THE ROYAL INSTITUTION OF NAVAL ARCHITECTS

AUSTRALIAN BRANCH

FROM KEEL TO TRUCK

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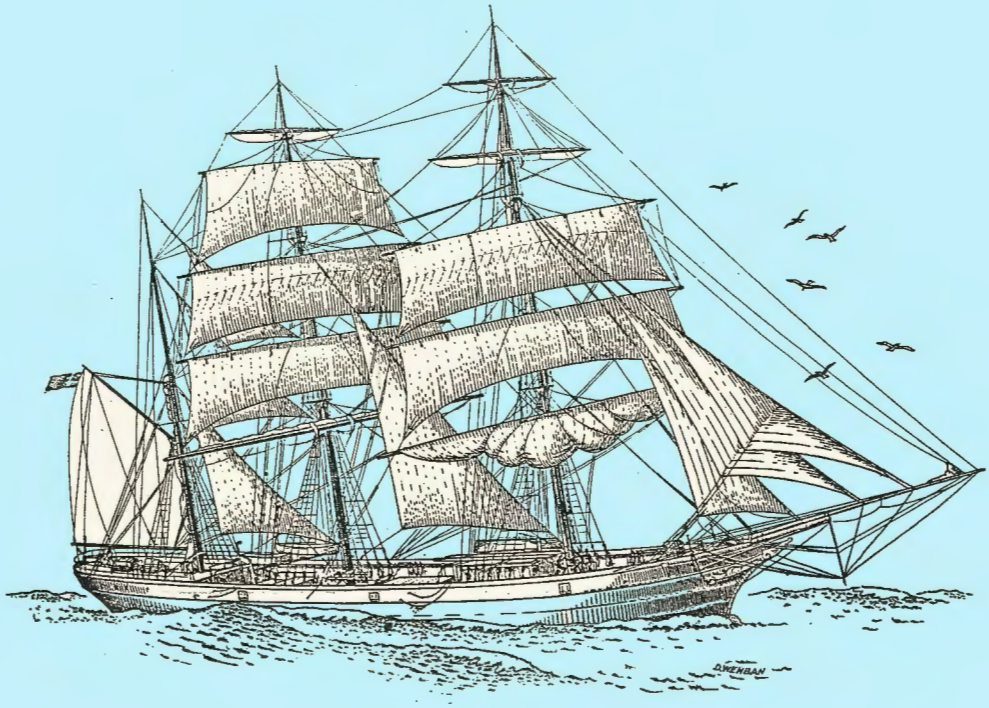
AN OVERVIEW OF PRINCIPLES AND METHODS USED IN THE RESTORATION OF THE BARQUE

JAMES CRAIG



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INTRODUCTION

The tour you have just made of the ship, shore display and audio-visual will have given you a good idea of the history of JAMES CRAIG and the present state of the restoration project.

While inspecting the ship you might have wondered about how the Museum goes about the restoration of such a vessel. How is it that a sailing ship can be created from what was, after all, just a bare hulk? Can such a thing be truly a restoration? What about the many thousands of fittings which are now missing? Is such a restoration of historic significance?

The following discussion will attempt to shed light on these questions.

CONCEPTS OF THE RESTORATION

The objectives of the Sydney Maritime Museum are to preserve maritime artefacts, technology, skills, culture and records of national and international significance and to disseminate this knowledge to the general public by means such as exhibitions, publications, library services, etc.

As with any educational institution, a Museum must establish and maintain a level of credibility. Vital to this credibility is a commitment for authenticity within its collections- the higher the level of authenticity, the greater the credibility and the greater the Museum's potential as a disseminator of knowledge. This commitment to authenticity must extend throughout a Museum's activities Included are ship restorations such as that of JAMES CRAIG.

Within the collections of the Sydney Maritime Museum, the JAMES CRAIG fills an important role. Though no CUTTY SARK or THERMOPYLAE, she is a good representative of the more typical 'workhorse' class of merchant sailing vessel. Constructed by the score in the latter half of the last century, these vessels helped build our nation. They are now extinct on the world's oceans.

"But No!" you might cry, "What about the school ships?" Though superficially these vessels might appear like merchant ships of the last century, take the rig away and all that remains is for all intents and purposes just a peculiar looking motor ship. In all but the superficial appearance of the rig these vessels are worlds apart from the old squareriggers. It should be emphasised that the roles of a school ship and museum ship are by and large quite seperate and distinct and cannot be properly combined in the one vessel. The reasons are many including modern statutory regulations, expectations of living conditions, insurance, crewing and scheduling.

