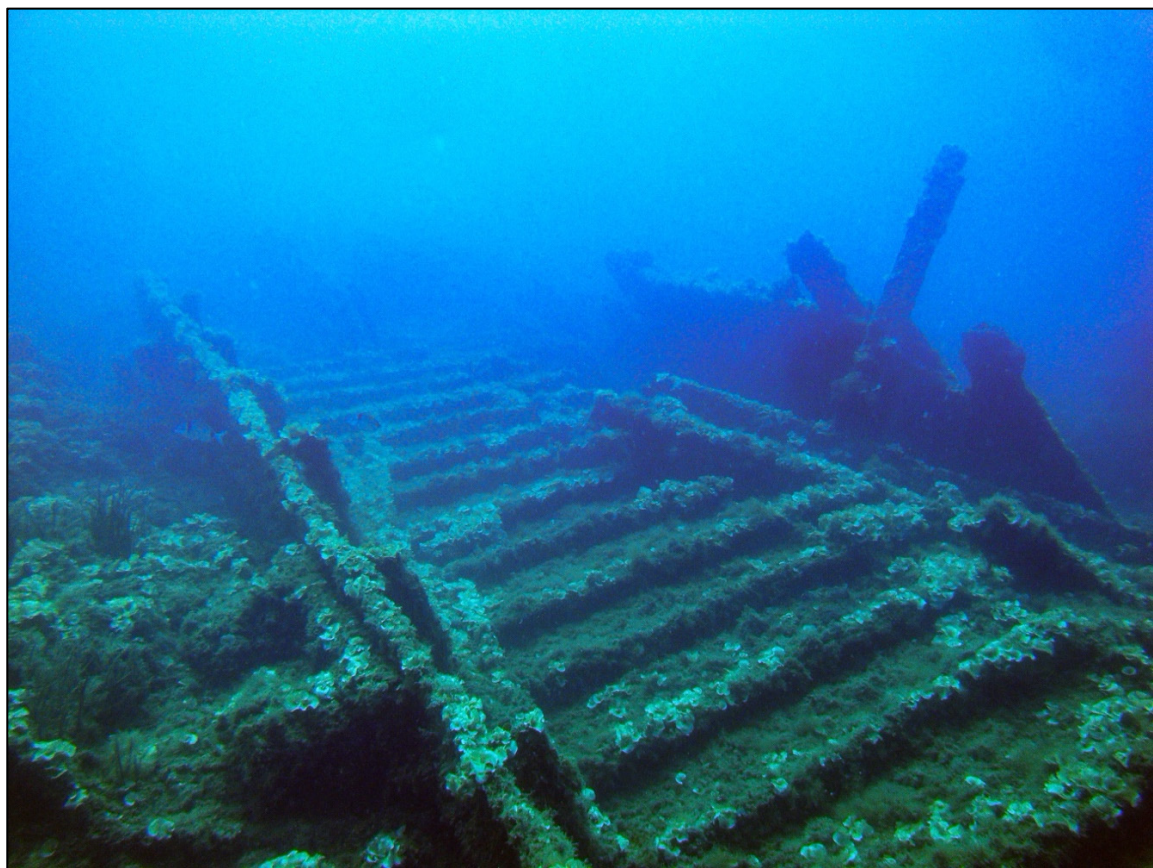


Figure 5. *Bengala* steamer (Capo Rizzuto, Crotone): A part of the metal gunwale collapsed and laid on the seabed (photo credit: Salvatore Medaglia).

On 23 July [21], after having loaded about 950 tons of coal [22,23], she sailed to Calcutta with Captain F.B. Denton in command. He was an experienced master who had several navigations to the East seas on his credit. In command of *Dunelm*, a 514-ton clipper owned by Hudson and Co., in 1867 he reached the Pacific and touched the island of Guam [24] (p. 104) and Napier (New Zealand) [25], while the following year he was in Singapore [26] (p. 2).

Once she had crossed the Suez Canal, *Mecca* landed on 18 August in Aden [27] (p. 8) and on 1 September she arrived in Calcutta [28] (p. 2). While in Calcutta, the coal was unloaded, and the ship loaded up 1100 tons of goods (including 300 tons of castor seeds and 200 tons of tamarind) [29] (p. 5) [30] to be unloaded in Genoa. *Mecca* left Calcutta on 1 October but while sailing down the Hooghly River she had a small casualty as she “touched slightly at Nynan . . . but did not stop” [31] (pp. 6–7).

After passing the Suez Canal again on 6 November [32] (p. 7), the steamer arrived at his destination in the port of Genoa on 14 November [33] (p. 8), but strangely never returned to England. From Genoa the ship *Mecca* shuttled for Livorno, getting to her destination on 30 November [34] (p. 7) [35] (p. 3), and from there she left again for Genoa on 11 December [36] (p. 7).

2.2. Livorno and Bengala (1872–1881)

At the end of 1871, about seven months after her launch, *Mecca* had a new owner, becoming part of the fleet of the *Lloyd Italiano*, just founded in Genoa [1] (pp. 90–91). The acquisition date can be retrieved from the “Appropriation Books” of the Registrar General of Shipping and Seamen in Cardiff: Here at no. 62626, where *Mecca* is mentioned, there is an annotation in the margin that reads “Sold to foreign port 02.01.1872” to indicate the reflagging date, i.e., the transition from British to Italian jurisdiction [37] (Figure 6). At that time, the *Mecca* steamer was renamed *Livorno*.

“The bearer share owned steam navigation company” called *Lloyd Italiano*, based in Genoa, was established by Royal Decree on 23 October 1871 [38] (pp. 276–277, n. CXLIII). The initial capital amounted to Lire 6,000,000 divided into 12,000 shares of Lire 500 each [39] (pp. 146–147) and, as it was said by Michele Casaretto, the president of the Board of Directors, in a letter dated 25 August 1871, the company had as its primary objective, “steam navigation especially with India, Black Sea, and England” [40] (p. 563, note 2). Since its appearance in the fierce competition among Italian shipping companies, the Genoese firm never received any support from the Italian government. The Lloyd administrators in fact asked for a grant of Lire 50,000 for every voyage to India [41] (p. 179, note 34), hoping to be able to have it included in the package of state subsidies regarding the “postal and commercial maritime service” which amounted to the total of Lire 7,110,000 (“Legge di bilancio e spesa per l’esercizio 1871, n. 575 of 30 December 1871”) [41] (pp. 144–149) [42] (p. 3138). Among other things, the exclusion of the *Lloyd Italiano* from these subsidies was the subject of a heated parliamentary debate in 1872, during the discussion of the bill for the approval of maritime concessions (12 and 13 June) [43].

