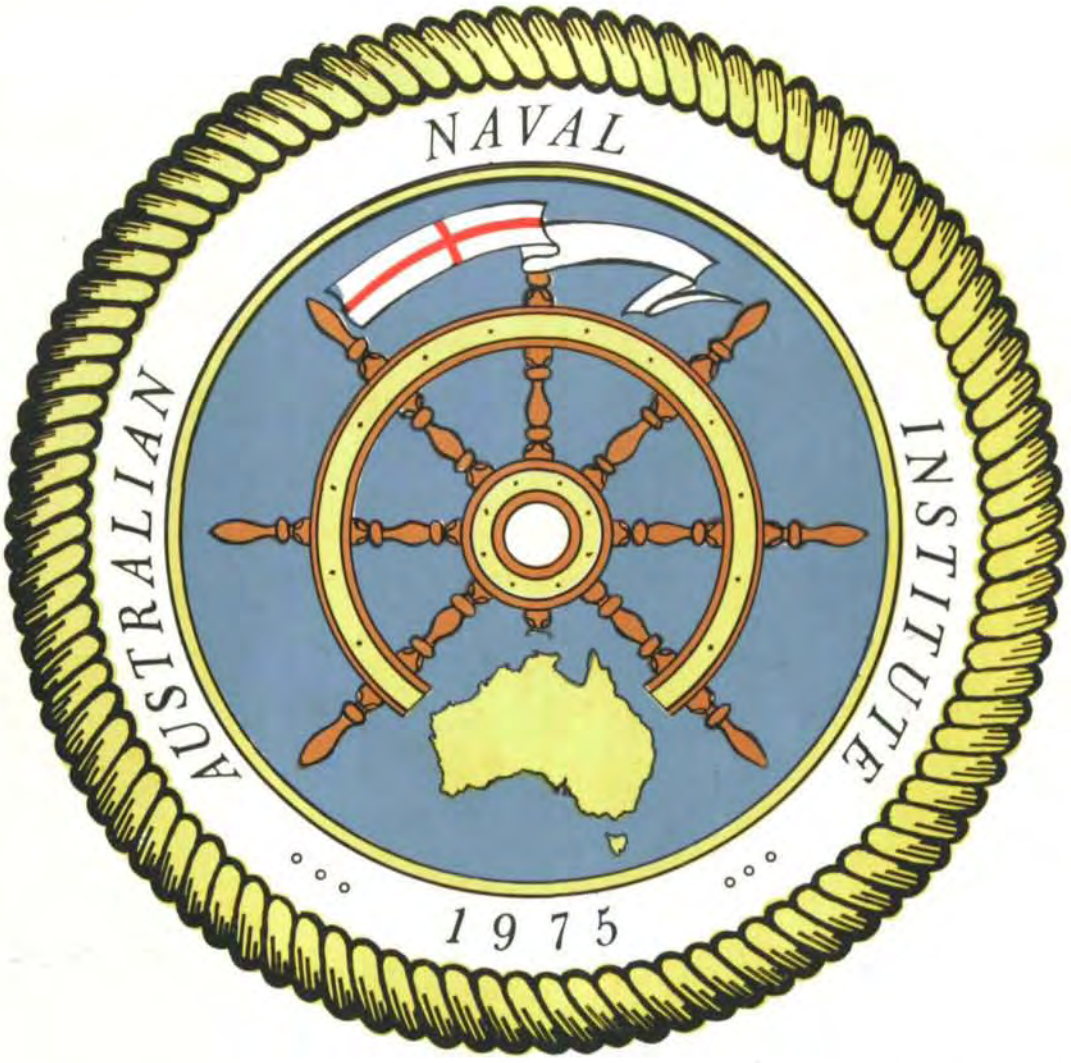
JOURNAL OF

THE AUSTRALIAN NAVAL INSTITUTE



VOLUME 2 NOVEMBER 1976 NUMBER 4

AUSTRALIAN NAVAL INSTITUTE

1. The Australian Naval Institute has been formed and incorporated in the Australian Capital Territory. The main objects of the Institute are:—

   a. to encourage and promote the advancement of knowledge related to the Navy and the Maritime profession.

   b. to provide a forum for the exchange of ideas concerning subjects related to the Navy and the Maritime profession.

   c. to publish a journal.

2. The Institute is self supporting and non-profit making. The aim is to encourage freedom of discussion, dissemination of information, comment and opinion and the advancement of professional knowledge concerning naval and maritime matters.

3. Membership of the Institute is open to:—

   a. Regular Members--Members of the Permanent Naval Forces of Australia.

   b. Associate Members—(1) Members of the Reserve Naval Forces of Australia.

      (2) Members of the Australian Military Forces and the Royal Australian Air Force both permanent and reserve.

      (3) Ex-members of the Australian Defence Forces, both permanent and reserve components, provided that they have been honourably discharged from that force.

      (4) Other persons having and professing a special interest in naval and maritime affairs.

   c. Honorary Members—A person who has made a distinguished contribution to the Naval or maritime profession or who has rendered distinguished service to the Institute may be elected by the Council to Honorary Membership.