Returning to the JAMES CRAIG, as a vessel of the last century she

will represent a veritable time-capsule of the Victorian era. Literally thousands of items of technical, historical and sociological interest were contained in such a ship. Outside the framework of a complete vessel, it his highly unlikely that many of these components would be properly preserved or documented- have you noticed how many ship's wheels find their way into glass cases but how few rudder pintles, butt-straps and boom goosenecks are likewise displayed? Taken further if all the components of a ship were to be displayed in a Museum under glass cases the question arises of how many people would be bothered to look at them all anyway. A vessel preserved complete gives therefore a balanced approach to artefact preservation and documentation and a meaningful and appropriate venue for display.

In a working vessel all the components are in some way related. By aiming to restore JAMES CRAIG to its original sailing condition the Museum aims to maintain this interdependence of purpose and function, thereby ensuring a more complete and authentic level of restoration.

Having been engaged for nearly 50 years in the arduous Cape Horn and Trans Tasman trades, it is not surprising that JAMES CRAIG underwent numerous changes in her career. In 1922 when the vessel was laid up, she was a very different ship to that when she was launched. Repairs, modifications for changing trades and to reduce costs, the introduction of new technology and statutory regulations all contributed to these changes.

Two points arise from this. Firstly the fact that JAMES CRAIG had been significantly altered and was in need of a major refit at the time she was laid up places the restoration of her hulk in its proper perspective. Even if she had been obtained intact it would have been inevitable that the vessel would need total rebuilding and reconstruction in areas which had been modified. The extent of repair and modification is quite surprising. By the 1920's she had been fitted with her third deck, the entire bulwark had been roughly replaced and repaired, lower spars had been patched and upper spars replaced, boat skids and hand winch removed, boats and deckhouse replaced, chain locker moved, steam and petrol winches fitted, etc, etc. In addition because her hull had been fitted with numerous temporary doubling plates she was badly in need of major repairs. JAMES CRAIG'S predicament was by no means unusual for such vessels after WW1.

The second point which arises is the need to define a fixed period in time upon which to base the restoration. The Museum has been fortunate in that a number of excellent photographs of the vessel were taken in the 1880's and 1890's coinciding with when she was in her prime. It is to this period that the vessel is to be restored to. As far as is known comparitively few modifications had been made by this time.

RESEARCH

The restoration of JAMES CRAIG can be likened to a jigsaw puzzle with three quarters of the pieces missing. The problem is to fill in the gaps and complete the jigsaw so that not only does it look right from a distance but also so that the individual pieces are as close to the original as possible.

From the earliest days of the JAMES CRAIG project the Museum has been engaged in a programme of research for the purpose of the restoration. The Museum is continually corresponding with hundreds of people and organizations worldwide in an attempt to uncover as much material as is possible before the information is required in the restoration process. It is in fact a race against time.

Of course the immediate response is to seek original production drawings of the vessel. Unfortunately this is impossible because none were ever made. In the period JAMES CRAIG was built it was practise with vessels of this type to limit formal drawings to only a general arrangement, lines and midship section- these being mainly for the approval of the owner and classification society. Most of the detailed design was left to the various trade foremen who roughed out sketches of fittings in consultation with the owner's representive. To date the only original drawing of JAMES CRAIG so far uncovered has been the sketched iron spar cross-sections which had been submitted to Lloyd's for approval.

Alternative means of obtaining information must be used. Material is gathered from many sources including libraries, archives, descendants of owners, builders and crew, books, museums, knowledgable experts and the public at large.

This material can be divided into three categories depending upon its source. Each category represents a level in the hierarchy of credibility for use in the restoration. Starting with the most important, these three categories are:-

PRIMARY SOURCES- Information pertaining directly to JAMES CRAIG / CLAN MACLEOD including:-

i) Photographs of the vessel in service
ii) Photographs of hulk when recovered
iii) Measurements and traces of fittings obtained directly from the hulk
iv) Crew lists, building survey reports, registration documents
v) Oral histories and written reminiscences of former crew members

SECONDARY SOURCES- Details of other similar vessels of the period with special credence being given to information pertaining to sailing vessels built by the same builder or for the same owner.

TERTIARY SOURCES- Other information such as that obtained from contemporary and modern texts on shipbuilding and seamanship, details of sailing vessels generally, other museum ships, trade texts and chandlery catalogues.

Clearly the greater the proportion of material from primary sources used in the restoration, the better the chance for an authentic result.