In the 60s of the 19th century it was widely believed that the opening of the Suez Canal in 1869 would have given enormous opportunities for trading with India and East Asia, and it was imperative to take advantage of it [44]. In 1870 a total of 486 ships overpassed the canal (for a tonnage of 436,609), in 1871 the ships were 765 (for 761,467 tons), and 1082 (for 1,160,743 tons) in 1872 [45] (p. 447). In this context, it was obviously the British navy that dominated the trade, while Italy, along with other merchant navies, played a rather marginal role; for example in 1872, when the steamship *Livorno* made her first passage of the Canal with the *Lloyd Italiano*, 758 ships out of the total of 1082 (80, 87%) flew the English flag while the Italian ones were only 67, equal to 6.19% [46] (p. 47).

The opportunities given by the efficiency of steam technology obviously became a decisive factor in the race to conquer the new markets: In 1872, A. Bertocchi, while commenting on the situation of the Italian merchant navy and reflecting a common sentiment, underlined that, “by now it is recognized, without much discussion, that only steam navigation is useful when traveling across the canal” [47] (p. 482). This was obviously also the opinion of the *Lloyd Italiano*, expressly advocated by its president: “ . . . Italian trade with India cannot exist without steam transport, through which the small importer can bring the goods he needs” [48] (p. 567).

Official Number.	Name of Ship.	Tonnage.	Whether Steam or Sailing Ship.	Port of Registry.	Date of Registry.	Occasion of Appropriation.	Date of Appropriation.
6260	1 Houghton	491	Steam	Switzerland	26 Oct 70	First Registry	26 Oct 70
2	Giff	286	Sail.	"	9 Nov 70	"	8 Nov 70
3	Bride	861	Sail.	"	10 Nov "	"	10 "
4	Pendlepe	32	Steam	"	18 "	"	15 Nov "
5	Manchester	473	"	"	28 "	"	25 "
6	Wanderer	8	"	"	5 Dec "	"	3 Dec 71
7	Houghton	392	Sail.	"	12 "	"	5 Dec "
8	Caladonia	473	Steam	"	21 "	"	19 "
9	Dunro	723	Sail.	Registered to Dunro	21 Dec 71	"	17 Jan 72
6261	0						
1	Locura	824	Steam	"	1 Feb 71	"	1 Feb 71
2	Fairy, Gell	228	"	"	4 "	"	3 Feb 71
3	Chadon	489	"	"	18 "	"	17 "
4	Sunshell	504	"	"	27 "	"	25 "
5	Olive	373	Sails	"	3 Apr 71	"	31 Mar "
6	Myrtle	417	"	"	"	"	2 Apr "
7	Oriental	823	"	"	"	"	"
8	Tane & Co	104	"	"	"	"	"
9	Albion	460	"	"	"	"	"
6262	0						
1	Princess Louise	419	"	"	"	"	"
2	Clarion	618	Steam	"	23 "	"	22 "
3	Hugh Stratfield	522	"	"	27 "	"	26 "
4	Warden Saw	460	Sails	"	29 Aug 71	"	29 Aug 71
5	Clypeus	690	Steam	"	3 July "	"	30 "
6	Mecca	951	"	"	7 "	"	6 July "
7	Summide	584	"	"	20 "	"	19 "
8	Abraham	568	"	"	28 "	"	27 July "
9	Clarinda	694	"	"	31 "	"	29 "
6263	0						
1	Monica	406	"	"	18 Sept "	"	18 Sept "
2	Senior	537	Sails	"	20 "	"	18 "
3	Angela Lass	264	"	"	21 Oct "	"	2 Oct "
4	Thomas Parker	738	Steam	"	6 "	"	5 "
5	Squirrel	94	"	"	21 "	"	21 "
6	Marc Aubrey	869	"	"	30 "	"	26 "
7	Lawrence	422	"	"	4 Nov "	"	27 "
8	Arno	690	"	"	22 "	"	22 Nov "
9	Selous	653	"	"	28 "	"	27 "
6264	0						
1	Mercator	710	"	"	28 Dec "	"	27 Dec "
2	Talbot	521	"	"	12 Jan 72	"	9 Jan 72

Figure 6. “Appropriation Books” of the Registrar General of Shipping and Seamen (Cardiff) with handwritten note referring to the steamer Mecca. Credit: Crew List Index Project (<https://crewlist.org.uk/data/appropriation/62601>).

The Italian total steam fleet grew steadily after the national unification: In 1862 it amounted to 10,228 tons, in 1872 it was 37,860, in 1876 it went to 57,881 tons, and in 1882 it almost doubled with 104,719 tons [49] (p. 177). Nonetheless, the Italian steam fleet was not only undersized, but also had a little share of the overall composition of the national navy, where sailing ships still had a good game. In 1870, Italy had a total steam fleet equal to only 3.17% of the entire tonnage of the merchant fleet and by 1880 this percentage had grown slightly, reaching 7.71% [50] (pp. 80–81). If compared with the fleet of other European countries, these data clearly show the lack of dynamism and, above all, the inadequacy of the Italian industrial complex in the ‘steam race’ imposed by the new mechanisms of large-scale maritime trade [51–54] (pp. 247–255). This international freight traffic required increasingly larger steam vessels with capacious holds: In 1868 the average net tonnage of Italian steamers used in international navigation was still 193 tons, while that of foreign fleets was on average 453 tons [41] (p. 114). This was the situation when, in order to benefit from the new trade opportunities with the East, *Lloyd Italiano* purchased *Mecca*, promptly renamed *Livorno*, and four other modern steamers. The

latter were also built in England and launched between 1871 and 1872: They were called *Genova* (1494 grt), *Firenze* (1015 grt), *Torino* (1553 grt), and *Roma* (1736 grt). Among them, only *Genova* was built in Glasgow by Alexander Stephen and Sons Ltd., on the banks of the River Clyde, while all the rest came from Sunderland's arsenals.

Since 1872 *Lloyd Italiano* undertook mainly round-trip routes, on average 35 days each way, between Genoa and Calcutta, touching the ports of Livorno, Naples, Suez, Aden, and Ceylon. The imported goods were mainly cotton, coffee, seeds, hides, shellac, spices, saltpeter, and other merchandise [48] (pp. 570–572) [55] (p. 423). In Genoa and Livorno the ships were often loaded up with marble, while from Trapani and Cagliari they systematically exported large quantities of sea salt to Calcutta: It is estimated that between 1872 and 1875 the company brought 32,665 tons to India [48] (p. 570, table III; p. 572, table VI). With some rare exceptions, *Livorno* (ex-Mecca) was assigned to this line as well, having Captain Daneri as her new master since the beginning of January. According to the data provided by the company, *Livorno* (ex-Mecca) had an average speed of $9\frac{1}{2}$ miles per hour, consumed 72 kg of coal per mile and about 16 tons of coal every 24 h of navigation [48] (p. 569, table I).