4. Joining fee for Regular and Associate Member is $5. Annual Subscription for both is $10.

5. Inquiries and application for membership should be directed to:—

   The Secretary,
   Australian Naval Institute,
   P.O. Box 18,
   DEAKIN, A.C.T. 2600.

CONTRIBUTIONS

As the Australian Naval Institute exists for the promotion and advancement of knowledge relating to the Naval and maritime profession, all members are strongly encouraged to submit articles for publication. Only in this way will our aims be achieved.

DISCLAIMER

In writing for the Institute it must be borne in mind that the views expressed are those of the author and not necessarily those of the Department of Defence, the Chief of Naval Staff or the Institute.

JOURNAL OF THE AUSTRALIAN NAVAL INSTITUTE (INC)

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OUR COVER

Our cover now features the crest of the Australian Naval Institute.

President's Report Presented at the Annual General Meeting Held on 22 October, 1976

It gives me much pleasure in reporting to you the activities of the Australian Naval Institute for the year 1975/76. Since my first report there has been considerable progress. On the 30 September 1976 our membership stood at 140 regular, 115 associate and 3 honorary members, a total increase of 125 since 30 September 1975. This is very gratifying but we should all strive to encourage more to join. The future success of the Australian Naval Institute depends largely on the strength of its membership.

The Council has met each month during the year under review to conduct the day to day business of the Institute. I would like to take this opportunity to thank all officers and councillors for their support and advice during the year. As foreshadowed in my Report last year the By-Laws have now been issued.

The issue of the August 1976 Journal (our 5th) displayed the Institute's new crest on the cover. It is intended that the crest be used for future issues until we are big enough and weatlhy enough to vary the cover illustration from issue to issue. The Journal, thanks to the dedication of a small group of enthusiasts, has reached a high standard in articles printed and is being widely praised for its content. I would like to add here that contributions from members in the way of letters and comment on articles published has not been very large and if we are to attain our aim, we need more from members to the forum, about which, for years many, many Naval people lamented the fact that we did not possess—we now do—so to your pens.

Support for a National Headquarters from the organisations mentioned last year was minimal. This project is kept under constant review by the Council but prospects do not look very promising.

Chapters of the Institute are active both in Sydney and Canberra under the vigoruous leadership of their respective Convenors. Regular meetings are held and papers persented which are later published in the Journal. It is hoped that like-minded enthusiasts in other centres will follow suit. It does not require many members to start a Chapter.

The state of our finances and the record of income and expenditure up to the end of our financial year (30 September) have been distributed separately and will be printed in the next issue of the Journal. As can bè seen our funds are in a comparatively healthy state but as with everything, inflation continues to exercise its grip on our rising publsihing costs.

To summarise, a year of consolidation and steady progress.

CHAPTER NEWS

Canberra

On Wednesday, 29th September, Rear Admiral G. R. GRIFFITHS, DSO, DSC, the Chief of Naval Personnel, addressed the Canberra Chapter on the subject of "Officer Development".

The meeting, which was held at the usual venue, RSL National Headquarters, and chaired by the Convenor, Captain L. G. FOX, RAN, produced our best ever attendance of 41 members and guests.

The Admiral's talk stimulated a large number of questions and a wide ranging discussion which extended into the refreshment period, after closure of the formal meeting.

The next meeting will be held on Tuesday, 30th November when Commander A. R. CUMMINS, RAN is expected to address the Chapter on the subject "Operational Training Projections for the 1980's".

Canberra Chapter Annual Report

The Canberra Chapter has met on five occasions at RSL National Headquarters during the 1975/76 year with an aggregate attendance of 133 members. Papers were delivered at these meetings as follows:

October 1975:	The Future Role of Womens Services by Captain B.D. McLeod A.M. WRANS
November 1975:	The Indian Armed Services–An Overview by Captain T.R. Fisher, RAN
March 1976:	Australian Martitime Trade by Captain N. Ralph DSC, RAN
June 1976:	The FFG Acquisition–Some Aspects of the Management Role by Captain N.R.B. Berlyn RAN
September 1976:	Officer Development by Rear Admiral G.R. Griffiths DSO, DSC

Chapter finances solely involved the sale of refreshments in which the cash turnover totalled $144.93. The Chapter has an outstanding liability of $13.00 with cash in hand of $20.22. It also has assets to the value of $30.45. The Chapter accounts have been audited by the Honorary Treasurer of the ANI.

The Office Bearers of the Canberra Chapter are as follows: Convener–Captain L. G. Fox; Secretary–Lieutenant R. Jemesen; Treasurer–Mr. F. Goddard.

The next meeting of the Canberra Chapter will take place at the RSL National Headquarters Tuesday, 30th November, 1976, and further meetings are expected to occur thereafter during 1977 at approximately quarterly intervals.

In conclusion, it is considered that the proceedings of the Canberra Chapter have made a valuable contribution to the growth of the ANI and it is with some optimism that the office bearers look forward to the Chapter year 1976/77.

