

CENTENARY DINNER

FRIDAY 18TH NOVEMBER 1960

INCLUDES DISCUSSION ON
PAPERS PRESENTED BY MESSR?

MITCHELL DJ & BOWEN CEB

SUNDERCOMBE JCR &

ARMSTEAD EW

- CENTENARY DINNER -

Held at the Premises of the Royal Sydney Yacht Squadron, Peel Street, Kirribilli, on Friday 18th November, 1960, at 7.00 p.m.

OFFICIAL GUESTS.

Mr. H.P. Weymouth, Chairman of the Australian Shipbuilding Board.
Capt. & Mrs. Parker, Assistant Managing Director of Cockatoo Dock & Engineering Co. Pty. Ltd., representing the Institute of Marine Engineers.
Capt. & Mrs. Clift, Manager of H.M.A. Naval Dockyard, Garden Island.
Mr. & Mrs. Dickson, Vice Commodore of the Royal Sydney Yacht Squadron.

Total number of Members, their Ladies and Guests - 65.

Guests and Members were received by the President from 6.45 p.m. onwards, the dinner starting at about 7.35 p.m.

7.45 P.M.:

The President gave the Royal Toast "Her Majesty the Queen".

9.20 P.M.:

Mr. H.P. Weymouth spoke, deploring the absence of Rear Admiral Urquhart, the 3rd Naval Member, due to unexpected illness. Although this should provide the Speaker with an automatic apology for an unprepared speech, he would like to point out that the Parent Body had made a most important contribution to worldwide welfare, which is so much tied up with ship and shipping development. Since, progress has been such a great factor in this development. Elementary Naval Architecture was applied by Archimedes and is certainly one of the oldest of science contributions. Now it covers a diversity of fields such as stability, resistance and propulsion, steering and safety in many ways. Transport in the world has advanced from floating via handpower, sail and crude machinery to very refined nuclear propulsion. In this accelerating development the Parent Body has fulfilled and continues to play a major role.

Naval Architecture is important here in Australia also. There are some 60 - 70 large ships, designed in the main by Naval Architects here. Shipping here is said to be in the doldrums and perhaps for some Companies this may be correct. However the future is not depressing. Both Naval Architects and Marine Engineers should have sufficient enterprise and inventiveness for new ideas. Some Members of the Commission consider the new ideas coming to fruition rather successful. The future of Shipping will depend on this. If Naval Architects and Marine Engineers are prepared to try something else, the future for fine applications will be assured.

Mr. Weymouth then gave the toast of "The Institution of Naval Architects".

2.30 P.M.

The President expressed his thanks and the appreciation of the Institution. He then read a cable received from the President of the Parent Body Viscount Runciman: "On the occasion of the centenary dinner please accept best wishes for successful celebrations and prosperous years ahead".

The President pointed out that the Institution is a Body purely for the Scientific advance in Ships and Shipbuilding, not limited to males, as is proven by the fact that the Branch has in Brisbane a fully qualified lady member, Miss Davenport.

In connection with the Institution of Naval Architects nothing is restrictive, members may be of all nationalities. The scientific side purely counts as Naval Architecture itself is international. Charles II may be considered the parent of yachting. Great Mathematicians for ships were inspired by Napoleon I of France, Frederic the Great of Prussia and Catherine the Great of Russia, who founded the Academy of St. Petersburg.

The Royal Institution of Naval Architects with its 4000 members may be considered small, compared with such Institutions as Civil Engineers or Mechanical Engineers, but it is not the least. It has done extremely good work. Take the Froude's Father and Son, the late Baker, etc. After the loss of the monitor type H.M. "Captain", Sir Edward Reid put stability in the foreground. Later the extensive research in strength of ship in cooperation with Lloyd's Register of Shipping. All these items were discussed in the Transactions of the Royal Institution, and each is of a progressively high standard all over.

We can be proud of the fact that we are members of the Royal Institution of Naval Architects, which is not a Trade Union. To this effect it is well to remember the words of the President of the Parent Body: "The Institution is not there for the members, but the members are there to serve and promote the Institution". This was appreciated by the British Government when about 2 years ago the Royal Institution was exempt from rates and taxes, because of acceptance of the purpose of pure science.

The Australian Branch is the only one outside the United Kingdom and, due to the spread over such vast distances is difficult to run cohesively. Therefore the enthusiasm, assistance and good work of all members and representative Office Bearers is needed and highly appreciated. The President called on Mr. Boden to welcome and toast the Guests, who spoke as follows:

Mr. President, Honoured Guests, Ladies and Gentlemen.

This function would be a failure without bestowing appreciation of their interest shown on our honoured guests. To mention our official ones we are genuinely sorry to miss Rear Admiral Urquhart as Chief of Construction and 3rd Naval Member, prevented from attending, by hospitalisation. We have Mr. Weymouth as representative of the Merchant side of Shipping Construction. As is now established practice the "Marinees" are in it too. Captain Parker for the Institute of Marine Engineers, and a representative from H.M. Naval Establishment "Garden Island", important to many members' early training

and often later positions, Captain Clift. Thanks are given for the Royal Sydney Yacht Squadron's hospitality to its representative Vice Commodore Dickson, which is highly appreciated.

Toast was given to "The Guests of the Institution".