The year of 1872 was an *annus horribilis* for the steamer because of two accidents in which she was involved (Figure 7). The first, mentioned by many newspapers of the time, happened on April 11 around 10 pm when *Livorno*, while trying to enter the port of Bombay (now Mumbai) without the assistance of a pilot, hit a “buggalow”—a native ship of the Indian Ocean—named *Palkee* (120 grt), owned by the Rajah of Verawull, with 44 persons on board [56] (p. 4), [57] (p. 3), [58] (pp. 12–13), [59] (p. 2), [60] (p. 7). The local boat, which attempted to maneuver to leave the port with a load of rice and sugar, sank, causing 11 casualties. Among other things, as reported by some newspapers, including the *Homeward Mail* of 6 May, it seems that it could have ended much worse since, “She [i.e., *Livorno*] was observed when coming in by the pilot schooner, and signals were burnt, but they were apparently not noticed. Her collision with the buggalow saved her from running on to the Sunken Rock, as at the time of the accident she was going straight for it, and ten minutes more would have sufficed very probably to make her a complete wreck” [61] (p. 2). The authorities were investigating the incident and the results are known to us thanks to the press release published on the *Shipping and Mercantile Gazette* by the London agents of *Lloyd Italiano*, H. Clarkson and Co. The statement not only claimed that the Court totally exculpated the *Livorno* steamer and her crew as “The survivors from the buggalow were examined as well as the Officers of the Lightship, and it was proved that, with the exception of the helmsman, all on board the native vessel were asleep, and he saw the steamer’s lights a considerable distance off, but took no steps to avoid a collision, notwithstanding his vessel was showing no lights,” but also that “The report of the steamer having been saved from the rocks by this collision in entirely without foundation, as she was steering her proper course” [62] (p. 5).

Meanwhile, since the end of June 1872, the *Livorno* master was no longer Daneri, but G. Martino who was hastily sent by *Lloyd Italiano* to Bombay [63] (pp. 5–7) to take command of the steamer and leave in time for Liverpool on 18 July [64] (p. 4), [65] (p. 14), where it arrived on 17 September with a mixed load of cotton, wool, hemp, and “myrabolams” [66] (pp. 3–4).

The second accident occurred at the end of 1872 and concerned the sudden death of the chief officer. It happened on 14 December during the Atlantic crossing, on the return route from Canada (Montreal, Quebec, Sydney C.B.) to London [67] (p. 4), [68]. We can learn the dynamics of the disaster caused by a violent storm from the *Cork Advertiser* of 19 December 1872: “... The mate, while at the wheel, was struck by a very heavy sea which washed over the vessel. It struck him and dashed him against the bulwarks, inflicting serious injuries upon him, from the effects of which he died. He was yesterday brought ashore in Queenstown, where it is expected he will be buried” [69] (p. 6).

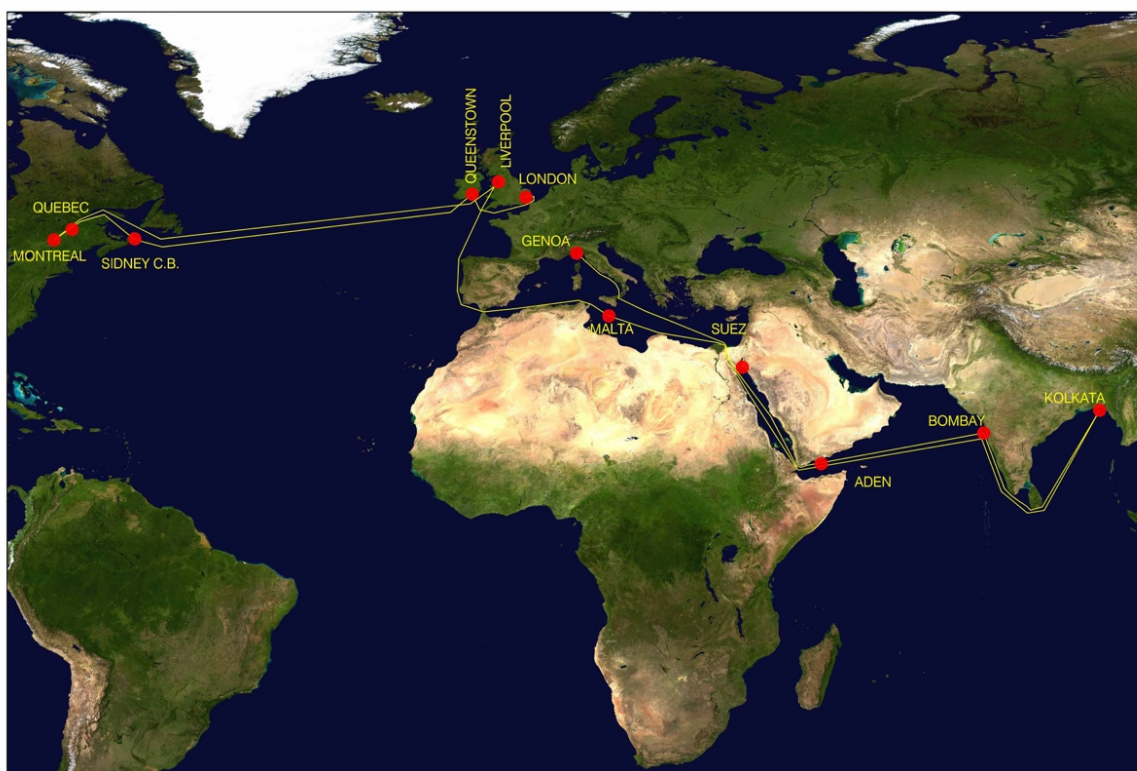


Figure 7. The routes of *Livorno* in 1872 with the main stages (editing: Luca De Rosa).

In the years 1873, 1874, 1875, and 1876—apart from Marseille, ports in the United Kingdom (Cardiff, London), and occasional trades for Mauritius and Singapore—*Livorno* sailed mainly along the Genoa–Calcutta route and back. It is worth to mention a slight accident that occurred on 22 September 1873 when the steamer, coming from Shields and directed to Genoa, ran aground on the Goodwin Sands in front of Cape Deal, England, fortunately without serious consequences [70] (p. 8), [71] (pp. 11–12). Also noteworthy is a new change in command of the steamer which occurred in February 1873 when Martino was succeeded by Captain Dodero [72] (p. 4). At the end of 1874, the latter left the command to be replaced by Captain Crucciani [73] (p. 7). It should be also remembered that in August 1875, during a voyage from Calcutta to Genoa and Marseille, *Livorno* broke the transmission shaft just before arriving in Aden on 4 August: There the crew rudely fixed the broken component and the steamer was able leave again on 7 August [74] (p. 9). A few days later, on 12 August, the crankshaft broke again, and the steamer remained at anchor near Mocha, in the southern Red Sea, awaiting rescue. The aid came from the steamer *James Hutton* (2343 grt) [75] (n. 575) of Joseph Heald and Co. of Newcastle, who after having intercepted the damaged steamship towed her to Aden where she arrived on 14 August. This event resulted in a court case concerning the legitimate compensation due to *Hutton* for the provision of recovery and towing services. The dispute only resolved in the appeal sentence of 1877 when the High Court of Justice-Admiralty, Division of London determined an adequate compensation [76] (p. 6).

