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MADRAS RECORD OFFICE.

Government of Madras.

Marine DEPARTMENT.

G.O. No. 237 Press Mis.

Dated 12 June 1857

Not to be folded or roughly handled

(No. 71)

From Captain C. D. Campbell R.N.
H.C. S.S. Coromandel

To The Chief Secretary to Government
Fort St. George

Sir

I have the honor to enclose my report upon the H.C. S. Troopship Coromandel prepared in obedience with your letter No. 376. of 11 Dec.r 1857 and in explanation of the extraordinary delay in forwarding this report. I beg to state that since the arrival of the Coromandel in India and her constant employment in conveying troops to and from Burmah &c. I have been so over-whelmed with multiplied duties from the loss of my purser, clerk, and three officers, that it has been out of my power sometimes to attempt to copy out the rough draft I had at once prepared in January - the duties of Purser, paymaster and clerk devolving on me I therefore solicit favorable consideration for any errors or deficiencies that may be detected in the report. I have the honor to submit -

I beg to add that the late accidents to the machinery of the Coromandel does not affect

the correctness of my prior recorded opinion regarding the excellent construction of the engines and the general efficiency of the Coromandel as an excellent troop ship.

I have the honor to be
Sir
Your most obed.t humble
Chas. D Campbell R.N.
Captain

H.C.S.S.I.
Coromandel
at Sea May 1st 1857.

H.C. No 237.

Admiralty 15th June 1857
Rec.d 18th June 1857

Report of Commander C. D Campbell R.N. upon the Hon.ble Co.s Iron screw Steam Vessel Coromandel.

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1st Size

The Coromandel is 234 feet long 36 feet beam and is 1200 tons burthen She has a troop deck 7 feet high under the beams with 18 scuttles on each side 13 x 14 inches 7 feet above the water and capable of accomodating 350 troops besides 350 more on the upper deck making a total of 700 men which number I consider she will receive with tolerable ease and convey with their arms and baggage &c to localities not requiring more than 10 days fuel to be put on board, as beyond that limit both her Stowage and buoyancy will become decreased so as to require the number of men to be reduced and subjecting those on the troop deck to the loss of ventilation from the frequent closing of the side scuttles and

Stowage

of part of the baggage on that deck, which will prove a grave evil when sick or wounded men may be on board

2. Material The Coromandel is an iron vessel of peculiarly strong and novel internal construction. having her keel and the double stem frame all forged into one solid mass of welded iron! In her bottom an iron diaphragm of thick iron plate extends the whole length of her floor 5 feet above the keel from bilge to bilge where it is joined to the sides. and thus becomes a false or second bottom to the vessel which it was proposed to use as a bilge tank containing 70 tons of water to be used as ballast if requisite or for fresh water The chief object of this diaphragm or tank was to prevent the vibration or snake like motion so injurious to long screw vessels and this object has been fully obtained the vibration of the Coromandel at high velocities being quite trifling compared with that of other vessels - and the great strength resulting from the novelty of welding the keel and stem frame into one solid mass instead of being riveted together will I trust be never

fect

Material (Continued)

put to the extreme test as such could only be proved by severe straining on the ground or rocks when I am confident she would endure more without injury than any vessel afloat. The secondary objects of the tanks however have not been realized and much expense and trouble were consequently expended in vain as the ship is found to be so very stiff as not to require any ballast and the working of so long a vessel in a heavy swell precludes all chance of it being kept sufficiently tight or clean for use for fresh water.

Composition on bottom.