Captain Parker got up to address the President, ladies and gentlemen present, expressing his appreciation for a wonderful week spent as a Guest of the Parent Body during the Centenary Celebrations in London, related in short from the registration in hundreds, the reception in the Festival Hall with the Duke of Edinburgh present, Sir Alfred Sim, Director of Warship Production, Mr. Murray of Lloyd's Register of Shipping, etc. Cocktail Party at Lancaster House with the attendance of the First Lord of the Admiralty and the Australian High Commissioner, Claridges, etc. Next day a typical launch trip down the Thames with explanations of all hostilities, ships passed etc. to Greenwich and visit to "Cutty Sark", truly inspiring to Australians and Seafarers. Lunch under Marquee. Visit to Naval College and Church with expert guidance of Professors of History, who even brought out a link with Alice Springs. The visit to Stratford on Avon by train, the hour of Shakespeare's "Twelfth Night" at the Memorial Theatre, parties following.

Historically Naval Architecture goes back with the Royal Navy to King Alfred's time and has made a long way with successful achievements such as the "Milo", "Trafalgar" etc. In comparison it may be recalled that when the Germans had occupied Norway for more than a year during the last World War and the Commanding General visiting the Museum in Oslo commented that he did not think much of the old Viking longboats, which had been recovered out of the mud prior to the War, the answer was "oh, but we invaded England".

Growing success was wished on the Royal Institution of Naval Architects Parent Body and Branch.

Vice Commodore Dickson replied for the Hosts mentioning the subject close to the heart of most Australian Yachtsmen, the America Cup Challenger.

Alan Payne has done a most painstaking and thorough research. It may be said that he has returned from testing the tenth model with a satisfied smile. However, construction is behind schedule and will necessitate months of 18-hour workdays for building. The handicap is that there is only one vessel "Yin" for training, which is a very fine vessel, although built in 1938, designed by Sparkman-Stevens, raced with fantastic distinction. When Captain Matthews obtained her, she was remodelled regardless of expenses, new sails, masts, booms, and rigging being installed. Captain Matthews, one of the United States leading Stevedores is no mean yachtsman. As a consequence she showed some remarkable eliminating race results. These were close races indeed with very small differences, considering that the last heat resulted in a twelve seconds win over 24 miles distance. Australia considers herself lucky to have such a yard stick. Crewed by Australians she has given results only five minutes

behind best performances.

It is expected to ship the new racer later in 1962 and confidence is expressed that we can be proud of the work of the Naval Architect.

On behalf of the Squadron thanks are given for the achievement of the Naval Architects and a welcome extended to the Branch at any future occasion.

The President concluded the official part of the Dinner and many Members and Guests remained for animated discussions.

DISCUSSION ON: "SOME NOTES ON THE
DEVELOPMENT OF SHIPBUILDING IN AUSTRALIA".

MR. CARMENT: The paper is now open to discussion.

MR. PEARCE:

I think it is usual to say, that unfortunately, we have not read this paper completely, before it is open for discussion and I do not quite know what was said about Evans Deakin but I think the main thing is in the first paragraph and that is, before the War this Company was one of the leading structural Engineers and bridge builders. The shipbuilding programme of Evans Deakin was purely a wartime effort and I think that at the time when they commenced building the vessels, they did not think that they would continue up till today in the building of ships at Kangaroo Point. For that reason, we have not got at Kangaroo Point a shipyard as is well known in other places. It was purely an erection yard and Rockleigh Works did all the prefabrication. It was carted by truck down to Kangaroo Point and if it did not fit it was carted by truck back to Rockleigh and then brought back to the shipyards. Since the inception of the Australian Shipbuilding Board in the production of Merchant ships in Australia, Evans Deakin have continued with ships and those of us who are there can hope that it will continue for many years to come. They tried in the initial stages to build a ship in the same way as they had built their bridges and for that reason they took a little bit longer but we have been very proud of the record of some of those ships and one in particular that sat on the bottom in Melbourne for three weeks before they raised it up and it came back to the surface with very few rivets sprung or anything like that. That was mainly because most of those rivets were fitted and the holes were drilled on the job and the rivets were actually a fitted rivet and not in accordance with, shall we say, common shipbuilding practice, but the Company has developed. We are now introducing into our organisation quite a few men from Britain in the same way as Mr. Mitchell has pointed out that Cockatoo did earlier on and we trust that this introduction of new blood and new ideas and the know how from the other side, where shipbuilding is such a major industry, will be able to bring our development and our shipyard production up to the standard. I do not think there is very much more I can add, as I said I do not know what you have said already about us, but we are doing our best to maintain the shipbuilding standard of Australia in the southern part of Queensland and the several visits that I have made to Walkers, I should say that Queensland will do its best, no matter what.