L. G. Fox
Captain, RAN
Chapter Convener

Sydney Chapter Annual Report

The inaugural meeting was held on 22 October, 1975 at which the film "The Rise of the Red Navy" and two papers were presented. "The Battleship Mentality Part I–The Case for the Prosecution" was presented by Captain J. A. Robertson and 'Software at Sea' was presented by Lieutenant Commander C. J, Skinner. Both papers and the film invoked considerable interest and subsequent discussion.

The second meeting was held on 10th December, 1975 when two papers were presented, "Naval Aspects of the Defence of Australia" by Rear Admiral N. E. McDonald and "Operation Sea King Recovery" by Captain J. A. Robertson.

The first meeting for 1976 was held on 21st January at which the President, Commodore V. A. Parker, attended and addressed the members. Two papers were presented, "The Aircraft Carrier" by Commander G. Nekrasov and "The Battleship Mentality Part 2–The Case for the Defence" by Captain J. A. Robertson.

At the meeting on 10th March 1976 Captain J. A. Robertson introduced the major topic of Naval Wargaming by giving a brief review of its history. Mr. Dennis Brackman, a wargamer of international experience, then spoke on recreational wargames available, how they are devised, constructed and played. He used the game "The Soloman Islands Campaign" to demonstrate a typical game.

On the 11th April 1976 a film night was held at the TAS School, HMAS Watson where the film "Tora, Tora, Tora' was shown. This was preceded by a short address on the Intelligence aspects of the film by Lieutenant Commander W. N. Swan RAN (ret'd.).

The last formal event was a presentation on the Battle of the Coral Sea at HMAS Penguin on 7th May, 1976.

Fremantle Chapter Annual Report

The Fremantle Chapter of the ANI operates on an informal and infrequent basis. There are only about eight financial members, but meetings are open to all and so far we have had fair attendance.

The first meeting was on the 26th March 1976 when seven people heard a presentation for Lieutenants Dave Taylor and Norm Good on 'Aspects of Naval History', including a brief discourse on the origins of some ships' crests.

The second meeting on the 29th July 1976 was a film called 'The Rise of the Red Navy' followed by informal discussion. This meeting was attended by 15 people. Our last meeting on 23 September 1976 was also a film, 'The War Game' (about the effects of a nuclear explosion in S. England) followed by a discussion with Mr. Col Porter from the Department of Conservation and the Environment. Mr. Porter was most interesting not only because of his current background, but also because he knew the director of the film at the time of its production.

The original convenor was LCDR. Geoff Cutts but due to a recent posting this task is now being undertaken by Lieut. Dave Taylor.

Correspondence

Dear Sir,

I was delighted to see "Juror's" letter in the May '76 Journal, and I concede his point that I have not properly investigated the Battleship Mentality in the RAN. Unfortunately he weakens his position by the statement about the "DDG acquisitions during the gun-boat war of Confrontation". In fact the DDG's were ordered four years before Confrontation began. Nevertheless, I hope his letter will have roused some others to write and tackle the subject with greater precision.

While commenting on the May issue, "Slingshot" is obviously another member with something thicker than ice water in his veins. While I do not agree completely with everything he says, either, it is, in my opinion, one of the best contributions we have had so far, and gives me great hope for the Institute's future. Whoever you are "Slingshot", keep it up.

Of course this could be said of all our contributors, and it may seem pointed to omit anyone. This is certainly not my intention if I single out Captain Neil Ralph's article on our maritime trade (May '76 also). On such matters may hang all the law and the prophets of Maritime Defence of this country. So many supposedly cheap solutions proposed for Australia's Maritime Defence seem to overlook the fact that we will probably be back to having to import all our oil fuel within five years. Unless we can find more oil here, or develop substitutes, it seems that the first requirement for our defence forces could be to ensure that we can bring in enough oil to run the country, first of all, and still have enough left over for the fighting vehicles.

Before I close, I think the time has come to mention that, while I acknowledge the hard work and devotion of our editorial team, and sympathise with their pleas for copy, we will have to avoid the mistakes, omissions and misspellings which have so far marred their otherwise praiseworthy efforts. For instance, the book review of the "Ultra Secret" should have said that, because of excellent Intelligence, the principal Headquarters fighting the Battle of the Atlantic in World War II *knew practically everything the U-boats in the Atlantic were up to.* The omission of the words in italics made nonsense of the whole paragraph. Similarly, simple spelling mistakes and misprints detract from the attitude of professionalism we are supposed to be trying to promote. If the editorial staff cannot find the time needed (and that is easy to understand) would you think of sending the galley proofs back to authors for proof reading? It would cost a bit more in postage and time, but it would be worth it.

J.A. ROBERTSON
Captain, RAN

EDITORIAL COMMENT

With regard to Captain Robertson's comments on editing we are well aware of our shortcomings and during the production of each edition we try to do better. Unfortunately a pet gremlin still seems to be in the system. Now that we appear to have a stabilised team as regards postings we hope to produce error-free Journals in the future. Having said that we will probably make a real nonsense of the whole thing. We welcome comment, it spurs us to do better.

Editor.