The Museum has indeed been fortunate in that a high proportion (approx 70%) of the material so far used has been from primary sources. Although stripped the hulk contained a vast quantity of detail. Over 80 contemporary photographs have been so far uncovered, taken both from a distance and aboard the vessel. There are some hundreds of photographs and sketches of the hulk as recovered. Research has tracked down the original Lloyd's survey report, spar and rigging sizes, crew articles and numerous other documents. A number of former crew members who served on JAMES CRAIG in the early 1920's have come forward with their reminiscences- helping to determine details in areas not photographed such as accommodation spaces.

Among the most important secondary sources are building and survey data, photographs and artefacts from the seven other Bartram Haswell built iron square-riggers of the mid 1870's. Details of two in particular- CUMBIA, sister vessel to JAMES CRAIG built for a different owner, and CLAN CAMPBELL, a slightly larger vessel built for the same owner have proven a veritable gold mine of information. Artefacts from the wreck of another- the EDEN HOLME- in Tasmania have also been useful. Another rich source of secondary information has been builder's specifications for similar sailing vessels built in other British yards.

Occasions do arise where no satisfactory solution is available from primary and secondary sources in which case it becomes necessary to refer to tertiary sources. Great care has to be taken to ensure that information from these sources is not erroneous as frequently differences and errors are found in items where the actual original arrangement is well-known. Tertiary sources frequently are of great help confirming detail obtained from more positive sources and as a reference when looking at primary and secondary sources.

The research activity on JAMES CRAIG has already revealed some hundreds of details about sailing vessels of the period which hitherto had not been formally documented. Among these are the fact that only hemp and chain were used in the running rigging- the iron wire being too inflexible and steel wire not yet being available. Another is the widespread use of Liverpool points on rivets in structure. Another is the use of sister hooks rather than shackles in the majority of the running rigging. Many of these findings are quite small but taken as a whole they give a very good picture of the technology of the period.

In the above I have concentrated on the technical aspects of the research. Similar activity is underway researching the history of the ship -the people, the cargoes, the ports, the incidents. When

exhibited and combined with the physical reality of the ship the total will be a powerful educational experience for the visitor.

TECHNICAL DEFINTION

Because of the unique nature of the tasks involved in the restoration of the JAMES CRAIG, present day trade knowledge cannot be relied upon to always produce an authentic result, consistent with design and practices of a century ago.

Each and every item from keel to truck must therefore be closely defined by means of production drawings, these drawings being based upon the results of the research already described. The Museum has already made much progress in this work with about half of the estimated 200 drawings necessary already completed.

Each drawing represents a marrying together of the physical appearance, serviceability, materials and manufacturing technology of JAMES CRAIG / CLAN MACLEOD. The fact that the vessel must be made capable of sailing necessitates a close understanding of and adherance to function in all parts of the vessel.

When JAMES CRAIG was built, the design of a vessel both as a whole and its component parts was largely a matter of experience gained from trial and error on previous vessels. Even today this principle largely operates. In the case of JAMES CRAIG no such experience is available. The Museum must enter into what is nowadays a little known area of technology and produce an appropriate and effective result first time. This calls for great care in the draughting stage to avoid errors.

The techniques used in the technical definition of JAMES CRAIG differs from the usual design process. Instead of defining the general arrangements and then designing the details to suit, the authentic restoration of JAMES CRAIG required that all remaining detail was first properly defined. Getting back to our jig-saw puzzle analogy, the equivalent is to record all the remaining pieces. These are then combined using photographs and other sources of information where necessary to generate the basis for the various arrangement drawings. The missing pieces of the general arrangements are then filled in using the research material as a guide. Once the general arrangements satisfy both authenticity and serviceability requirements, the missing individual components of the ship can then be designed, again based upon the results of research.

Although considerable care is taken to avoid introducing new design faults into the vessel, it is the Museum's policy to restore the vessel 'warts and all'. After over 100 years faults in the original design become obvious. It is difficult to resist altering and improving the vessel in such areas. But it is fundumental to the concept of the restoration that such flaws in the original design should remain- after all the original design has been well proven; th ship having survived reasonably intact

after over a century of hard work and neglect.

CONCLUSION

The foregoing has been by necessity only a brief overview of the complex processes and principles which go into the restoration of JAMES CRAIG.

JAMES CRAIG will be a faithful representation of a vessel built during the transition from timber construction to iron. Rather than being a copy of existing preserved vessels, she will stand as an individual artefact. It is the depth of research rather than the extent of original material upon which the credibility of the project must stand. Such a situation is not new. Numerous historic buildings in Europe have been totally destroyed through war and then rebuilt. It is a practical reality that no large vessel of extensive service and great age can be more than fractionally original. This statement covers all existing preserved vessels of similar scale and type. Moreover, even after a vessel has been restored it is inevitable that in time more original material will be lost in time.