In connection with the subject of Material I must observe the great loss of speed resulting from the fouling of the bottom from sea weed Barnacles &c. which were found to grow so quickly and thick as to reduce the speed 2 knots per hour after being at sea 3 months on the passage from England. The Cromandel was thickly coated with a composition patented by Mr. J. Browning of Bristol of a very costly nature in which "black lead" and "Lac" formed chief ingredients and from which very good results were expected. and I am

Hall

Materials (Contin^d)

inclined to think that it will be found the superior to Peacock's composition which is used by the Peninsular & Oriental Company whose vessels nevertheless require to be docked and cleaned frequently in Indian seas - - The Coromandel was well cleaned at the Island of Diego Garcia 36 feet below water and her speed subsequently improved but the weed and barnacles grew again until the vessel went to Maulmain where she remained in the river in fresh water for 14 days which destroyed them all and has cleaned her bottom very greatly but I consider that it is highly injurious to allow her to remain long without being cleaned and recoated periodically until some one discovers a plan to obviate this great difficulty which is however by no means to be put into comparison with the vast superiority of well built iron ships over wooden ones which cannot stand the continued vibrations caused by the screw propeller without quick destruction -

The real and relative value of the composition on the Coromandel can only be decided upon her being put into dry dock -

3. Power

The nominal steam power of the Coromandel is 250 horse - excited by two direct acting engines upon a three bladed propellers of 18 feet diameter and 23 feet pitch revolving at a maximum velocity of 63. revolutions a minute. but the machinery was found on experiment actualy capable of exciting a power of 700 horses - when urged at full steam and making 70 revolutions of the screw and engines per minute! such a velocity however is of course "extreme" - and the average effective propelling power excited at a velocity of 50. revolutions of the screw will be about 450. horse power at a consumption of about 30 tons of coal per day working the steame expansively - It would thus appear that the power of the Coromandel is rather in excess of the economical proportion but as she will probably be constantly required to tow vessels her great power will then be available

4th. Speed

(steaming). The Speed of the Coromandel as tested at the measured mile in the Thames was found to be 11. 3/10th. Knots per hour with a 19 feet pitch propeller, but before leaving England this was shifted for one of 23 feet pitch, with which the

Speed (Contd) Vessel ran down the river and down Channel at a speed of 11½ Knots under steam alone with 600 tons of fuel besides stores and provisions for 6 months onboard !! — During the voyage out it was very requisite to economize the fuel and I therefore never worked at full speed but on the various steps of the expansion geer when it was found that with the revolutions reduced from 65 to 45 in Calm weather the Vessel obtained a speed of 8 Knots which I consider her most economical point of steaming both as regards coals and Machinery and mean-

Maximum, economical point

Since arrival in Indian seas the Coromandel has lost some of her original speed from the change of tempreture of the water used for condensation and from the state of her bottom and her maximum steaming speed may now be considered not more than 10½ Knots but to obtain this speed there must be considerable risk even of accidents to the Machinery and great wear to the working parts and the boilers, the average speed maintained in her voyage to and from Burmah has been 8½ Knots at 55 revolutions and a consumption of 27 tons of patent fuel or 35 tons of Coal

loss of speed in India

average of voyage to Burmah.

Speed (Sailing / Under sail alone with the propeller disconnected it requires a speed of 3 knots to make the screw revolve, but with all sail set and smooth water the Cromandel frequently went 6½ knots per hour with a beaming wide wind but upon being hauled close to the wind she never made more than 6½ knots and lately (when the bottom was very foul) not more than 4½ knots

greatest distance in 1 day The greatest distance actualy made under sail in 23½ hours was 202 knots or nautical miles - with a stiff breeze on the quarter and all sail set, the screw making 33 revolutions per minute

5th / Machinery

I Under this important branch of my report I have embodied the opinion of the chief Engineer of the Vessel (Mr. J. Ward. RN.) with my own remarks - in order to make it the more complete as there cannot be two opinions regarding the correctness of representing the machinery of the Cromandel to be highly efficient both as regards execution and power of effort -