The following letter to Captain Robertson is printed for the interest of our members —

2 Lucifer St.,
North Balwyn
Victoria, 3104

Dear Captain Robertson,

Your paper "The Battleship Mentality"–Journal of the Australian Naval Institute, February, 1976–was most interesting, as were the views you expressed in your review of the book "The Continental Commitment" (Journal of the ANI, November 1975). I would like to make some comments and hope you will take these in the spirit in which they are made–constructive contributions.

Firstly, you quote David Divine as saying "every major Admiralty and Fleet Appointment going to former Grand Fleet Officers, radical or innovative thinking was not encouraged." In my view, the facts show that Divine's statement is substantially incorrect. Every major Admiralty and Fleet appointment did *not* go to former Grand Fleet Officers. Whilst this depends to a certain extent, upon the definition of major appointment, the following are examples of Officers who later held major appointments and who were *not* Grand Fleet Officers:

Admiral of the Fleet Sir Reginald Yorke Tyrwhitt, Bt., CinC China, and CinC Nore.
Admiral of the Fleet the Lord Wester Wemyss, First Sea Lord.
Admiral Sir W. A. Howard Kelly, CinC China, VAC 1st BS and 2 i/c Mediterranean.

Examples of officers who served for only a short time in the Grand Fleet, and who later held major command etc. include:

Admiral of the Fleet Lord Keyes, CinC Med., CinC Portsmouth.
Admiral of the Fleet the Rt. Hon. The Earl of Cork and Orrery, CinC Home Fleet, CinC Portsmouth.
Admiral of the Fleet Sir John D. Kelly, CinC Home Fleet, CinC Portsmouth.
Admiral of the Fleet Viscount Cunningham of Hyndhope, CinC Med., First Sea Lord.

Secondly, I consider that there are a number of examples of Officers who did serve for extended periods in the Grand Fleet and went on to "think innovatively and radically". Examples include A.E.M. Chatfield, W.M. James, F.C. Dreyer, R.G.H. Henderson, R.F. Phillimore and H.W. Richmond. Indeed, far from discouraging Richmond's radical and innovative thinking, Beatty *asked* to have him transferred from command of the (detached from the GF) battleship *Commonwealth* to the dreadnought *Conqueror*, where he would be back in the main body of the fleet.

Incidentally, you mention that H.W. Richmond "Had to resign". I am unable to trace this–it is not mentioned in Marder's "Portrait of an Admiral". He was *removed* from at least one post (DTSD). However, so far as I can trace, he seems to have held all his major post war Flag Appointments for at least the customary tenure–Greenwich 2/20–2/23, CinC East Indies Station 12/23–12/25, Commandant Imperial Defence College 9/26–12/28. He retired on 1st April, 1931, at his own request, after 2½ years on half pay. However, under the regulations then in force, he would have had to retire on 31st December 1931 in any case (appendix to THE NAVY LIST, Jan. 1923, page 2282). I would be very grateful if you could help me by clarifying when Richmond resigned and from which post. His career interests me very much, and I have it in mind to prepare a short biography in due course.

Reverting to David Divine, your quotations from his book reveal a further error on his part. This concerns Captain S.W. Roskill, RN, who, Divine says, was the son of an Admiral. According to Who's Who, 1970, Roskill was the son of *Mr.* J.H. Roskill, KC. Frankly, Divine's inaccuracies surprise me, as his MUTINY AT INVERGORDON was well researched–I had some correspondence with him on the subject.

A number of the comments in your paper interested me very much, in the context of the personal qualities needed to promote successfully the major changes in large organisations. Contrary to the views of many Naval Officers, major changes can be just as difficult to implement in large industrial, commercial or academic organisations as in the Armed Services. I am now preparing a lecture for the Victoria Chapter, Naval Historical Society, on this subject, building my theme around the Fisher-Beresford Controversy. In very general terms, J.A. Fisher had relatively little difficulty in producing new ideas (particularly for materiel improvements), but much greater difficulty in getting them introduced. *If* he could have persuaded Beresford to *sell* his (Fisher's) ideas to the Fleet, the two would have been a formidable team. If you have any comments on this, I would be very grateful.

Yours sincerely,

A. W. GRAZEBROOK

Response by Captain Robertson —
A reply has been made on the following lines:

"Roskill was the son of an eminent KC." This was a deliberate misstatement on my part to see if any one would take the trouble to look him up, or had read his books, and knew. I am delighted that you have bowled it out, but it is not David Divine's mistake.

The paragraph which troubles you is not a quote from Divine, it is taken largely from Roskill. Once again there is a deliberate misquote, the first one in more length, should read, "not until air power had spelled the doom of the entire conception of the battle fleet in the last war did senior officers of British Squadrons cast off the shackles which Hawke and Rodney had first loosened, and Nelson had shattered into fragments, but which were then sedulously refastened by his successors. It is one of the greatest puzzles of history how a service which has never ceased to worship the memory of Nelson has remained so blind to the chief reason for his successes, and after his death followed with almost monotonous regularity the opposite course to that which he himself adopted" (The Strategy of Seapower p 81). I have hinted at these deceptions in the last paragraph of the defence.