The economic situation of *Lloyd Italiano* was not good at all: In 1874 the company's shares on the Genoa Stock Exchange were worth 120 Lire compared to the 500 Lire of 1871. This meant that after a few years they lost 320 Lire per share [77] (p. 120). The director Lloyd, A. Nattini, admitted in 1876 that, "... the Company's balance sheet proves that it earns money only just to secure a capital amortization fund, but the hope of having interests for the shareholders is excluded. It therefore seems proven ... that in Italy steam shipping companies cannot live without subsidies" [48] (p. 566). He demanded, "at least a subsidy a little higher than the serious expense of crossing the Suez Canal." This did not happen and during the shareholders' meeting of 1876, a little earlier than the approval of state

subsidies with the Law n. 3880 of 15 June 1877, Senator Migliorati spread the rumor, “that Lloyd will never have subsidies of any kind” [41] (pp. 151–152). It should be added that the company’s coffers were yet to recover from the tragic downsizing of its fleet, since on 7 July 1874 the steamer *Firenze* [78] (p. 8), only three years old, sank after having ran aground on February 12 in Ras Sherateeb in the Red Sea during a trip from Genoa to Bombay [79] (p. 3), [80] (pp. 9–10). Only two years later the same fate was suffered by *Genova* (ex-*Glensannox* equipped with engines built by J. and J. Thomson of Finnieston Engine Works) [81] (p. 46) which, on 18 January on the route from Genoa to Calcutta, sank near Galle (Ceylon) after hitting the Whale Reef [82,83].

In the same year, on 4 September 1876, *Lloyd Italiano* was dissolved by its shareholders: The resolution was formalized on 26 September by the Court of Commerce.

In 1876 the three vessels still owned by *Lloyd Italiano*, namely *Livorno*, *Roma*, and *Torino*, which had a net tonnage of total 3082 tons, were purchased by the shipping company headed by the Genoese Raffaele Rubattino [84] (p. 92), (Figure 8). According to an estimate made a few years later, precisely in 1881, the three steamships were worth Lire 2,150,000 on the market [41] (p. 187, note 64). Taking advantage of the financial difficulties of other companies, for some years Raffaele Rubattino had been extending his fleet with an unscrupulous investment policy, regardless of a very difficult moment that the company was going through [85] (p. 81). In 1872 he bought *Piombino* (ex *Labrone*, 21.76 grt) [3] (p. 179), in 1874 two used steamers by the Baltic Lloyd (*Sumatra* and *Batavia*) [3] (pp. 173–174) and in the same year the brand-new *Assyria* (1605 grt) from a shipyard in Sestri Ponente [3] (p. 174). In 1875 he bought *Corsica* for just 100,000 Lire (ex-*Liguria*, 209 grt) by a company based in Porto Maurizio and in 1876 [3] (p. 173), in addition to the aforementioned purchases from *Lloyd Italiano*, he bought *Pianosa* (73 grt) and then *Malta* (ex-*Brindisi*, 1055 grt) and *Candia* (ex-*Cairo*, 1042 grt) from the *Adriatico-Orientale* company [3] (p. 172), [41] (p. 286). At the end of 1876, the “Rubattino Company” owned as many as 31 steamships for a net tonnage of 19,021 tons; in 1877 the number of steamboats reached 35 units for 20,153 net tons [41] (p. 197). These figures made *Rubattino and Co.* the second national company in terms of overall net tonnage, largely outclassed by Florio company.

The two leading Italian shipping companies, Rubattino and Florio, had been implementing since several years a policy of concentration of steam fleets on a national level, and in 1877 they together held 73% of the national net tonnage for steamships. Obviously, the concentration of steamers coincided with the hegemony in the appropriation of state subsidies. In relation to the subsidies for postal and commercial services, as provided for by Law n. 3880 of 15 June 1877, in 1878 the Rubattino Company owned 45% of all state subsidies [41] (p. 196).

Despite all this, the debt situation of Raffaele Rubattino’s company was nothing less than appalling. It suffered a chronic lack of liquid assets and a constant pressure from lenders to pay off the bills. The revenues from state subsidies were mainly used to temporarily cover the debts and for planned and extraordinary maintenance interventions on the vessels. The latter were very onerous: Between 1 January 1877 and 30 June 1881 the company’s repair and maintenance expenses amounted to Lire 7,290,913 [41] (p. 233 and note 1), not to mention the economic crisis going on since 1873 which, in addition to a general deflation, caused a decrease in freight rates almost everywhere [86] (p. 179 ff.).

Be that as it may, along with the transition to the company of Rubattino, *Livorno* changed her name again and was renamed *Bengala*. It is likely that this choice was somehow linked to the usual destination of the steamer which, as we shall see, remained the East routes. The steamer appears with a new name in the *Lloyd’s List* as early as 1877, when its departure from Genoa to Calcutta on January 10 was announced. Master Crucciani was still in command and confirmed under the new ownership [87] (p. 11).



Figure 8. Raffaele Rubattino, the third owner of the steamer, in a painting by an anonymous artist dated around 1870. Genoa, *Camera di Commercio* (from Piccione, P., ed. [3]).

In the years 1877–1881, the Rubattino Company assigned *Bengala* to two lines. The first included Genoa, Livorno, Naples, Catania, Port Said, Aden, Bombay, and Calcutta; it was not included in the routes subjected to the state convention according to the law of 15 June 1877, so this route was proposed by the owner on his own initiative and without the obligation of regular departures [84] (p. 96, note 1). The second route was, by contrast, regulated by the aforementioned agreement which obliged the shipowner to establish a new line from Genoa to Singapore with four trades per year (subsidized with Lire 560,000 per year, corresponding to Lire 32 per nautical league) and at least two extensions per year from Singapore to Batavia [41] (pp. 191, 194, 195 note 14).

In 1877 the steamer went backward and forward from Genoa (or London) to Calcutta; in 1878, in addition to the routes to East India, an unprecedented voyage was undertaken in March to the Black Sea and the Sea of Azov: An article from the *Lloyd's List* of 23 April indicates that the ship passed through the Strait of Kerč in western Crimea on 2 April [88] (p. 10).