The engines of the Cromandel are by Messrs Robt. Napier & Sons of Glasgow - and are direct acting - with an arangement for disconnecting

the

Machinery (Cont^d) screw from the Engines shaft which is found to answer very well - and nothing could exceed the smoothness and adjustment of the various parts of the machinery - which was in motion during 45 days between England and Madras without the slightest accident - without the slightest accident - The only observation that can be made regarding the machinery is that the whole is so compact as to cause the working parts to be almost in Contact and that risk of accidents are thus greatly increased with but little adequate advantage resulting

parts too close -

Boilers The Boilers are 4 in number of iron with metal tubes and Copper tube plates each boiler having two safety valves &c so that they can all be worked seperate from the others if required which is an admirable arangement, they generate steam in abundance and fire easily but (surface blow off the pipes of the surface blow off are too high out of water and cover every thing with brine when the wind is on the bow - The whole of the pipes connected with the sea under water

sea cocks. are fitted with metal sea cocks (with a very few exceptions) by which the safety of the vessel is greatly ensured and I cannot too strongly dwell upon the value of this "costly"

but

Machinery (Cont.)

best most admirable precaution which has already proved of the utmost importance

Wood bearing of screw shafts.

The introduction of strips of lignum vitæ in the bearing tube of the screw shaft is an excellent invention and has worked perfectly without any wearing away of the lower part or signs of heating any where nor has any part of the bearing heated or caused trouble except the after crank brasses chiefly at the first commencement of a voyage

Tunnels.

The ventilation of the shaft tunnel is defective and requires improvement as a number of men cannot work in it long owing to the small circulation of air

Boiler casing

The iron casing on the troop deck round the steam chests of the boilers is found to be unnecessarily large and reduces the space for troops and ventilation very considerably - it might be considerably reduced and sloped so as to give two feet more space on each side of the deck, which would be of the utmost importance to the ventilation

Donkey boiler

The introduction of a small boiler for the use of the auxiliary or Donkey engines & winches on deck is most valuable and effective as by it fresh water can be made at a very small expenditure of fuel when steam is not up in the large boilers and cargo hoisted in & out with great expedition

Machinery (continued)

Expansion gear questionable

Diagrams

The advantages of fitting expansion geer to such rapidly working engines is open to question for though the geer works well yet at great velocities the numerous joints &c. caused a great rattle and strain so that it has been usual in general to reduce the power by shortning the link of the excentrics except when the speed is moderated by wind or sea. or when the coal is running short when the advantages of the expansion are decided but the respective diagrams do not shew it to be so great as to justify its constant use and consequent rapid wearing of the joints.

6th Stowage and Accommodations

The capacity of the Coromandel for stowage both for troops, fuel and baggage is very great; and the arrangements of the store rooms could not be improved except in the fore hold and fore peak decks which should have been raised 2 feet and thus give greater depth of hold below. and permit the water tanks to be enlarged so as to admit of stowing 7000 gallons. the Coromandel only

stowing

Stowage (Contin^d) stowing 5,000 gallons in her tanks which is found sufficient for all demands aided by the steam but there should be a larger quantity in reserve in a troop ship - the bilge tank before mentioned being found useless.

Bunkers - size The coal bunkers were intended to carry 10 days supply of coal but they only can stow 210 tons of coal, and this is only sufficient for 6 days maximum consumption they are not well arranged causing the vessel to trim by the head very much when full of coal and lay the fore bunkers stowing 145 tons while the after bunkers only stow 65 tons - so that on leaving

quantity of Coal -

England she was 3½ feet by the head being 4½ feet out of her proper trim, the fore and after cargo holds are capable of stowing

holds - 200 tons more coal if so required making a grand total of 400 tons of common coal or about 450 tons of patent fuel equal to about 12 days supply of coals or 16 days supply of patent fuel which burns better and stows closer than coal.

The after cabin accomodation for passengers

Cabins is very good and sufficient but that provided for the Officers and engineers of the vessel are totaly unsuited for a tropical climate, the cabins being too hot and too small for the bed places

So

Stowage (Cont.d)

that I anticipate the (13) necessity of entirely altering this part of the fittings of the Coromandel and place a solid bulk head across the ship to seperate the troop deck and heat from the engines from the after accommodations.

alterations proposed.

part for crew.