To the Musuem's best knowledge, the restoration of JAMES CRAIG is the first of its type to employ such a structured approach to research and technical definition. This combined with the employment of the appropriate skills to actually carry out the work should result in a new standard of large vessel restoration leading to a valuable contribution to maritime heritage.

ACKNOWLEDGEMENTS

The various concepts outlined in this paper are the result of many years of development through the Sydney Maritime Museum's previous restoration projects and the restoration activities of dozens of other organizations and individuals worldwide. Every one of these successive restorations has set a new standard or learnt a new aspect. In our work we have just tried to combine this accrued knowledge in a logical manner. No doubt others will follow to either build upon or reject the above.

Though assistance has been obtained from many sources too numerous to be all listed individually, I would like to thank the following:-

My colleagues both staff and volunteers at the Sydney Maritime Museum: in particular Ray Thorssell, Geoff Winter, David Hill and Janet Ash.

The Churchill Fellowship Trust for giving me the opportunity to study ship restoration overseas.

The staff and volunteers at maritime museums both within Australia and overseas including the Melbourne Maritime Museum,

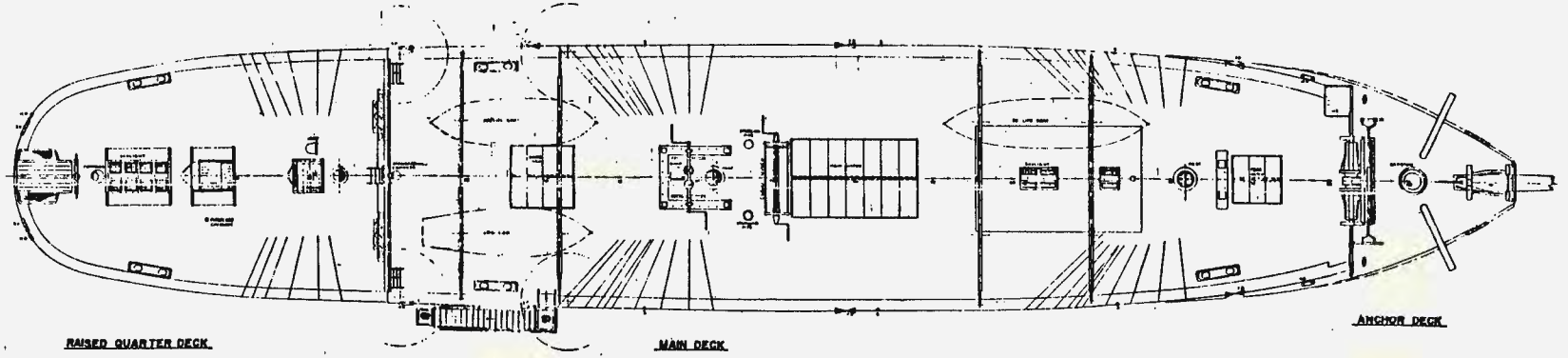
The Victorian Steamship Association, FALLS OF CLYDE (Hawaii), The Maritime Museum Association of San Diego, National Maritime Museum (San Francisco), The Galveston Historical Foundation, South Street Seaport Museum, Bath Maritime Museum, Mystic Seaport Museum, National Maritime Museum (London), The GREAT BRITAIN project, The CUTTY SARK Society.

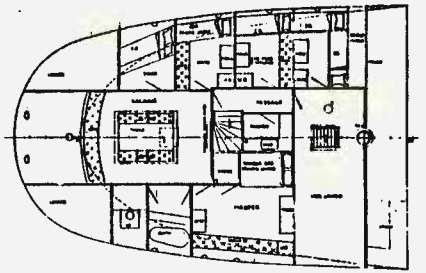
Those hundreds of people assisting the Museum with its research of the JAMES CRAIG project both in Australia and overseas. In particular I would like to thank Jack Churchouse of New Zealand, John Lingwood formerly of Austin and Pickersgill Ltd, Sunderland, Sir Thomas Dunlop of Glasgow and Bert Watson of Kirribilli.