The phrase "every major Admiralty and Grand Fleet appointment" should have been preceded by "practically" and its origin in a paper given at a Canadian seapower symposium ("From Dreadnought to Polaris", USNI). The addition of the word "practically" would soften the phrase, but your correcting comment is well taken. There is little doubt in my mind, though, that the 20's and 30's were indeed a period of tactical sterility and Roskill is again relevant. (ibid p. 149) "The big gun was, however, still regarded as the principal arbiter in naval warfare" and goes on to mention the very low requirement placed on Naval air and the fact that RAF coastal command had no training in ASW, defence of convoys or attacks on enemy merchant shipping. The lack of development of ASDIC is a matter of record.

Richmond is a fascinating character and Beatty did have a lot of time for him as a Captain. "I am sorry Richmond has to go to the Admiralty, (from HMS Conqueror) . . . He has brains, has studied and will, I hope, be a great help to me. He is of an independent character, and will always say what he thinks, which is one of the reasons I could not get them to take him there before". But that was in 1918. In the 20's Richmond started questioning Beatty's policies on battleships and cruisers in the context of the various naval treaties, and wrote letters to the papers under the pseudonym "Admiral". Eventually he was in such conflict that the only honourable course left was to resign. Why was he placed on half pay so early?

The problem of making changes in any human organisation are well appreciated, and I have made a gesture towards this understanding in the second last paragraph of my article. Nor is conservatism always disadvantageous, but there is a tendency for it to become paramount, particularly in peacetime as resources dwindle. Chatfield, James, Dreyer, Hendersen, Richmond and Dewar may all have been capable of innovative thinking but there is not much evidence to suggest that they produced anything like the innovations of the USN, the Japanese, or the original thinking of the Germans (the "Z" plan) in the same period. I regret I do not know much about the Fisher-Beresford controversy so my comment on its effect would be superficial. Roskill (ibid p. 101), and again (p. 140), "The schisms produced in the Navy by Fisher's drastic methods took a long time to heal, and internal disunity in a fighting service must surely militate against efficient staff work and sound planning" may be of value. Yet the "party line" approach of the years between the wars seems to have paralyzed any significant development too. Without wars it seems that the R.N. would not have been ready for World War I at all; so it all boils down to the trite thought that a balance has to be struck.

On looking up the paper about Richmond I find that I have an apology to make to its author, B.D. Hunt of the Royal Military College of Canada. In writing my own paper I have lifted whole sentences and phrases verbatim without putting them in quotes and acknowledging the source. The paper's full title is "Smaller Navies and Disarmament–Sir Herbert Richmond's Small Ship Theories and the Development of British Naval Policy in the 1920's".

The phrase "period of tactical sterility" is quoted by Hunt from Roskill's "Naval Policy Between the Wars".

In going back to these sources I was reminded that Richmond was officially censured in 1929 in a letter drawing his attention to KR & AI's provisions about public comment on policy matters. Hunt says"(Richmond's) decision to publish his 'heresies' was made in the full knowledge that it would cost him his career" and he makes it plain from direct quotes from Richmond's letters that this was indeed the case.

AUSTRALIAN NAVAL INSTITUTE FINANCIAL STATEMENT 1975/76

Income and Expenditure Account for the year ended 30th September, 1976
(With 1974/75 figures for comparison)

Expenditure	74/75	75/76	Income	74/75	75/76
Advertising	25.60	9.60	Advertising	380.00	1297.50
Audit Fees		25.00	Joining Fees		637.69
Art Work		10.00	Subscriptions	1940.00	2724.15
Bank Charges	2.50	4.50	Journal Subscriptions		461.69
Hall Hire		24.16	Bank Interest	8.93	42.19
Postage & PO Box Rental	39.61	250.00			
Printing & Stationery	841.98	3370.35			
Replacement Lock		3.00			
Legal Fees	57.40				
Surplus for the year	1361.84	1466.61			
	$2328.93	$5163.22		$2328.93	$5163.22

Statement of Receipts and Payments for the year ended 30th September, 1976

Receipts	74/75	75/76	Payments	74/75	75/76
Cash at Bank		672.53	Advertising	25.60	9.60
Cash on Hand		309.31	Audit Fees		25.00
Bank Interest	8.93	42.19	Art Work		10.00
Joining Fees		637.69	Bank Charges	2.50	4.50
Subscriptions	1940.00	2724.15	Commonwealth Bonds		1000.00
Journal Subscriptions		389.19	Hall Hire		24.16
Advertising		977.50	Postage & PO Box Rental	39.61	250.00
Debtors		380.00	Printing & Stationery	841.98	3370.35
			Replacement Lock		3.00
			Legal Fees	57.40	
			Cash on Hand	309.31	
			Cash at Bank	672.53	1435.95
	$1948.93	$6132.56		$1948.93	$6132.56

Balance Sheet as at 30th September, 1976

Accumulated Fund	74/75	75/76	Assets	74/75	75/76
Balance at beginning of year		1361.84	Sundry Debtors	380.00	392.50
Surplus for the year	1361.84	1466.61	Commonwealth Bonds		1000.00
			Cash on hand	309.31	
			Cash at bank	672.53	1435.95
	$1361.84	$2828.45		$1361.84	$2828.45

D. J. CAMPBELL
Lieutenant Commander, RAN
Honorary Treasurer

RUGENDYKE MANN & CO
Auditors

Officer Development

By REAR ADMIRAL G. R. GRIFFITHS, D.S.O., D.S.C.