It has been found requisite to give up the fore part of the ~~deck~~ troop deck as far as the fore mast for the European and native seamen while the stokers occupy the fore peak which was fitted up for them and is found to be cool and well ventilated, an open network division seperates the crew from the troops and one part can be washed without wetting the other

Rigging. The Coromandel is rigged as a three masted schooner with square sails on the fore mast only and with booms to all her fore and aft sails. the lower rigging is wire rope the yards and upper spars & hemp rigging are too slight in their proportions for the nature of the voyages she has to make and this defect obliged me to reduce sail sooner than otherwise would have been requisite but I consider the Coromandel has sufficient canvas for a troop ship whose crowded decks would prevent longer sails being worked without danger

description

too slight

sufficient canvas

Rigging (Cntd.) danger and would therefore not be used at all whereas in a screw vessel the aid of sails is an indispensible to her efficient working especialy in strong head winds against which such vessels should not be driven by steam alone

defects I regret to add that in this department the Coromandel must be considered as badly fitted by the contractor both rope, iron work and spars are not what they should be — inferior material & workmanship having been introduced (in spite of my best attention and the repeated remonstrances of the Surveyor) by which the safety of the vessel and the lives

Iron work bad — of the crew have been endangered. the iron work especialy aloft has frequently given way exposing most wretched workmanship and also the large granular texture denoting very bad iron —

(Wire rigging) The wire down rigging is very good and answers well. having hemp laniards — to give elasticity

8th Fittings The fittings of the vessel are in many respects very perfect and well executed but on the other hand many parts are most defective and require much alteration The side scuttles and sleeve

side ports ports were left in a discreditable state and it has required considerable outlay to finish them properly

do

as to render them water tight, & cuppen holes must be also added to the upper deck, and the cabin bulkheads are not placed on cants as they require to be to prevent water from running into the cabins when the troop deck is washed The venetiaban blinds of all the cabins have been made too close for free ventilation and should have been made to take out for the sake of air in hot weather The water closets for the sick and officers have been made too contracted and are situated too close to the other cabins.

Fitting (Cont^d)

water closets

The flying cabins which were added on each side for casual use of the sick are in fact in constant demand for warrant officers and their families ordered passages at Government expense

flying cabins

The cisterns onboard the Coromandel are all of Slate as it was considered better than lead but it has been found not so - owing to the constant leaking of the tops, and also from loss of water space and I would recommend slate not to be used for this purpose in future. The pipes of the water closets are too small and cause excessive fatigue in pumping the handle which an invalid could not do, Some of the water closets fitted to the Coromandel are very complicated but are a decided improvement upon Downton's patent the others work very well

Slate cisterns

pipes of water closets

Gray's patent

The

Fillings (Cont^d)

The large iron cook house constructed on deck with the intentions of affording space sufficient for the use of all the troops but which was left only partly fitted, has been now completed with five range all round and is generaly sufficient but is the cause of much religious difficulty from the various casts being in so close contact with each other so that it has been found requisite to add one or even two native Cosboys for the use of other casts or religions

Cook house

difficulty of Casts.

The papier Maché lining of the sides of the Troop deck appears to answer very well and that added to the sides of the troop deck keeps the temperture very moderate where I am convinced it would have been quite intolerable without this valuable substance which is durable and tough and far superior to wooden lining from its indestructive and non shrinking nature but I feel very anxious to have all the slabs taken out and the backs coal tarred to prevent the risk of their being eaten by vermin as is stated to be found blue the case on board ships in indian climates - and I would therefore recomend this or some other precautions may be adopted in future fittings

lining of sides of ship

danger from vermin

The troops water closets fitted up on each bow are found to answer very well indeed. the

Bow galleries

stream

Fittings (Contd.)

of water freed by the auxiliary engine acting well but the space is rather too limited for the wants of the troops as one side has to be appropriated to the ship's crew - Europeans & natives leaving the other side alone available for 700 men and would therefore recommend them to be made longer and subdivided for caste with arrangements for lighting all by night - as a great conducive to cleanliness in this most important sanitary department

Dispensary too small

The medicine dispensary of the Coromandel is found totaly insufficient in space for the duties of a troop ship and it has been therefore thrown open into the surgins cabins for the sake of air and light - it should be at least double the size it was and with all the fittings moveable