JAMES CRAIG

TECHNICAL DESCRIPTION

NAMES	CLAN MACLEOD (1874 - 1905) JAMES CRAIG (1905 -)
OFFICIAL NO.	68086
TYPE	IRON BARQUE : "flush sheer" with raised quarter deck and monkey focs'le
REGISTERED DIMENSIONS	Length 179'5" (54.71m) Beam 31'3" (9.54m) Depth of Hold 17'5" (5.33m) Depth Moulded 18'1" (5.51m) Freeboard 3'1½" (0.95m)
TONNAGE	671 Gross 629 Underdeck 646 Net
DEADWEIGHT	1015 tons cargo capacity
BUILT	1874, BARTRAM HASWELL & CO., Sunderland, Yard No. 75
HULL	Riveted Bar Keel 7½" (190 mm) Shell Plating 7/16" - 5/8" thick (11 mm - 16 mm) Reverse Angle Framed. One watertight Bulkhead (Collision Bulkhead)
DECKS	1 Deck, 2 tiers of beams Yellow Pine with Hardwood margins 3½" (89 mm) thick
RIGGING	3 Masted Barque setting courses, lower & upper topsails, topgallants & royals, 21 sails in all. Iron Fore & Main Lower Masts Iron Fore & Main Lower Yards 63' long (19.2 m) Bowsprit Iron Remainder of spars timber
OUTFIT	Lever operated hand windlass Flywheel Bilge Pumps
CREW	Typically - Master, Mate, 2nd Mate, Cook/Steward, 3 Apprentices - housed aft under raised quarter deck. 10 Seamen - housed forward in a small deckhouse 17 in all - no passengers
FIGUREHEAD	Originally a ¾ figure of a woman. Later replaced by a scroll billet head.



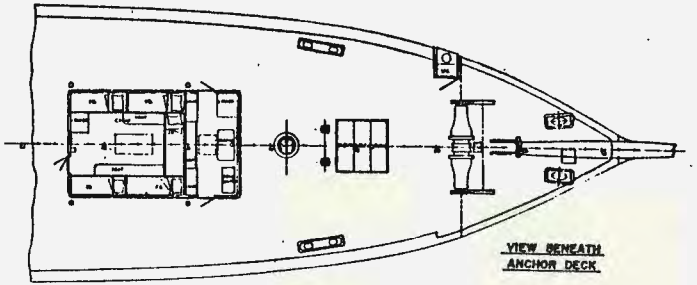


BARQUE "JAMES CRAIG"

— b 1874 —

BARTRAM HASWELL & CO.
SUNDERLAND

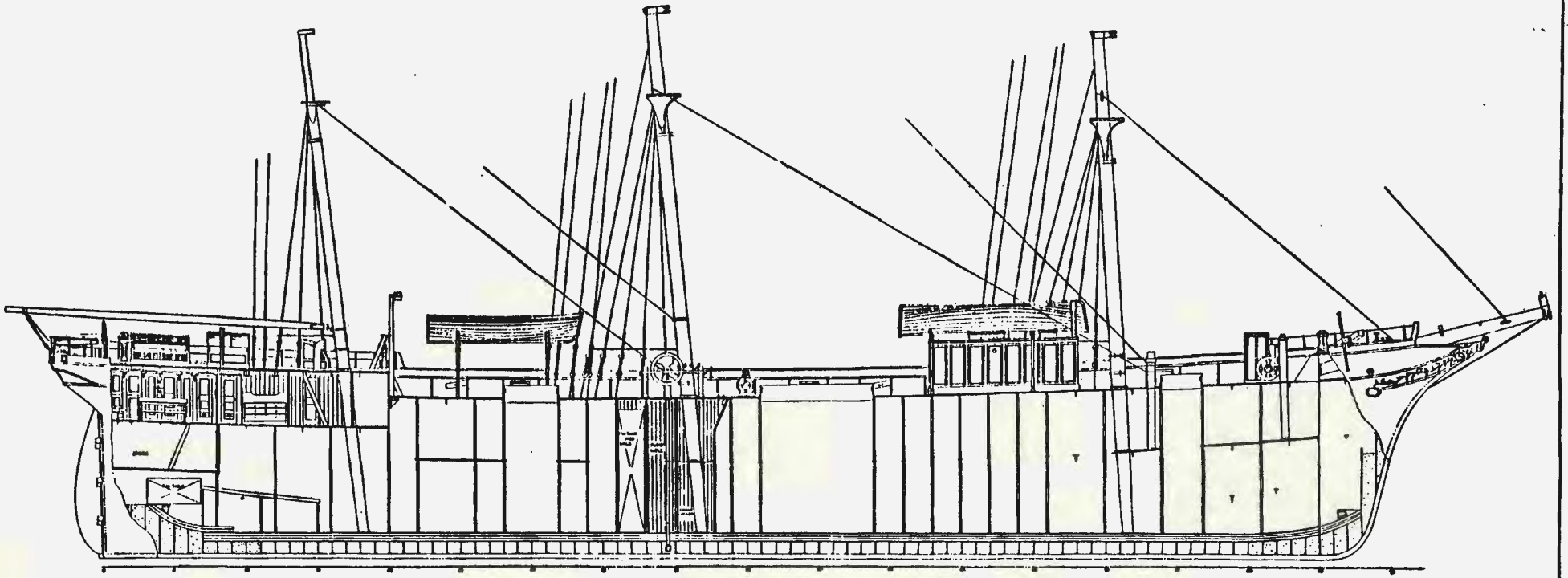
ARRANGEMENT AS DETERMINED FROM PHOTOGRAPHS AND RESEARCH MATERIAL APPROPRIATE TO THE PERIOD 1880–1900