MR. LAST:
(LLOYD'S)
REGISTER)

I have been very pleased with the scope of this paper since it augurs very well, I think, for the future of shipbuilding in Australia. Since I came out from the old country 2½ years ago, the thing that struck me very forcibly is the large diversity of types that are built. At the present time, we see there is a list in the paper of the ships that are now building. There is every conceivable type, tankers, oil carriers, passenger ships and I think that if anyone had any doubts about whether ships can be built in Australia they should put these ideas to one side because

MR. LAST
(CONTINUED)

I think their slogan should be that Australia can build it. Now the next thing that strikes me is whether they can build it economically enough. We all know that there is quite a large shipbuilding subsidy at present involved in Australia and people have said to me that they will build ships in Australia if they could build them quickly enough. Now it seems to me that the next step in the chain must be that we must build them quicker and must build them more economically. That can only be done in my view by two means. One is larger introduction of welded prefabrication and further beyond that, we must build more of the one type, not such a lot of widely diversive types. If possible to standardise on a few types, it might well be possible to reduce the prices and make Australia not only building for its own account but building for other people in other countries economically. Then it would get companies like Evans Deakin not afraid to tackle anything for anybody economically shall we say. Now there is very little else I can add but I must say that I am very gratified by the paper and very hopeful for the future of shipbuilding in Australia.

MR.
SUNDERCOMBE:

I would like to ask Mr. Boden about that standard ship, the Caledon design. Was that ultimately the "A" class ship - I did not quite get that?

MR. BODEN:

There was a slight alteration. Admiral McNeal arranged for some modifications to be done at Navy Office, I think to the bow. The lines there were slightly modified.

MR.
SUNDERCOMBE:

And also the matter of the double ended boiler - was that added later?

MR. BODEN:

I think the propulsion unit was completely changed. Originally the propelling machine was quite simple, but the exhaust turbine was added and I am not sure whether there was some change in the boilers. They were arranged to burn fuel oil.

MR.
SUNDERCOMBE:

Yes they were ultimately. Thank you Mr. Boden.

MR.
ARMSTEAD
(MARITIME
SERVICES
BOARD):

I have been particularly interested in this paper, mainly by virtue of the fact that the Maritime Services Board of New South Wales has been mentioned in it in a few places and also the old Harbour and Rivers Branch. First of all, one of the things that struck me was the description of the first shipbuilding sites in Sydney. I am lead to believe through the Board, through our Public Relations people down there that the present head office of the Board stands on that site of the first shipyard in Australia, that is in the south western corner of Circular Quay. Reference too, to Cockatoo brings to mind something that recently happened like in the last 12 months down there the construction of the old stone wharf at Circular Quay in that, where the present new passenger terminal is nearing completion part of that old wharf was recently uncovered when they demolished

MR. ARMSTEAD:
(CONTINUED)

the wooden apron and structures and that has now been buried under the apron and buildings of the new passenger terminal. The period that Cockatoo was under the Harbours and Rivers Department still appears to be seen around Sydney in that many of our own craft at the present time still look as if they were built around that period. I spent some time at Cockatoo as Asst. Overseer in 1947 with Mr. Follan, he was the Hull Overseer at the time. It was certainly interesting to walk around the place and see, not only the shipbuilding activities but the items of historical interest. Certain of the ratings were quartered in the barracks, I think several of our welding overseers were quartered in one of the womens sections at one time. I think, wasn't it Mr. Follan? Mr. Follan used to say it was a good place for them at times.

Well then mention was also made of the dredge "Hercules", the bucket dredge, the ladder dredge. She is like Paddy's Hammer. She has had a couple of new heads and a few new handles but is still the same dredge. We did have cause recently to carry out major repairs to the bucket ladder and it was done as is usual in quite a number of Government Contracts in the cheap and nasty manner. You just accept the tender or quotation, which is the cheapest and trust to luck that it is right. Well we were caught on it and finished up going back to Cockatoo to have the thing rectified, went back home again.

Also referring to the State Dockyards I noticed that in the list of crafts given there as being constructed and Mr. Boden also mentioned outstanding crafts, neither Mr. Mitchell, nor Mr. Boden mentioned the "Kooloon". I don't know whether we think that is an outstanding craft or not, I think that is rather a moot point as far as Naval Architecture is concerned. But summarising, I feel that the work involved in the research by the authors in this paper has been rather considerable. I feel that besides the Mitchell Library, Mr. President, the Royal Australian Historical Society may be interested in it and for my part it has been very interesting to hear some of the facts and figures and items of interest of our shipbuilding in the past and I feel that like the other speakers this afternoon, if that is any indication of what will happen in the future, then shipbuilding in Australia should prosper.

MR. CARMENT:

I will now ask Mr. Sundercombe to introduce his paper and we will proceed with that as we have this one and another one to get through this afternoon.

DISCUSSION ON
"ONE HUNDRED YEARS OF MERCHANT SHIPS ON THE
AUSTRALIAN COAST".

MR. CARMENT:

We now come to the discussion of second paper. It is really a formidable paper and in view of the short notice to Mr. Sundercombe must have entailed an enormous amount of work. I do not know how he found all the time to do it. This is another paper which of course is pretty hard to have a discussion on. I am only going to ask him one question, which he may or may not answer. How do the present Australian Shipbuilding costs compare with current costs of similar ships in Britain? I see you have a list there.

MR. SUNDERCOMBE:

I think that would be covered by the very same document by the Australian Shipbuilding Tariff Board in 1959 and it was stated there, as I have mentioned elsewhere in the paper, the price seems to work out at about 75% (the costs in Britain about 75% of those out here). I think that sums it up. It says here cost details were available for 8 vessels of varying tonnages demonstrated. Taken over these vessels, the proportion of total costs represented by each element varied over

labour	24% - 30%
steel	4% - 11%
other materials	26% - 54%
overhead	17% - 55%

that is only a subdivision of labour but weighing the disabilities of Australian industry on each cross stroke the estimated cost of building these vessels in the U.K. has been calculated at 72%-74% of the cost of building in Australia - weighted average of 73.3%.