An Address to the Australian Naval Institute, Canberra, 29th September, 1976

Mr. Chairman, Ladies and Gentlemen,

This evening I would like to present to you some thoughts on the problems associated with producing officers for the Navy in the future, though you will see as the talk progresses that much is relevant to the requirements of the present day officer.

The term 'officer development' is not original–a number of you will no doubt be aware that the Canadian forces have an officer development board which studies this important subject.

At present we do not have a term which embraces the whole range of education and training activities which provides the individual officer with the necessary knowledge and professional ability to fulfill his duties at each level of responsibility. The term 'the officer development process' seems to cover this.

But before we can explore the problem of officer development and determine some of the key factors in the development process it is essential to identify the duties or tasks which face the naval officer. Here we are looking for a broad definition of duties ashore and afloat–there will be some differences, some change of emphasis in certain aspects, but there will be a close inter-relation between each as the whole effort of the individual officer, whether serving at sea or ashore, must contribute to the overall effectiveness of our naval forces.

These duties or tasks seem to fall into two main inter-related areas of responsibilities which increase with rank:

(a) firstly from the sea going aspect there is the professional command and management of the wide range of shore and fleet matters associated with the effecive conduct of naval and joint-service operations at sea in time of peace, emergency or war, and

(b) secondly from the shore service aspect there is the managerial work and direction associated with such matters as force planning, equipment procurement, preparation of tactical doctrine, defence and strategic planning, personnel management and training, conditions of service, and logistic and maintenance support of the fleet.

Now against this background definition of the requirements placed on the officer ashore and afloat, let us consider how these demands and responsibilities increase with rank.

An important aspect of the military profession is that the officer is required to broaden his experience in order to progress to higher levels of responsibilities. This is in contrast to a number of other professions where success lies more in high and relatively narrow specialisation. The career

THE AUTHOR

Rear Admiral Guy Griffiths was born in Sydney on March 1923, and spent his early years in the Old Rothbury/Pokolbin district of the Hunter River Valley NSW. He entered the Royal Australian Naval College as a cadet midshipman in January 1937, aged 13. He was made Chief Cadet Captain in his final year, and on graduation to Midshipman in December 1940, was posted to the Royal Navy and joined the battlecruiser *HMS Repulse* in March 1941.

In December 1941 *HMS Repulse* was sunk off the east coast of Malaya, and after rescue 'Midshipman' Griffiths was posted to the battleship *HMS Revenge*. In January 1943 after service in the destroyer *HMS Vivian* he joined *HMAS Shropshire* on commissioning. The next two years saw action in the South West Pacific including the Leyte and Lingayan Gulf operations in the Philippines and the battle of Surigad Strait. He was awarded the Distinguished Service Cross after the Lingayan Gulf operation.

After the war he completed the Specialist Course in Gunnery at *HMS Excellent*, Portsmouth, and after two years exchange service returned to Australia. From 1950-52 he served as Gunnery Officer in the carrier *HMAS Sydney* and saw action in the Korean War. At the end of 1952 he returned to the Korean theatre and saw further action in the destroyer *Anzac*.

In 1954 after undergoing the RN Staff course he served in *HMAS Melbourne* on commissioning in October 1955 to end 1956 when, on promotion to Commander, he was posted as Fleet Operations Officer.

In 1961, after two years ahsore in Navy Office he was posted in command of *HMAS Parramatta* on commissioning which was the first of the new River Class DE's in the RAN. This was followed by duty as the Director of Tactics and Weapons Policy at Navy Office Canberra.

In 1964 he was promoted to Captain and in December 1965 took command of *HMAS Hobart* the second of the guided missile destroyers, on her first commission. The ship saw action in Vietnam and he was awarded the Distinguished Service Order.

From late 1967 he served in Malaysia as Naval Adviser to the Chief of Naval Staff Royal Malaysian Navy, and in 1970 attended the Imperial Defence College London.

In 1971 he was posted as Director General Operations and Plans at Navy Office Canberra, and was promoted Commodore in the same year. From late 1973 to mid 1975 he commanded the aircraft carrier *HMAS Melbourne* and in addition to normal operations participated in the Navy Help Darwin Operation after Cyclone Tracy in January 1975. He was posted as Director General Personal Services in November 1975.

On 30 June 1976 he was promoted Rear Admiral and was appointed Chief of Naval Personnel on that date.

process of the naval officer could be placed in the following stages:

a. The first stage covering the period as a sub-lieutenant and a lieutenant is that in which the officer is required to achieve the optimum standard of ability in his branch and specialisation in relation to his responsibilities at that level,

b. the second stage covers the period as a Lieutenant-commander and Commander in which the emphasis changes to include increasing demands for managerial ability, to be developed concurrently with the broader branch and specialisation ability which comes with experience. In this stage employment generally covers the wider scope of the inter-relation of branches and activities within the service, and also enteres the policy making and join service fields.

c. The third stage is seen to cover the period as Captain and above and continues to demand a high standard of professional and managerial ability which increases with rank. In addition to single service higher level managerial tasks ashore and afloat, the officer is involved with the inter-relation of the Navy in the national and international context.