JAMES CRAIG

GENERAL ARRANGEMENT

1/200-2



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— b 1874 —

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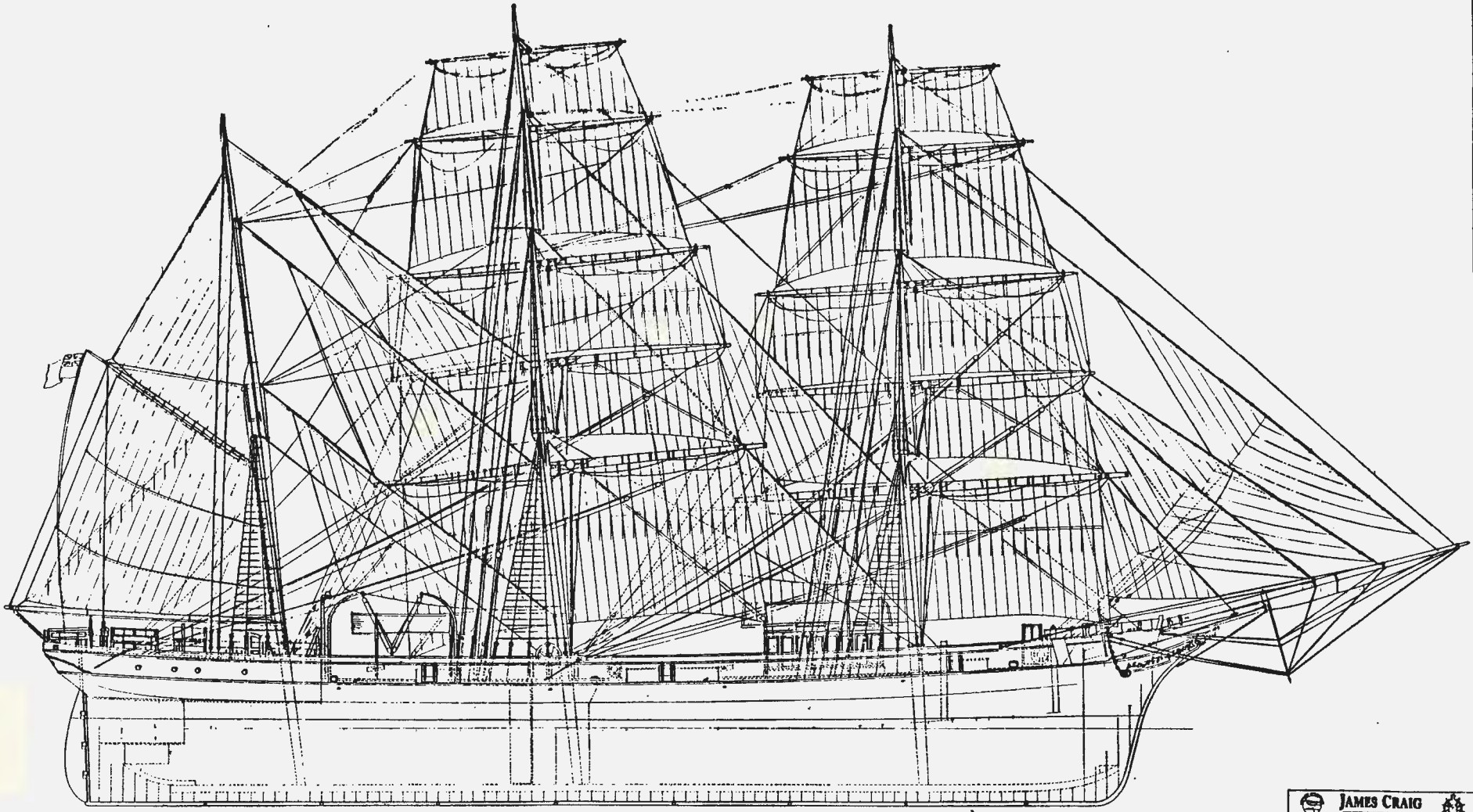
SUNDERLAND