MR. CARMENT:

Yes. That is about 3 years old isn't it?

MR. SUNDERCOMBE:

1 year, well on 30th June 1959, it was published.

MR. CARMENT:

Well it is pretty recent.

MR. SUNDERCOMBE:

The Australian Shipbuilding Industry - I should have mentioned verbally, it was not mentioned in the paper - has been granted a subsidy of 33-1/3% virtually based on that.

MR. CARMENT:

I was sure of that.

MR. SUNDERCOMBE:

That should mean that the Australian Shipbuilder, after he has subtracted 33-1/3%, he should then be in a position to compete with anybody else in the world.

MR. CARMENT:

Now gentlemen, it is open to discussion.

MR. DODDS:

It gives me great pleasure to open the discussion on a paper like this, because first of all the Adelaide Steamship Company's name is mentioned quite frequently.

MR. DOBBS
(CONTINUED):

in the paper and also that the Muddart Parkers are great and close friends of the Adelaide Company and we have shared many experiences together. It is unfortunate that we have such a limited time to read a paper of such volume and of such information but what Mr. Sundercombe has said and what he has read and what he has shown on slides, I think it is a wonderful history of the Australian private shipowner over the last 100 years. Just to briefly add to his remarks it is unfortunate from the private shipowner's point of view that there has been a serious decline in coastal shipping. It is most regrettable that this decline has affected the passenger ships because to my way of thinking, I have been on a few passenger ships, the "Manoora" and "Kanimbla" are even at this stage, 25 years old, of very high standard in deck space, sports space, and everything for the comfort of the passengers, yet due to various circumstances crew troubles, slow turn around on the wharves and lack of cargo, we have to look to the day when we might lose the valuable shipping help to our concerns.

This paper that you have read is really several papers in one. It is the private shipowner, latterly it is the Australian Government line, and also there is the very important aspect of this paper which I think should be treated separately that is, the Australian Navigation Act and I think it could be the essence of a good paper for discussion in the future. Regarding the ships of the present day we have a lot of difficulties to surmount. We have the wharf difficulties, the lack of help sometimes in the Harbour Authorities to be as modern as some of the ships they handle, there is the tremendous competition of road transport, the Navigation people wishing the ships to get more safe every year, and, last but not least, there is the crew who are now at the stage where two sailors can share washing space between them. Obviously there is only one more step to come. We have got to do all this, run against strong competition and make a profit for shareholders together with the fact that repair costs are going up all the time. We must realise that this decline is not entirely our own fault, but let it not be said that we are not partly to blame. There is a line in this country at the present time who are looking to the future, and it is up to us to get in and compete against them. They are leading the field, they are leaving us behind in many respects and I think it is up to the private shipowner to pull his socks up and get in there with them.

Just a few brief remarks which show you the quickening trend of ships. The "B" class ships, which Mr. Sundercombe mentioned, the "Bungelceer", "Barossa", "Barwon" were excellent ships before the War and even until a few years ago. We converted most of them to oil burning from coal and they were still excellent ships until something happened, somebody got the bright idea we could build a bulk carrier. We built that bulk carrier, the bulk sugar carrier "Waringah" - one ship, and at least 4 "B" class ships were finished. One good modern bulk carrier of a modern design wiped out four old ships. The "A", "B", and "D" the "C" Class, I do not think were ever built, the "A", "B" and "D" class are now out of date.

MR. DODDS
(CONTINUED):

Getting back to costs, I might say that the subsidy is 33-1/3% which is applied to Australian shipbuilders. Even now, the shipbuilders are struggling to meet overseas competition, but, from a shipowner's point of view, I will tell you shipbuilders now, that the main thing is not the subsidy - it is delivery. The European yards have really got it over you for delivery and, if you are going to sink 1 to 1 1/2 million pounds in a ship, it is preferable to have that ship 6 months earlier than it would be locally. If you are thinking about keeping applying subsidy all the time, please remember the delivery. Finally, I would like to compliment Mr. Sundercombe on one of the most excellent papers I hope to read when I get the chance. Thank you very much.

MR. PEARCE:

When I rose earlier this afternoon at Mr. Boden's request, more or less, I purposely omitted to compliment the authors on the paper they presented because I knew that I would want to say exactly the same thing for this paper presented now, and, as time is running out on us, I felt it would be unfair to you to say the same thing twice. I would like to compliment both Mr. Sundercombe for the paper we have just heard and Mr. Mitchell and Mr. Boden for the earlier paper, which has been very interesting, particularly to me. I have not met Mr. Sundercombe earlier but I started my career in the shipbuilding game under Mr. Boden and Mr. Mitchell both together and it is very valuable to us, I think, to hear what has gone on in the past and look forward to what we can in the future. These papers, the first one has been referred to as an historical document, and so has the second one. We have learned, I think, today a terrific amount and, as Mr. Dodds has just said, when we are able to read and digest all that is involved in these papers we will be very much wiser than we were before we came here today.