In the first months of 1879, the steamer still travelled on the route from Genoa to Calcutta, after which she would have stood still for some time to undergo a repowering of the engine into a compound engine one by the shipyards “N. Odero and Ferro” of Sestri Ponente, Genoa. (Figure 9).

The new compound engine of 254 NHP replaced the old Clark engine of 170 NHP and the machines for high steam pressure were also adapted. *Bengala*, by then, could aspire to run at 11 knots against the 9.5 of the old engine. The new engine was a compound twin cylinder with 73 and 134 cm bore and 106 cm of stroke [89] (p. 211, n. 24). As reported by the press of the time, on 26 September 1879 *Bengala* completed a test run before a commission that “had a very happy ending” [90] (p. 705). The steamship went back in operation in the autumn of 1879 when, in October and November, it

travelled from Genoa to Singapore, Batavia [91] (p. 2) and Semarang where she was loaded up with sugar [92] (p. 8).



Figure 9. Wreck of the *Bengala* steamer. Detail of the huge compound engine of 254 NHP by “N. Odero and Ferro” of Sestri Ponente (Genoa) mounted in 1879 to replace the old engine of George Clark (photo credit: Salvatore Medaglia).

The following year, *Bengala* crossed the Suez Canal as many as five times [93] (p. 609) and on one occasion she reached Batavia [94] (pp. 8–9). Also in 1880, precisely on March 9, the *Tribunal de Commerce de Marseille* condemned Rubattino and Co., Compagnie des Docks, and Captain Crucciani to indemnify with interests Angst Kock and Co. for some 221.70 kg of coffee missing in the load that had been transported in sacks on *Bengala* from Java [95] (pp. 139–140).

As in the previous year, also in 1881 the steamer reached the Java Sea up to Batavia and Samarang. It is worth mentioning that during the return from Singapore to Marseille, which lasted from the end of September to the beginning of October 1881, the engine broke and caused *Bengala* to await in Suez for about two weeks to carry on the necessary repairs [96] (p. 4).

2.3. *Bengala* (1881–1889)

Due to the overdraft and an extremely low profitability index [97] (p. 242), Rubattino’s Company merged with Florio from Palermo, marking the birth of the largest Italian shipping company. On 4 September 1881 the company, “*Navigazione Generale Italiana. Flotte riunite Florio e Rubattino*” (NGI) was founded with a share capital of 50,000,000 Lire and a fleet of 81 steamships amounting to 58,335 net tons [41] (p. 246 ff.), [98,99].

The NGI was the second largest shipping company in the Mediterranean and, in fact, was growing even more with the further acquisition of 12 ships from “Raggio and Co.” and five steamers from “Rocco Piaggio and Figlio” in 1885 [1] (p. 142), [99] (p. 34). After the last acquisition, in 1885 the NGI

owned as many as 109 of the 225 vessels registered in the ports of the Kingdom (*Regno d'Italia*) [99] (p. 35), (Figure 10).



Figure 10. One of the ships belonging to the fleet of *Navigazione Generale Italiana* in an advertisement of the time (credit: Lentini, R., *E la nave va. Crispi, Florio e la nascita della Navigazione Generale Italiana*, *Dialoghi Mediterranei* (Periodico bimestrale dell'Istituto Euroarabo di Mazara del Vallo) 2019 (<http://www.istitutoeuroarabo.it/DM/wp-content/uploads/2018/12/113.jpg>).

Among the ships of the Rubattino fleet sold to the NGI, there was also *Bengala* whose value had been estimated to amount to 600,000 Lire [1] (p. 91).

In the year of birth of the NGI (which also coincided with the death of R. Rubattino on 2 November), there was a change at the command of the steamer since Master Fabiani succeeded Crucciani [100]

(p. 3). The former remained in command for a few months, giving way to Master Gavino in March 1882 [101].

In that same year, in accordance with one of the new commercial ambitions of NGI which was strongly interested in the transport of emigrants overseas, *Bengala* marked the first NGI voyage to America between March and April, leading 446 emigrants to New York from the ports of Naples and Messina [3] (p. 174), [1] (p. 91).

Between 1883 and the beginning of 1884, Captains Anfosso, Rosselli, and Mancini rapidly succeeded each other. Meanwhile, *Bengala* was assigned back to the usual route of Singapore.

In 1885, at least one Atlantic crossing needs to be mentioned: The one to Latin America, which happened between March and April, in which the steamer reached the ports of Buenos Aires, Montevideo, and Rio de Janeiro [102] (p. 1040), [103] (p. 1406), [104] (p. 1523). On 5 May 1886, the ship moved away from the maritime authority of Genoa and was registered in Palermo [3] (p. 174), (Figure 11).

Also noteworthy is *Bengala*'s participation in the naval force offered by NGI to Crispi's government for the 1887 Italian military expedition to Eritrea against a payment of three million Lire [98] (pp. 339–340). In total, 11,742 men and 1904 animals embarked from Naples on 16 steamers under the command of General Alessandro Asinari di San Lorenzo. *Bengala*, who left on November 6 and arrived in Massawa on the 17th of the same month, embarked 10 officers, 12 non-commissioned officers, 147 soldiers, and 159 quadrupeds (horses, donkeys, and mules) [1] (p. 289), [105] (pp. 101, 103).

Over its last years, the steamer was mostly used for cabotage routes along the most trafficked ports between the ports of Genoa and Trieste (Figure 12). In January 1886, while sailing down the Adriatic, she had to stop in Brindisi because of a failure [106].

That same trade and passenger route, scheduled once per week from Trieste to Marseille and back, is the one that the steamer was following in the late spring of 1889 when shipwrecked. The events were covered by various newspapers of the time, e.g., [107,108], in which it is stated that the steamer, with Francesco Rosasco at the command, the crew, and three or eight passengers (depending on the sources), had crossed the Adriatic at the end of May. After having called at Taranto, she was expected to call at Catanzaro Marina in the Gulf of Squillace, about 40 nautical miles from Crotone. The steamer was loaded with various goods and navigation went fine until, in the late afternoon, she arrived at Capo Rizzuto (near Crotone) where there is a vast shallow scattered with rocky shoals for many hundreds of meters. It is a very dangerous area for navigation and well known for having caused numerous shipwrecks over the centuries [109].

As the ship was proceeding at great speed with a strong southwest wind (*Libeccio*), while trying to go round the bank, "a terrible crash was heard, followed by a long rumble, as if an iron slab was being torn apart by a tremendous blow" [107] (p. 2). The steamer had hit some rocks that caused a large crack in the bow sector (Figure 13). After leaning on the starboard side, *Bengala* sank in a very short time. While the steamship was being abandoned, two members of the crew lost their lives: A waiter-cook who, panic-stricken, clung to an iron part of the ship and sank with her, and the third engineer who, having jumped into the sea, was swallowed up by a whirlpool. The survivors were brought to safety in Cotrona (now Crotone) by a sailing ship of the Taranto port, named *Mamma Chiara*, which was fortunately passing through the same expanse of rough sea.