Fresh water Still, discriptive

In concluding the subject of fittings I must dwell upon the efficient working of the Still by "Hows" for making fresh water, which being of a novel arrangement was a matter of some anxiety the Still is of copper and is supplied with cold water by a pipe leading from the bow of the ship round a number of small tubes and passing out at the after part underwater the velocity of the ship giving the required current of water capable of making 600 gallons

quantity of water made

of most excellent water per day with a consumption

J

Fittings (Cont.d)

of about 5 Cwt. of fuel, at anchor the still can be worked by the force pumps but it is capable of much improvement in the pipes for this object and the Copper case of the still should be made of very strong copper, that supplied to the Coromandel some years ago and was renewed at Madras - being little thicker than paper.

Winches value of

The steam winches have proved of the greatest use in expediting the duties of constant transfer of Cargo & Stores &c. and it is only to be regretted that some plan cannot be found to render one winch available for working the fore and after holds.

Telegraph by How. & Ridsdale

The telegraph to the Engine room and to the helmsman are both admirable inventions and are quite indispensible in troop ships

Tamer

The blowing apparatus from the stoke hole is most effective - and great aid to the draft and refreshing to the stokers when the wind is light - and following

Pumps prod-

The force pumps fitted by Epery have worked very well and I consider them decidedly a great improvement upon Downton's complicated pumps -

Good sea boat

It is now requisite I should report upon the efficiency of the Coromandel at sea, in which

Report upon qualities as sea boat

I feel the greatest pleasure in being able to bear testimony to her very high character as a most excellent sea boat in every respect, steaming sailing and steering very well and riding remarkably easy at anchor in a heavy sea and she must be then pronounced a very excellent model. In the Bay of Biscay she laid to very easy in a high chopping sea when very deep indeed and with 100 tons of fuel on the troop decks, off the cape of good hope she scudded before a severe Gale with a tremendous following sea under reefed fore sail and close reefed fore topsail without shipping any water except three benific rollers which suddenly rose and broke over the stern but did very little damage, the vessel steering very easy and steady though her stern was raised so far as to leave 3 feet of her keel before the rudder out of the water while her bowsprit was plunged into the receding wave before her. but as usual with all screw vessels of great length and small beam, she rolled very heavily and quickly all the way out from England which caused the severe springing of the head of the fore mast off Madeira Islands, but since much

good model.

bad weather

in heavy sea

rolls

of

of the spare iron and dead weights have been removed and troops formed a heavy deck load she has not rolled at all seriously

improved

9th Compasses. The compasses of the Coromandel are all made by Lilley & son on Sir W.S. Hamil's patent improved by Lilley - and are decidedly the very best description of iron vessel Lilley's improved method of suspending the compasses in India rubber slings being excellent the steering compasses were adjusted before leaving England by large magnets and the local attraction of all the compasses ascertained but on going to sea it was soon found that these were totally useless and only calculated to lead to fatal errors as the vessel altered her station the magnetic forces altered, and the corrected compasses became so deflected by conflicting powers as to defy all my attempts to reduce their errors to any regular scale I therefore removed the magnets and left the compasses to the free influences of the Terrestial magnetism and the vessels mass the extent of which was then easily and constantly ascertained by observations of the sun and recorded daily in the log book and the result confirms

description

adjusting magnets none

error found

my

Compasses (Cont'd)

opinion that no attempt should be made to correct the compasses artificialy but that the errors of each compass should be tabulated daily in order to obtain a practical basis upon which corrections can be interpolated when terrestrial stars are obscured. and I consider this method far more trustworthy and important than the swinging of the vessel periodically to obtain tables which become useless upon the vessel altering her magnetic station

Mode of Corrections

The Binnacles are lighted by candles upon Lilley's plan from below and are very superior to the old plan with oil lamps

Good Binnacles

10th

General Observations,

Having reported upon the various parts of the vessel entrusted to my charge and attempted to convey my opinion upon each respective subject as far as my judgement will permit me I beg now to submit (in accordance with the desire of Government) a few observations regarding other vessels being or intended to be built for transport services in the Bay of Bengal,