DISCUSSION ON
"THE DESIGN AND CONSTRUCTION OF THREE 66' DIESEL
PILOT VESSELS FOR THE M.E.E. OF N.S.W."

MR. GARMENT:

Now this paper of Mr. Armstead's I think is really a very excellent paper indeed, and it is a paper in which he is breaking new ground. It is a paper that I do not know whether - all these papers are I think worthy of going into the Transactions, whether they would print papers as long as the last two I don't know, but I do hope that at any rate they will put in this one of Mr. Armstead's which is not too long and which I am sure would give a tremendous amount of interest and is such a very good paper.

I will ask Mr. Armstead now to give us his paper on Pilot Boats.

MR. ARMSTEAD: Presents his paper.

MR. GARMENT: A most attractive paper. I have often seen these boats manoeuvring out there and they are very good. Knowing this paper was coming up, I went to see some of my old friends who were Marine Superintendents of overseas liners to get their criticism. It might please Mr. Armstead to know that they had no criticism at all - it was all extremely favourable. That is quite a tribute I can assure you.

I would like to ask Mr. Armstead about this steering gear of his, this "torsion" steering gear.

MR. ARMSTEAD: Well, Mr. Garment, it consists actually of gear rods and bevel wheels to transmit the motion from the steering wheel. The mechanism comes straight down from wheelhouse with a roller chain and is then carried by the gear rods and the bevel wheels back to a 22:1 reduction worm box which is near the rudder stock. The bevel gears were obtained through the assistance of Garden Island. We used standard damage control wheels they had - 3" bevel wheels - this saved us a lot of time, we just borrowed the patterns, had the wheels cast and fitted them to the vessel. The other equipment we used in the steering gear was "off the shelf". In regard to similar equipment throughout the whole vessel, we tried to use items which were "off the shelf" to save time, and by adopting that method we did save a lot of time, although it means a lot of running around for some of us, to get hold of the stuff.

MR. GARMENT: Thank you. Now gentlemen, it is open for discussion.

CAPT. MILLER: I would like to heartily support the Chairman's remarks about the excellence of Mr. Armstead's paper. It really was an excellent paper, but before asking him a question, I would like to say, each of the papers we have heard today have been of first class quality. There has been an enormous amount of work put into these papers and I think each one is well worthy of being printed in the Transactions and I certainly hope that at least one will be printed. They are really a very excellent contribution, not only by the authors themselves, but by the Branch, the Australian Branch, to the Centenary Celebrations of the Institution, and I do congratulate each of the authors on the immense amount of work and the quality and excellence of their papers. I would just like to ask Mr. Armstead three brief questions -

- (1) Has there been any occasion since these Pilot Vessels have been in use that they have not been able to board a pilot outside.
- (2) the fendering, I see, is very heavy on the sponsons, has there been any damage to the sponsons, through coming into contact with any part of the ship structures while they have been in operation?
- (3) What is the derivation of the names of these vessels?

MR. ARMSTEAD:

Thank you, Captain Miller, they sound quite easy, I think I can answer all of those.

In regard to the first question whether we have yet been unable to put a pilot on board, there was some publicity given in the press on one occasion to the fact that the "Orontes", I think it was, had to stand off the Heads for three hours stated to be due to the fact that the Pilot Boat could not get out. The facts as I have been informed were as follows: The "Orontes" was due in, it was cyclonic weather, other vessels had come in that morning, other vessels with pilotage exemptions for the Port had stood off, they were not going to come in. The "Goondooloo" went out to the "Orontes" and asked the Master whether he would follow him in. The Master said he would rather not. The idea is by way of explanation, that in following in, the pilot vessel leads into where the water is more sheltered. The bearded vessel makes a lee for the pilot vessel, as is usual, and thus facilitates the Pilot's boarding. The "Orontes" stood off for three hours, finally the pilot boat went out and put the pilot on board. I think it was several miles off the Heads in a cyclone. There is no other occasion that I have heard where we have not been able to put a pilot on board. There was one occasion also where a pilot was carried on, due to bad weather.

The second question relates back - can be related back - to something Mr. Carment said about there being no criticism from Shipping Companies. Well, we have one criticism against one or two shipping companies, the P. & O. and Orient. I think, where the pilot boards the vessels through gun port doors in the side. The hinges for these gun port doors are outboard and on one occasion the "Goondooloo" chipped a piece out of the spinnaker, roughly amidships, on one of the hinges. It was a sliver of timber about 2'6" long and about 4" thick and I think it is still out. That is how much we thought of the damage and that is the only damage that has been caused there. In the earlier stages we did have trouble with the rubber fendering. One particular Master - we called General Macarthur because he was always returning to the shipyard to have minor adjustments made to fendering - would say "We hit hard today". "I rang the bell!" I know when you ring the bell on these boats you have certainly hit them hard and it is really a thump.

The other question was the derivation of the names. They are aboriginal names meaning "The Southern Cross" "Star" and "Moon". The "Goondooloo" means "Southern Cross", but I am not quite certain which of the other two - I think "Giralong" is "Moon" or "Moonlight", the use of aboriginal names gets us into some strife at times.