The torpedo boat n. 99 I of the Italian *Regia Marina*, however, found it impossible to salvage the ship due to the depth of the seabed [45] (p. 138). An incident investigation was opened by the authorities at the Royal Prosecutor's Office of Catania [110] (p. 105).

The *Bengala* shipwreck was a hard blow for *Navigazione Generale Italiana* company. This tragedy added to many more or less concomitant difficulties, such as a marked drop in earnings coming from the lines to South America due to the Argentine Revolution, uncertainties about the future due to the expiration of the maritime subsidies on 31 December 1891, the general economic crisis of the 1890s, and the death of Ignazio Florio. All these factors had such massive repercussions on the stock market that, in August 1891, the company's shares fell to an all-time low of 254 Lire [98] (p. 340).

THE RECORD, 1885.														Ben
No. Off. No. Signal Letters.	NAME OF VESSEL AND MASTER.	Rtr.	NATION. Reg.	HAILING PORT. Dimensions.			Tons. Decks	BUILT.		OWNERS.	REMARKS.	YEARS.	CLASS.	LAST SURVEY.
				Lib.	Bth.	Dth.		When.	Where. Builder.					
313	Benan ----- Ross, J. NTLJ	S	Br	Leith	242.6	36.9 22.2	1338	'75	Glasgow, Scot.	W. Thom- son & Co.	I;1BH			San F 9, '76
314	Benarty ----- Potter, J. WTQR	Sew	Br	Leith	291.8	33.3 24.6	1119	'76	Glasgow, Scot.	W. Thom- son & Co.	I;5BH;C $\frac{3}{8}$ x39			N Y 8, '81
315	Benbrack ----- Lamb, T. QGCV	Sew	Br	Liverpool	300.3	34.2 24.1	1226	'62	Glasgow, (Smith & Rogers.) D D	J. Hoult	I;5BH;2C $\frac{3}{8}$;xBellona			Hlfx 1, '83
316	Benclench ----- Clark, J. PCJH	Bk	Br	Alloa	246.9	37.2 22	1350	'75	Greenock, (R. Steele & Co.) D D	W. Thom- son & Co.	I;1BH			N Y 10, '82
317	Benedetto ----- Roccatagliata. SQPC	Bk	It	Genoa			447	'73	Lavagna, It.	M. Trabucco	O;Icf;srps,clk, M11.80;xVenti Settembre			Phila 6, '82
318	Benedetto ----- Trapani. NHBW	Bk	It	Naples	115.8	25.9 18.1	370	'66	Alimuri, It.	F. Caffiero & O.	O,P;Icf;srps6,76; M4.81			N Y 2, '81
319	Benedicta ----- Darum, C. LKNW	$\frac{1}{2}$ B	Ger	Apenrade	111.5	25.7 13	247	'74	Apenrade, Ger.	G. F. T. Ra- ben	O;Icf;clk b,M8,84			Lvpl 8, '84
320	Benefactor ----- Tribon. 2,722	Sew	Am	New York	179.6	36 19.1	844	'70	Chester, Pa.	Wm. P. Clyde & Co.	I;4BH;1VD,1Blr; rps3,78;rps11,80	10 6,70	Ex	Wgtn 1, '84
321	Benefattore ----- Thian. JCHQ	Bk	Aus	Fiume	141.3	28.8 20.9	651	'75	Fiume, (G. Brazzoduro) Aus	G. Vicevich & Co.	O;Lch;Icf;M9,81			N Y 5, '84
322	Bengal ----- 2,469	Sew	Am	Norfolk	70.1	21.4 7.3	74	'46	Warren, Me.	B. & J. Baker	M;Icf;clk6,77	3 6,77	Ex	Nfk 6, '77
323	Bengal ----- Douglas, A. QLWF	Sew	Br	London	310	39.2 25.4	1303	'53	Greenock, Scot.	N. Y., Lond. & China S. S. Co.	I;6BH;2C,2Blrs			N Y 12, '76
324	Bengal ----- Gray, J. NCVP	Sew	Br	London	270	33 24.4	1095	'74	Middles- boro, Eng.	Glover Bros.	I;4BH;C $\frac{3}{8}$ x39 (W. Bal.)			N Y 4, '78
325	Bengal ----- Treng, W. HTPJ	S	Br	Liverpool	212.8	37.2 22.5	1296	'68	Birken- head, Eng.	F. A. Clint & Co.	I;1BH			N Y 1, '82
326	Bengal ----- Westman. 55,594	Bk	Br	Addl, S.A.	136.5	27.4 11.9	307	'64	Gefle, Swd.	Taylor & Co.	F;Icf;srps8,81; M7,83			Addl 9, '81
327	Bengal ----- Westerman, J. M. HLPT	Bk	Swd	Gefle	149.9	31.8 18.6	716	'74	Gefle, (Brodin.) Swd.	P. C. Rettig & Co.	F,O;Icf;clk,M12,81			Antw 12, '81
328	Bengal ----- Nye. RCMT	Bk	Swd	Umea	136.5	30 20	610	'51	Sunderland Eng.	N. Scharin	O,T;Icf;srps79; M11.79			N Y 5, '81
329	Bengala ----- Garino, A. QGFT	Sew	It	Genoa	246	31.4 21.3	952	'71	Sunderland Eng.	R. Rubattino & Co.	I;4BH;2C $\frac{3}{8}$ x41 $\frac{1}{2}$; xLivorno;xMessina(W. Bal.)			N Y 4, '82
330	Bengale ----- Bondon, C. HLVS	Bk	Fr	St. Servan	141.4	29.8 16.5	543	'73	St. Malo, Fr.	E. Le Marc- chal	O;Icf;srps80; M12.83			Mars 12, '83
331	Bengalen ----- Hofer, B. B. NGTR	Bg	Hol	Dordrecht	101.3	22.9 14.4	293	'54	Rotterdam, Hol.	A. Sandberg & O.	O;Icf;M2,78			Bost 2, '76
332	Bengloe ----- Buchanan, J. SCVP	Sew	Br	Leith	301.5	33.2 25.1	1854	'78	Glasgow, (Bailey & Co.) D D	Wm. Thomp- son & Co.	I;5BH;2C $\frac{3}{8}$ x45			N Y 2, '80
333	Benguela ----- Mortensen. JGLM	Bk	Nor	Flek'fjord	150.6	31.9 18.5	668	'76	Quebec, Ca.	B. Ingvard- sen	M;Icf;M12,83			Ldn 12, '83
334	Benhope ----- Doyle, P. WETQ	Sew	Br	Liverpool	246.3	34.2 17	1031	'82	Barrow, Eng. (Caird & Purdy)	Jos. Hoult	I;5BH;2C $\frac{3}{8}$ x39			N Y 1, '84
335	Benito Esten- Canals, E. ger	Sew	Sp	Santiago	150	25 10	3	'82	Camden, N. J. (Dialogue.)	Benito Es- tenger & O.	I;4BH;C $\frac{3}{8}$ x28	1.3 6,82	I	N Y 3, '82
336	Benjamin ----- Holmes. 2,442	Sch	Am	Pembroke	71	22.3 6.5	71	'50	Lubec, (Wilden.) Me.	Daniel K. Hobart & O.	M;Icf			N Y 3, '83

The * prefixed denotes Vessels built under Supervision of the Association or classed under Special Survey. No Vessel will be classed or rated unless surveyed and opened according to rules. All classes will be printed in Red. A draft will be fixed when required by owners.