As I see it, it is essential to have both the sea and shore responsibilities defined in the career stages for the level of responsibility with rank before you can begin to evolve a detailed plan for the officer development process. This should be a comprehensive plan covering all stages from the recruit onwards.

Indeed the recruit phase is most important for without it student material is not available to begin the officer development process. The effectiveness of the recruiting activity will be reflected with the standard and number of applicants. Recruiting is not an easy matter and the policy established must take into account the problems of society as a whole, its changes and rate of change and the relationship between the defence force and society. It is essential that recruiting material shows to both the parents and youth, the scope of professional and management ability required by the naval officer especially at the middle and higher rank management levels. This must be done to present the career as a sufficient challenge to youth. If we miss out on presenting both the scope and the challenge the effect will be to lower the prestige of the occupation to a level which no longer attracts sufficient interest. It is of interest to look into some of the career guidance handbooks available in high schools at present to see how improvements can be made in this important area.

Now let us look at the development process which should be a comprehensive plan to educate, train and provide the experience necessary to equip the officer with the knowledge and develop his ability to perform the tasks we have just seen in the career stages just shown to you. At present we tend to refer to the various activities under the expression 'officer training' but I feel it is necessary to identify the various steps and I would like to deal with each in turn. The educational part of the plan seems to be a combination of:

a. Formalized education which is recognised under normal national academic standards such as the present tertiary education for selected degrees and diplomas. It also includes,

b. the in-house service education which covers specific naval subjects which form the basis for subsequent training. An example of this would be the present principle warfare course and the supply officers charge course,

c. the training phase is carried out ashore and afloat and consolidates both formal and service education within the requirements of the naval environment, and lastly,

d. the remaining integral part of the development programme is the experience provided by the naval officers career plan. Such a career plan should provide a range of postings at sea and ashore to enable each officer to gain the necessary experience to develop his potential for higher rank and further responsibilities.

I would now like to deal with the formal education part of the development process, and it is important for us to remember that we are thinking about the standard of education required to equip officers for middle and higher management duties in the Navy not only at the present time but also in the period say from 1990 and beyond. A senior entry cadet who begins his career in Jan. 1977 could be a Captain in about 1999.

In 1962 the Weeden Committee was established to review periodically the academic syllabus and academic problems at the RANC. As a result of the first meeting of the committee the firm recommendation was made that technical officers should carry out degree training in Australia and the committee also went on to recommend that the best of the executive and supply branch cadets should have an opportunity to undertake a university degree course in science, arts, law, economics and commerce. These recommendations were processed and in August 1964 it was agreed that the then training scheme for officers should include engineering, science and arts degrees to be undertaken at the University of NSW, and action was taken to implement this in January 1966. Many of you will remember that Sir Leslie Martin headed a Committee in the late 1960's also to look into the education of service officers, and in the committee report the following statement was included:

> *"As to the type of education required all evidence we have heard indicates that the basic requirement in the three services is for education in social sciences, the humanities, the physical sciences and engineering."*

In addition the report also stated:

"We have no doubt that there is a genuine and increasing need in the services for officers who have followed appropriate courses of tertiary education leading to a recognised academic qualif-

ication. Pressures similar to those that have led the community to place a growing emphasis on tertiary education are evident also in the profession of arms. Service officers of the future must be more than leaders of men schooled in the techniques and disciplines unique to their professions. They will be concerned with sophisticated and increasingly complex equipment and weapons systems, and with technical measures and counter measures that require in varying degrees an understanding of the ideas, phenomena and vocabulary of science. To participate as many will be required to in the formulation and communication of national defence and security policies, they must have an educated understanding of the political and governmental systems, the history and economics of their own and other countries and of international relations. They must have particular skill in the process of management. They must be articulate and be able to communicate and collaborate with specialists at home and abroad, in fields such as foreign affairs, economics, industry, science, labour and finance. For their contributions to be effective, their knowledge and understanding of these matters must be at a level that will gain the respect and recognition of those with whom they will be dealing."

An outside and somewhat independent thought is expressed in a paper on 'Educating for the Profession of Arms' by Professor Patridge whose paper has been published by the Strategic and Defence Studies Centre of the ANU. In the paper the following two statements are made:

"In America type countries the prestige of occupations tends to be closely related to the level of education necessary to gain access to them. And there are many both in Britain and the United States who believe that the military profession will become less capable of attracting the necessary number of intellectually able and ambitious young men unless that profession also like law, medicine, engineering, management and the rest, presents itself as one of the learned or at least highly educated professions."