MR. BODEN:

Mr. President, it is very pleasing to be able to sit and listen to such an excellent paper presented by a former pupil. I am sure, Sir, you share with me the same enjoyment. I would like to ask Mr. Armstead if, in the paper, there is any detail of the stability of these vessels and if not, if perhaps he could append a note giving some indication of the statistical stability and possibly the range of stability. Thank you.

- MR. ARMSTEAD: Mr. Boden, unfortunately we did not have sufficient time available to reproduce the curve of statical stability, but I think on page 7 of the text some particulars of the G.M. and stability range are given.
- MR. SUNDERCOMBE: Well Mr. President, I would just like to thank Mr. Armstead very much for the very interesting paper. It is most gratifying to know that these boats have been successful. I have heard all sorts of dark forebodings amongst the pilots. The securing of the superstructure to the deck - Could you give us a bit more on that. Is there any special way of keeping all that gear watertight from a shipwright's point of view?
- MR. ARMSTEAD: It was done by planting a coaming on the deck with a rabbet in it and just bedding the plywood down into the rabbet with a mastic solution. It was all screwed where possible, in certain sections we used glue and also tiebolts were put in to help resist the racking stresses caused by the rolling.
- MR. SUNDERCOMBE: Thank you Mr. Armstead - Have you any trouble in keeping the deck-houses tight? I mention this because we have wooden wheelhouses in some of our ships and it is a bit hard to keep them watertight.
- MR. ARMSTEAD: The only place where the water comes through in these vessels when it does get through, is through the ventilators. The use of plywood does help a lot to maintain watertightness or weathertightness in the deckhouse. We would not say it is watertight but we have found that generally speaking, the deckhouse is quite good. At the start we did have a bit of trouble with the wheelhouse coaming at the f'ward end with the water running down underneath. This has been eliminated by a bit of "goo" being worked into the joint.
- MR. LAST: Mr. President, I would like to congratulate Mr. Armstead on a very excellent paper. Just a couple of small points I would like to ask him in connection with the structural sections. First of all, it would seem to me that some use must have been made of web frames in addition to the bent frames that are shown or were the stringers themselves considered sufficient between the transverse bulkheads?
- MR. ARMSTEAD: That is what we did, the stringers were considered sufficient.
- MR. LAST: I thought I noticed on one of the photographs some web frames near the f'ward ends, some deeper frames had been used.
- MR. ARMSTEAD: No, there were no web frames at all, there are only bulkheads at the f'ward end, with flitch floors across the top of hog.
- MR. LAST: Was any use made of hanging metal knees in where the beams?

- MR. ARMSTEAD: No metal knees, there were some wooden hanging knees and also lodging knees.
- MR. LAST: Wooden knees, I see, they are not indicated.
- MR. ARMSTEAD: Very few hanging knees were fitted and are not indicated on the sketches.
- MR. LAST: Just in way the ends of the dockhouse, the superstructure?
- MR. ARMSTEAD: They were fitted in way of the fo'c'sle and at the end of the engineroom casing opening in the deck. Actually the biggest opening in the deck is where the engineroom casing occurs. With all the rest we have the beams going right through.
- MR. LAST: You would put a fore and aft casing alongside the engine casing?
- MR. ARMSTEAD: Yes, there is a casing and the usual coaming, both of substantial size.
- MR. LAST: Reliance was presumably placed entirely on the strength of the deck beams for taking the compressive stresses?
- MR. ARMSTEAD: Yes.
- MR. LAST: I see - well thank you very much indeed.
- MR. ARMSTEAD: Bulkheads were put in as you noticed in the general arrangement. For a vessel of this type, there are quite a number of bulkheads provided and it was considered there would be no need for web framing in a vessel of that type with the bulkheads taking so much of the load.
- MR. LAST: Were they plywood bulkheads?
- MR. ARMSTEAD: Yes, 1 inch ("Giant Redwood"), on 4" x 1½" oregon vertical stiffeners @ 18" centres.
- MR. LAST: Thank you very much indeed.
- MR. DODDS: Just a couple of brief questions, Mr. Armstead, on this excellent paper. The first one is, what does each one of the crew do, what is their job? Can you explain that, I have not had time to read it.
- MR. ARMSTEAD: I have not explained that in the paper.
- MR. DODDS: Could you give me that and I take it then that the main engine is controlled by the Master on the bridge and the only other thing is, with such an excellent shipyard you have for wooden construction would not it be more opportune to go into the shipbuilding industry generally and start off with

MR. DODDS:
(CONTINUED)

off with the Sydney Ferries? Thank you, Mr. Armistead.

MR. ARMISTEAD:

In regard to the first question, Mr. Dodds, the crew of four comprises a Master, an engineer, greaser-deckhand and seaman-deckhand. The Master at the present time is shall we say serving an apprenticeship to become a Pilot. That was one of the big industrial problems we had to consider at the time. For the Pilot Launch at Port Kembla was operated by a Harbour and River Master only plus another member of the crew holding what we call a 3rd class Marine Motor ticket, Marine Engineers ticket.

The Board have so far on these vessels, in regard to the Master, asked for a Foreign Going ticket, because the man is expected to become a Pilot later on. I might add that I have certain opinions on how the vessels should be manned but the manning does not come under my jurisdiction. The engineers so far have all been first class certificate men, although a 2nd class man is acceptable if they cannot get a first class.