Figure 11. A page taken from the book *Record of American and Foreign Shipping 1885* with the mention of *Bengala* steamer (credit: New York Public Library, Public Domain, Google-digitalized).



Figure 12. A small insertion taken from a newspaper of 1887 with the announcement of the departure of the *Bengala* steamship along the route from Trieste to Genoa.

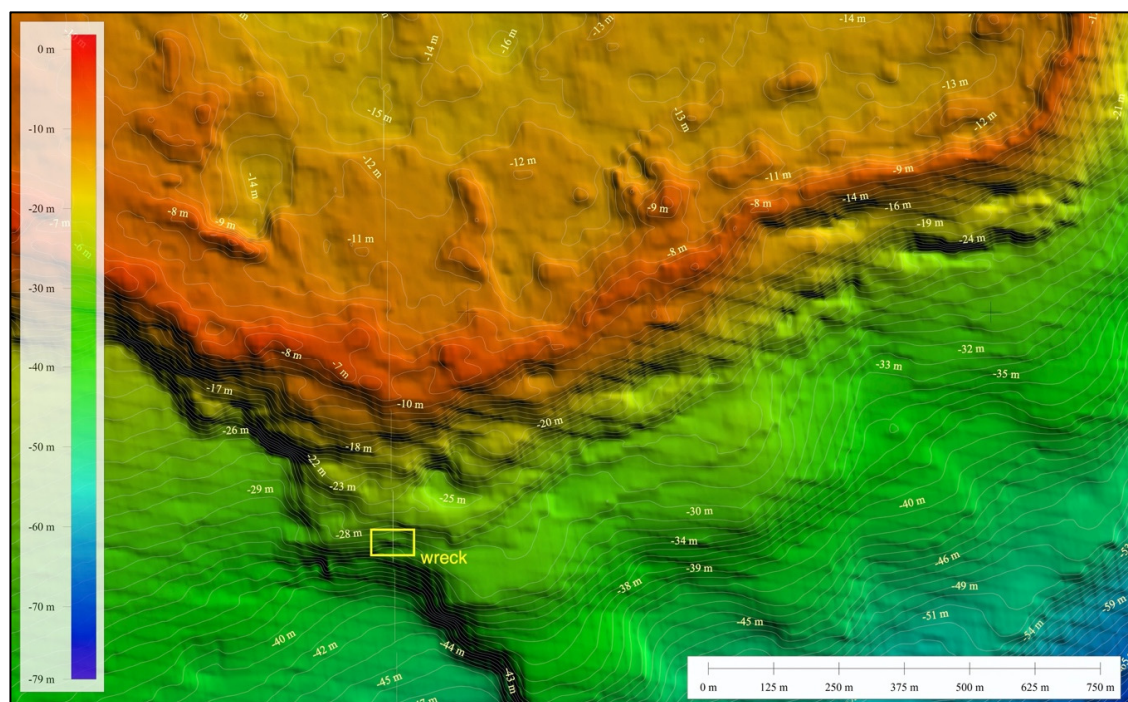


Figure 13. Multibeam acoustic survey with the position of the wreck along the side of the underwater escarpment (MB credits: AMP Capo Rizzuto; GIS processing Fabrizio Mauri).

3. The Wreck and the Archaeological Context

The site of the wreck is located off Capo Rizzuto (Crotone), about 1500 m from the coast and at a depth of 26–29 m. The body of water in question falls within a natural reserve measuring 14,721 hectares, established in 1991 and named “Area Marina Protetta Capo Rizzuto” (Figure 1). The section of the seabed that surrounds the steamer gradually slopes from north to south and features a mixed composition of sand and rocks.

The lack of images or drawings of the time does not facilitate the analysis of the submerged remains of the steamer. Until now it has not been possible to find such a depiction. In any case, the hull is still in a single piece and its orientation reflects the navigation position with the keel down, according to the longitudinal axis oriented in the W–NW/E–SE direction with the bow facing W–NW, therefore pointing towards the mainland (Figure 14).



Figure 14. *Bengala*: The current state of the stern of the wreck (photo credit: Francesco Megna).

The few observations that follow are not the result of an actual archaeological investigation—they come from observations made during recreational dives aimed at obtaining preliminary data concerning the actual consistency of the remains attributable to the wreck. These data are necessary and functional for the subsequent planning of any archaeological investigations to be agreed with the authorities responsible for the protection of the underwater archaeological heritage.

Although most of the remains have been preserved very well, it is clear that a number of superstructures of the wreck have collapsed, causing a bumping in some portions of the hull, and in particular in the broadsides and the main deck. This breakup seems not to depend on the natural mechanical wear of the iron structures, but may be attributable, as some old oral testimonies might confirm, to the illegal and noxious—although now abandoned—practice of blast fishing. It is also noteworthy that after the steamer foundered, the mast head was still emerging from the waters and only several decades later it was removed because it constituted a danger to navigation.

The quickworks seem to be preserved for the most part and some spaces pertinent to the holds are intact and deeply embedded in sediments, also by virtue of the weight exerted by the hull. As mentioned above, the main deck has collapsed almost everywhere and many of its parts are scattered on the seabed. Among the surviving artefacts belonging to the main deck, we should mention a chock (originally mounted on the vessel to support the lifeboats or used as a derrick) with a pulley still in place (Figure 15). Some winches are also clearly visible at different points on the deck: These were used for handling loads or as windlasses.

The aft sector is well-preserved too and shows a three-blade propeller still in place within the aperture and in axis with the drive shaft. Outside the stern post, it is possible to observe the dudgeons that were hinging the rudder (Figure 16). The latter is torn off but lies at a few meters on the seabed. The transom is tapered and pointed at the quickworks; the ribs and beams that supported the deck are also clearly visible here as in other parts of the hull.