As regards size I would recommend that one should be of 1500 or 1800 tons and one of 700 tons with the object of having

proposed size

General Remarks (Cont^d)

having one capable of passing through the Baumbam passage and the other sufficiently large to convey a whole regiment at once at a trifling additional expenditure beyond that of the Coromandel but if this is not deemed advisable I would urge the great

3 Sister Vessels

importance of having all three vessels of identical size proportions and machinery in fact "Sister Vessels" by which plan spare propellers, Machinery, boilers, stores sails and spars would all fit which-

Saving to Gov^t.

ever vessel required them and thus prove a vast saving to government. Should the Coromandel be adopted as the model the chief Engineer agrees with me in

moving the engines aft

suggesting that the engines be placed 5 feet further aft in order to trim her better and give more space for the after coal bunkers - and if possible that a passage be made in one wing from the the bunkers into the after hold

Too heavy & powerful

The size of the auxiliary engine should be reduced also - and be made more compact as it only requires force enough to work one of the force pumps at the same time

Boats

The boats should be stronger than those supplied

to

General Remark (Cont'd)

to the Cromandel as cutters. and a life whale boat should be substituted for the iron life boats which are useless being too heavy and large, for the ships

rigging & sails the same

With the exception of enlarged proportions for the rigging & spars I would advise the same rig and size sails as the Cromandel and the same armament.

Steam and sail to India

Finaly I would propose that the vessels should sail and steam out to India sailing as far as the Cape of good hope and steaming thence to India, the Cromandel having past the Cape on the 58th day from England averaging 7 knots per hour the whole way but failing in her progress through the calmes near to the eastward of that point

C. D. Campbell
Capt. R.N.

May 1st
1857

Rec. 1857 / Mrs
No 2209.

F. Mrs

Marine Department.

No 237

Extract from the Minutes of Consultation
under date 12th June 1857.

Read letter from Captain C. D. Campbell. I. N.
Com.g H. C. Steam Store-
-ship "Coromandel."

Dated 1st May 1857 - No 71

1. In Ex. Min. of Consn
of the 11th December 1856
No 945 - in obedience to
which the Report now
submitted is stated to
have been prepared - Capt.
-ain Campbell was re-
-quested to communi-
-cate with the Marine
Board and afford them
detailed information ~~that~~
~~they might require~~
respecting the Steamer
"Coromandel," and ~~such~~
any alterations or ad-
-ditions that might be
requisite

for the improvement of
requisite ~~fixtures~~ that Ves-
-sel and also to notice any
~~other~~ subjects ~~points~~ on which the
Board might desire the
benefit of his opinions
connected with the con-
-struction and equipment
of Steam Vessels ~~proper~~
for the Transport Service
in the Indian Seas.

2. Captain Campbell's
report will therefore be
forwarded to the Marine
Board for any Remarks
they may desire to of-
-fer on the points noticed
in it ~~the~~ other regarding the
"Cormandel" ~~and~~ or ~~the~~
Captain Campbell's
~~Conducting~~ general ob-
-servations " ~~having~~ re-
-structing of the ~~Vessels~~
~~intended to be built~~ for
Transport Service in the
Bay of Bengal.

3. The latter sub-
-ject

subject would appear
to have been already
considered in the Marine
Department in Council
Consn. of the 21st February
1855. P.P. 805.

Ellis

To the Marine Board
with copy of Captain
Campbell's Report.
" Comdr C.D. Campbell. I.N.
Comdg H.C.'s Ship "Cormandel"

Disptd. 25th

Mr. Lee to Adjt Genl U.S. Army
No 14 of 1857

P. 17

Inclosure in Genl Cooper's letter of 16. June
Marine. 1857. Department

No. 237

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Extract Minutes of Coms

Navy Department, 12th June 1857.

Com. 29th September 1857 / 5th Oct. 1857 30.

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C. 8 Lines
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