The controls for the machinery are remote controls from the wheelhouse to the engineroom - I think I mentioned in the paper about the trepidation I had of the Master being used to the practice (Captain Miller will understand this one) when coming alongside after completing a job and ringing down "Finished with engines". This control is just like a ship's telegraph in size and appearance. We got the shock of our lives when it arrived, it was so big. You could imagine what would happen to the gearbox if the Master suddenly decided to ring "finished with engines" - there would be great clouds of black smoke and crunching noises from down below. Over-riding these controls again, is a clutch, a declutching mechanism in the line whereby it can be disconnected and controlled in effect from down below, the telegraph being operated as usual. We have had one occasion where that had to be done when something went wrong with the gearbox when we were conducting manoeuvring trials on the Harbour and we finished up having to revert to engine control. We have had no trouble with the gear jamming except that as a precaution, a spline joint is fitted in the control rods. I wish I had brought along the sketch of the control gear but I will try to get hold of a copy of that for the Institution - where it comes down diagonally from underneath the fo'c'sle deck to the level where it comes back along the top of the machinery. We feel that there could have been some trouble there and actually when the first control rod was out it spread apart.

I think that answers all your questions, Mr. Dodds.

As regards the shipyard, that is a question involving policy and I would much rather not say anything there. It is rather a moot point but we have constructed vessels for the State Fisheries Department and at the present time are building for the Police Department and have also constructed them for other Government instrumentalities.

MR. CARMICHAEL:

There is only one thing. I would like to move a vote of thanks to the authors of these three papers, and I agree with Captain Miller, I think they are all of a remarkably high standard and the Branch ought to be very proud of them so I hope you will pass this with acclamation.

ERRATA TO
"SOME NOTES UPON THE DEVELOPMENT OF
SHIPBUILDING IN AUSTRALIA".

PAGE 5 Third para. last sentence, read: "Particulars of ships built, are given in appendix No. 16".

Fifth para. first sentence, read: "Two thousand seven hundred and twenty ships of all sizes were docked or slipped, over 1,000 of these ranging from 2,000 to 20,000 tons gross".

Last para. and sentence, read: "was" for "were".

PAGE 9 Walkers Limited - Maryborough, list of ships constructed, at end of 1940-44 delete: "cancelled freight".

PAGE 11 First para. last sentence, read: "Dock Hill" for "dock hill".

second para. last sentence, read: "See appendix No. 2 for copy from the Diary of the First Dockmaster and Engineer in Chief at Cockatoo Island".

Sixth para. second sentence, read: "indicates" for "includes".

PAGE 12 Second para. read: "Biloola" for "Bidela".

Ninth para. second sentence, read: "boilers and" for "boilers and".

PAGE 15 Eighth para. read: "Isherwood type" for "Sherwood type".

Ninth para. read: "longer" for "larger".

PAGE 16 Eighth para. delete: "dif".

PAGE 17 Third para. read: "Fordsdale" for "Foradale".

Eighth para. first sentence, read: "prepared" for "prepraed".

Eighth para. last sentence, read: "complete" for "complete".

Tenth para. add: "and" between Cockatoo Docks - Engineering Co. Ltd. and "for Sydney Morning Herald - Extracts of Ministerial Statement, etc." after "See Appendix 10".

Last para. first line, read: "on" for "in".

PAGE 18 Ninth para. read: "Docks" for "Dock".

Twelfth para. read: "Tribal" for "Tubal" and "Warramunga" for "Wanamunga".

Thirteenth para. read: "Destroyer" for "Destroyed" and "Bataan" for "Babaan".

PAGE 19 Second para. last line, add: "of" between "modernisation - warships".

Fifth para. read: Aircraft carrier "Formidable" for "Formidible" and "Cruisers" for "Crimea".

PAGE 19. Sixth para. last sentence, read: "their" for "these".

Last para. read: Victualling ship "Changte" for "Changtse", Troop Carriers "Orford" for "Oxford", "Orion" for "Orior".

PAGE 20 Second para. last line, read: "again" for "againa"

Sixth para. read: "stone" for "store".

Ninth para. read: "slipways" for "shipways".

Eleventh para. read: "Automatic Welding Machines" for "A.W. Machines".

PAGE 21. First para. second line, read: "Tribals" for "Tirbals".

Third para. fourth line, read: "4 to 5 times" for "4.5 times"

Sixth para. after "See Appendix 11" add "for particulars of vessels built subsequent to 1933".

PAGE 22 Second para. second line, add semi colon after "under contract".

Seventh para. read: "Docks" for "Dock".

PAGE 23, First para. second sentence, read: "Early" for "Iarly" and add "many of the yards" after "occupied".

Sixth para. particulars of "Scottish Monarch" read: "Forced draught" for "Flxed draught".

Seventh para. first sentence, read: "Lines" for "Line".

PAGE 25. Fourth para. eighth line, read: "under" for "aner".

PAGE 28. Sixth para. fourth line, read "joints" for "points".

PAGE 34. First para. fourth line, read: "ship" for "ships".

PAGE 35. Fifth para. read: "employ" for "enjoy".

Eleventh para. delete "Ballara".

Last para. precede with: "Two", read "Freighters" for "Freighter", "engines" for "engine", "fitted" for "filled" "exhaust" for "exhause", and "Wilcox" for "Wilson".