The highest point of the structure off the seabed, in the absence of the masts and the funnel, are the perfectly preserved boiler and compound engine. The latter, already mentioned in the present paper and installed in 1879 by N. Odero and Ferro of Sestri Ponente, presents a clearly visible head that houses the double-expansion cylinders, the connecting rod-crank system and the tube bundles that carry and discharge the steam (Figure 9). At the bow, where the upper deck has collapsed, two

large admiralty anchors are still in place, with the respective chains still well coiled as they were at the time of the sinking.



Figure 15. *Bengala*: A chock with a pulley still in place (photo credit: Salvatore Medaglia).

As often happens in similar environments, due to its complex and articulated structure, the entire wreck has provided a shelter for flora and fauna. Biocoenosis is extremely varied and sedentary in some cases. Among many species that can be observed, there are brown meagres, groupers, sea breams, scorpion fish, dentexes, lobsters, slipper lobsters, fan mussels, and many more. The flora is typical of the marine environment, with many species perfectly integrated into the covering substrate that naturally formed in the meanders of the metal plates.

Underwater visits to the wreck are currently allowed, but only with the supervision of official scuba guides and in accordance with the strict regulations in force at the Marine Protected Area.

Considering the dynamics of the shipwreck, the current position of the wreck indicates that, after hitting the rocks of the Capo Rizzuto shallows and suffering a gash on the bow, it must have displaced a little before reaching the bottom. This distance, however, might not have been too large if we consider that the sources of the time unequivocally refer to a fairly quick foundering after the collision with the shoals. The draught of the steamer, as indicated by the historical documentation in our possession, measured about 5.5 m: On the basis of this datum and with the help of multibeam acoustic bathymetry, it was possible to discriminate the probable points of impact. In doing so, it is clear that among the compatible seabed sections, i.e., those at a depth between -6.5 and -3 m, the closest sections are at a distance lesser than 300–350 m from the current position of the wreck (Figure 17). This confirms what was reported in the accounts of the time: In the attempt of doubling the Capo Rizzuto Promontory, *Bengala* had almost entirely avoided the reef, as the position of the shipwreck is close to the very last line of rocks that bounds the shoal in the southwest.

All the same, one can speculate on why the steamer sailed so close to such dangerous shoals. The presence of rough sea and a strong southwest wind on the day the steamer sank (as referred by the sources of the time) probably helped to push *Bengala* in the E–NE direction, therefore right towards

the reef. Contrary to what was reported by several Italian and foreign newspapers then, the rocks were well known, as irrefutably demonstrated by the official nautical cartography of the time and in particular by the *Carta costiera da Cotrone a S. Andrea del Jonio*, drawn to scale 1:100.000 and produced by the Hydrographic Office of the Italian Royal Navy in 1879, 10 years before the tragic shipwreck.



Figure 16. *Bengala*: View of the stern with the huge propeller (photo credit: Francesco Megna; photo editing: Fabrizio Mauri).

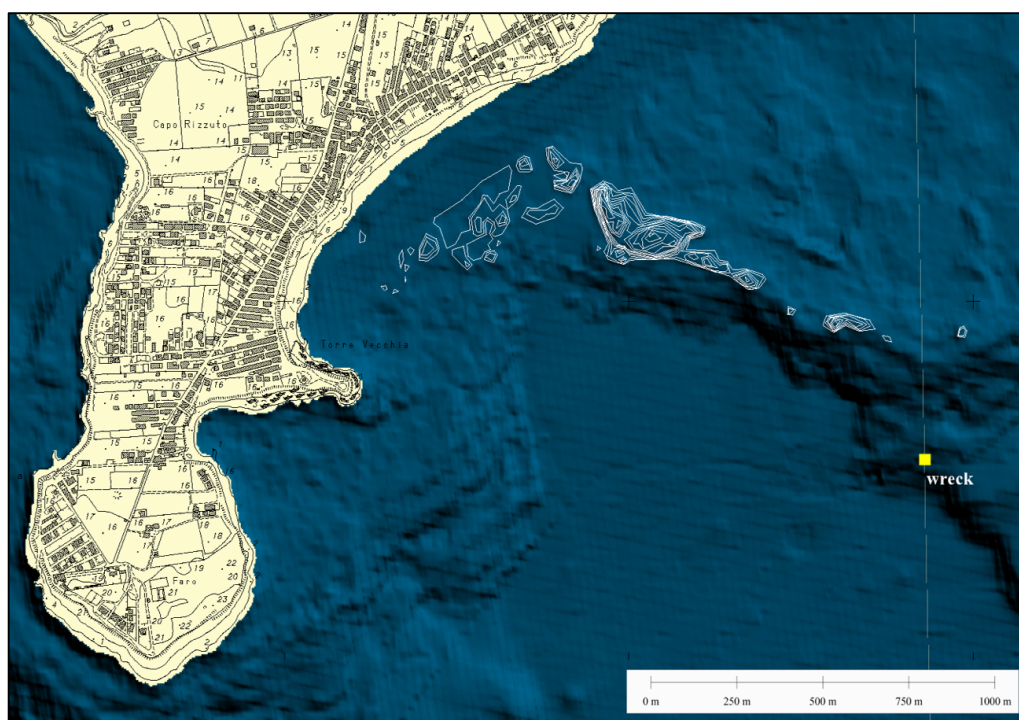


Figure 17. The location of the wreckage on multibeam. Seabed points have been highlighted with a bathymetry (−6.5/−3 m) compatible with the impact of the hull (MB credits: AMP Capo Rizzuto; GIS processing Fabrizio Mauri and Salvatore Medaglia).

4. Conclusions

We can confirm that historical and archaeological investigations on *Bengala* are still in their early stages. Much more shall be done in the future: Among the planned activities that have been given the greatest priority in the next months, a specific campaign of surveys to be conducted on the submerged remains certainly needs to be mentioned. Specifically, it will be necessary to carry out a side scan sonar survey and, above all, an opto-acoustic three-dimensional reconstruction of all the submerged remains. This activity must in fact be considered preparatory to any archaeological investigation that the competent authorities may wish to complete. At the same time, it is desirable that a survey campaign could be carried out also in the area surrounding the shipwreck in search of the point of impact of the ship and other remains pertinent to the steamer. In this regard, to give an example, it must be emphasized that the ship's chimney must still be identified which, based on the first observations, does not seem to be at the point where the hull has lain on the seabed. The prospecting will be conducted both through remote systems (Magnetometer, Side Scan Sonar, R.O.V.) and through underwater operators. Hopefully, in the future it will also be useful to program a research campaign that evaluates the state of degradation of the steamer which, as we have underlined several times, is completely made of iron.

Even historical-archival research, although so far it has been the most developed, cannot certainly be considered concluded. Among the main objectives to which we are devoting the necessary attention, the research of the naval plans of construction and at least one vintage image of the steamer should be remembered.

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