ARRANGEMENT AS DETERMINED FROM PHOTOGRAPHS
AND RESEARCH MATERIAL APPROPRIATE TO THE PERIOD 1890–1900

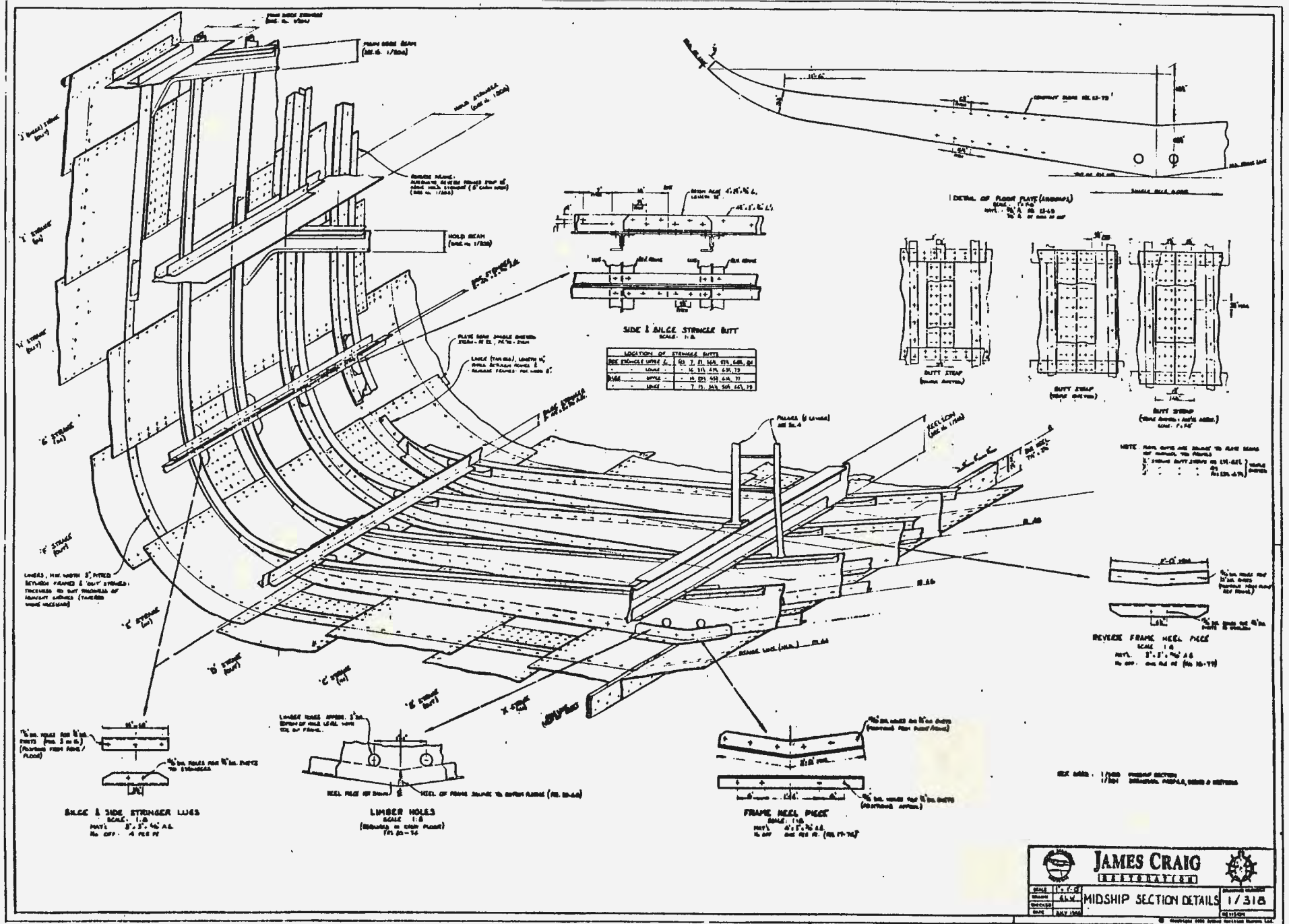
JAMES CRAIG

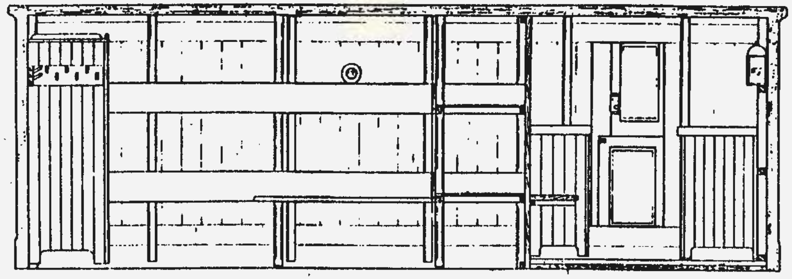
GENERAL ARRANGEMENT

1/200-1

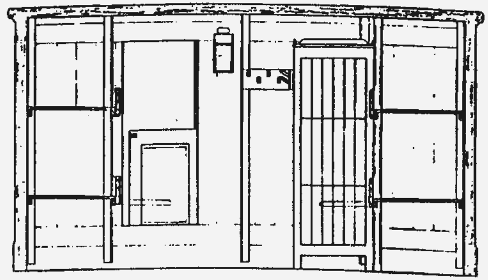


JAMES CRAIG
GENERAL ARRANGEMENT
SAIL PLAN
1/200 - 1

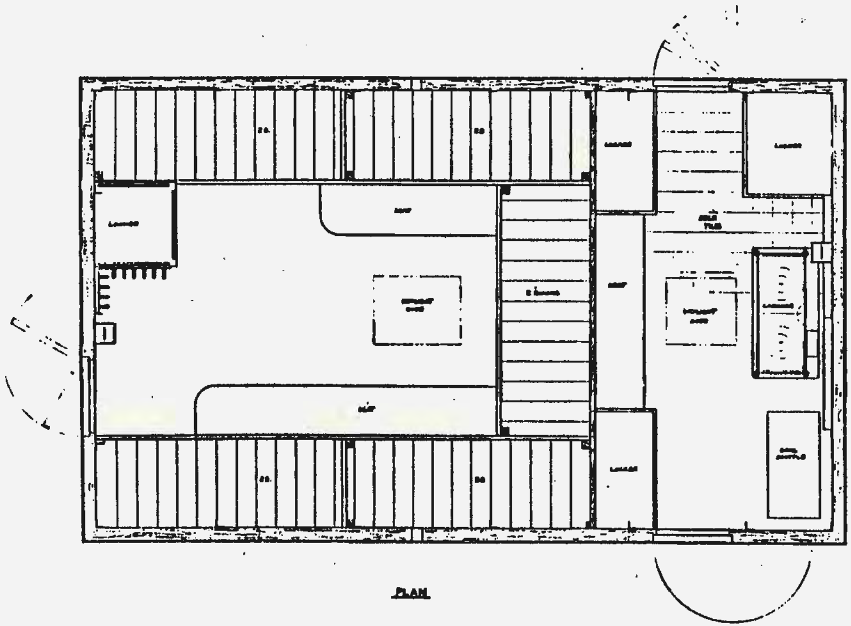

SIDE & BILGE STRINGER BUTT
SCALE - 1:8
LOCATION OF STRINGER BUTTS
BUTT STRAP
BUTT STRAP
BUTT STRAP
REVERSE FRAME HEEL PIECE
SCALE 1:8
BILGE & SIDE STRINGER LUGS
SCALE - 1:8
LIMBER HOLES
SCALE 1:8
FRAME HEEL PIECE
SCALE - 1:8
JAMES CRAIG
SHIPBUILDERS
MIDSHIP SECTION DETAILS
1/318



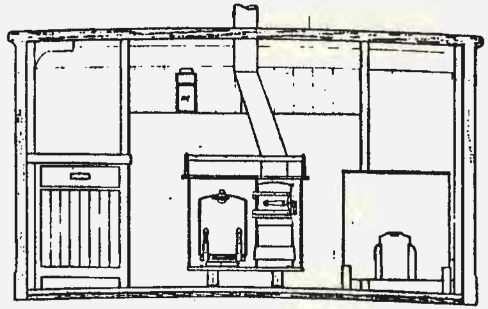
ELEVATION



AFT BULKHEAD



PLAN



FWD BULKHEAD

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2. [illegible]
3. [illegible]

JAMES CRAIG

DECKHOUSE

GENERAL ARRANGEMENT

1/413