PAGE 36. Last para. insert "are" between "Destroyers - large vessels".

PAGE 37. Seventh para. read: "Peninsula" for "Peninsular".

PAGE 40. Sixth para. sixth line, read: "Docks" for "Dock".

PAGE 41. First para. read: "inclusion" for "inclusions" and "production" for "productions".

Acknowledgment to Walkers Ltd. Maryborough, Queensland read, "Dr. W. Hughes" for "Mr. W. Hughes".

APPENDIX No. 1 Add ".... etc." to the preambles of signatures beginning "I have" of both letters.

Read: "Appendix No.2" above "Copy from diary" and "Appendix No.10" above "Cockatoo Dock" Entered on New Career.

Read Appendix No. 3" stop pages marked 2 and 3 beginning with "The total cost of ..."

Add footnote to Appendix 7 as follows:
"For list of ships as numbered see errata page".

Appendix No. 9 cont'd. read "Galasson" for "New calicut for Fitzroy Dock".

Appendix No. 11 Cont'd. under second paragraph, "Designs prepared for the A.S.B." read "Tugs" for "Tugs".
Under third paragraph, second sentence, read: "This" for "Thus" and "Q" for "Q" class destroyers.
Under fourth paragraph Ship No. 147, read "Tugs" for "Tugs" and Ship No. 172 read: "Lons" for "Lons".
Under "Major conversions and modernisations" Ship No. 126 read "converted" for "connected",
Ship No. 124 read: "converted" for "connected" and "fire" for "Fuel".
Ship No. 130 read: "side" for "side"
Ship No. 147 read: "armed" for "armed".
Ship No. 144 read: "Change" for "change"
Add "Appendix No. 13" stop of page marked "State Dockyard, Newcastle, N.S.W."

Add "Appendix No. 16" to pages marked "Hort's Dock and Engineering Co. Ltd., General Particulars of Vessels built".

LIST OF SHOPS AS NUMBERED IN APPENDIX 7.

1. Administrative offices.
2. Copper smith.
3. Sheet metal workshop.
4. Pattern shop.
5. General stores.
6. Tool room.
7. Tool room.
8. Small boiler shop.
9. Shipyard fitting shop.
10. Shipyard fitting shop.
11. Riggers shop.
12. Timber store.
13. Electrical shop.
14. Drawing offices.
15. Offices, stores and laboratory.
16. Paint shop.
17. Painters and dockers.
18. Prefabrication slab (in ship yard).

APPENDIX 3D
 "ONE HUNDRED YEARS OF MERCHANT SHIPS ON
 THE AUSTRALIAN COAST"

Page 10A between Pages 10 and 11, third para, forelast sentence, insert: "Wimmera" was lost in World War I when she struck a mine off the Three Kings on the N.Z. Coast. The mine was one of a field of 25 laid by the activities of the well known German raider "Wolf".

Page 10A, fifth para., second line, delete: "as a hospital ship"; third line, for "18-17" read "18, 12, '42".

Page 33, fourth para., sixth line, for "now" read "almost" and for "the last group" read "several".

Page 1-10 after Page 45 renumber 46-51 and subsequently 51A-51D.

Page 53, add:

Total tonnage	7,411 Gross.
Average tonnage	358 Gross.
Name of largest vessel	S.S. "Wonga Wonga".
Tonnage of largest vessel	1,002 Gross.

Page 56, add:

Total tonnage	21,455 Gross.
Total tonnage	15,471 Net.
Average tonnage	580 Gross.
Average tonnage	419 Net.
Name of largest vessel	S.S. "Victoria".
Tonnage of largest vessel	1,258 Gross. 578 Net.

Page 57, add:

Total tonnage	48,322 Gross.
Total tonnage	38,342 Net.
Average tonnage	722 Gross.
Average tonnage	572 Net.
Name of largest vessel	S.S. "Gabo".
Tonnage of largest vessel	2,080 Gross 1,246 Net.

Page 58, add:

Total tonnage	135,143 Gross.
Total tonnage	83,663 Net.
Average tonnage	1,362 Gross.
Average tonnage	697 Net.
Name of largest vessel	S.S. "Roverie".
Tonnage of largest vessel	3,987 Gross. 1,898 Net.

Page 60, add:

Total tonnage	329,686 Gross.
Average tonnage	3,570 Gross.
Name of largest vessels	S.S. "Indarra" S.S. "Gambarra".
Tonnage of largest vessels	9,736 Gross. 7,707 Gross.

Page 61, add:

Total tonnage	
Companies	239,893 Gross.
B.M.P. plus Govt.	101,268 Gross.
Total	341,161 Gross.
Average tonnage	3,100 Gross.
Name of largest vessel	T.S.M.V. "Maninble".
Tonnage of largest vessel	11,004 Gross. 6,225 Net.
	3,618 D.Wt.

Page 64, add:

Total tonnage	
Companies	140,520 Gross.
Government	182,928 Gross.
B.M.P.	92,872 Gross.
Total	416,120 Gross.
Average tonnage	
Companies	2,720 Gross.
Government	4,260 Gross.
B.M.P.	7,722 Gross.
All vessels	3,950 Gross.
Name of largest vessel	S.S. "Iron Flinders".
Tonnage of largest vessel	19,000 Gross 14,039 Net.