"Civilians in politics and administration who are professionally involved in the making of defence policy tend to be men who speak the language of the social scientists. And one argument that is sometimes heard in Britain and also in the United States is that if the military is to be able to hold its own in the discussion and determination of policy concerning military security, it too should have men able to talk the language of the social scientists capable of acquiring educated understanding of the political, economic and social forces and circumstances, national and international, which bear directly on military policy and activity. This of course is a mode of thinking more compelling in a great world power like the United States than it might be in a very small country like Australia. Nevertheless it also has its relevance to Australian circumstances."

From these statements that I have presented to you there is a strong thrust which shows that tertiary education should be regarded as the basic requirement for the military officer for the future. No doubt there would be many difficulties in achieving this for every officer in the Naval service. Nevertheless we have to be careful to ensure we have an adequate number of officers who have completed this level of education. A further aspect has also been presented by authorities cautions against accepting the initial attainment of a tertiary degree as the one shot education process in an officer's career. While experience has already shown that part of the officer development process requires a series of courses throughout his career, these courses in the main have been on service oriented subjects only. In the future it may well be necessary to modify the whole process to a continuing education plan to include an updating of the original tertiary level if only in conjunction with a service education process, the whole being graded to meet requirements as the officer progresses. At present I understand that engineers are considered out of date about 5-7 years after graduation.

In spite of the weight of evidence in support of the need for tertiary education for our future officers, many question the need for a degree qualification as a basic requirement. This stems mainly from the line of reasoning which is based on questioning the applicability of the present degrees, science and arts, to the tasks in the seaman and supply branches. I personally feel this is a narrow view which looks no wider than the sense in which the tertiary qualification can be applied to Navy as distinct from defence matters, and even then at a level below policy making level. I also believe it to be wrong, that future naval officers, not so qualified, should be asked to compete in an environment in which almost all their non-naval peers and professional colleagues will have this basic standard of education.

I have spent some time on formal education because I feel that it is a most important aspect of the officer development process and one which should be looked at as objectively as possible. Present day discussion seems to raise some emotive issues and comments mainly from those who have not completed a tertiary education phase. In looking towards the future and the position of the Navy and its officers in the technological age with its rapid rate of change, I feel we must be very careful to make the right decision and provide the means whereby a majority of officers are equipped with a nationally recognised level of tertiary education at the beginning of or during the officer development process.

I would now like to move to service education and this field is seen as covering most courses for officers of each branch of the general list which are conducted mainly in service training establishments to development knowledge in their professional field. For example, for the seaman branch, this

would include courses for principle warfare officers, tactical courses, advanced warfare courses, and for the engineering branch it includes application courses and for the supply branch it includes the supply officer's charge course. It also covers staff courses.

This education is an essential part of the officer development process and should be graded to provide the background which is needed by officers as they progress through stages of increasing professional responsibilities. This is done at present. For example the seaman Lieutenant after an initial period at sea consolidating basic learning in various ships but probably spending the majority of the time in PBF's and LCH's, will then be selected for a principal warfare officers course. This provides him with the knowledge to fit him for operational duties in destroyers.

It will be necessary to keep this aspect in constant review to ensure that future requirements are determined and that the associated service education process is implemented in sufficient time to produce the officers required.

Staff courses have always formed an essential part of the service education process. These consist of the single service Naval staff course, taken at the Lcdr level. Regrettably we do not run our own in Australia and must, at present, put officers through the RN staff course in penny numbers. The next step is the JSSC in Canberra which processes officers at Commanders level, and finally there is the RCDS in London for officers at the Captain and Commodore level.

Staff college training already presents us with problems at the Senior Lieutenant/Lieutenant Commander level. At present we are not processing sufficient officers through this important course which should be providing them with the additional knowledge on management matters and management processes to fit them to move into the second stage of their career. Consequently many Naval officers are disadvantaged with respect to their Army and Air Force equivalents where staff training for the majority is a mandatory step in the requirements for higher rank.

The training part of the development process overlaps service education to some extent and at present is conducted under officers training policy. It is carried out ashore and afloat in dedicated training establishments and in ships of the fleet including one training ship. In the shore establishments use is made of ships equipment specially provided for training purposes, and special training materials and training aids. Of these the computer based simulator is probably the most advanced at the present time. Ideally at sea the major portion of training should be carried out in dedicated training ships. This would allow the greater portion of operational sea time to be devoted to achieving the best possible degree of operational effectiveness in individual ships and in the fleet as a whole.

Training consolidates the knowledge gained in the education process by practical application in the service environment. This has to be related to the tasks and responsibilities of the officer at the various stages of his career.

Obviously there is a compromise between the amount of training effort expended ashore and the amount of on-the-job-training necessary at sea before the officer can be considered proficient to perform his duties. On the other hand one has to weigh up the costs of providing the facilities ashore against the costs of training at sea. Generally I feel there is scope for providing better training aids ashore particularly in the use of simulators and I consider that this action would prove economically viable. I would not want you to assume that these observations refer only to training in the seaman branch, as I am sure that investigations would show a range of application to the other branches.

The last part of the development process involves officer career planning. This should ensure that the officer is posted through a range of billets in order to provide him with experience and to develop his ability and potential for higher rank responsibilities. This does not necessarily mean that each officer in the particular branch and specialisation must pass through an identical sequence of posts. Time in rank and the availability of billets at sea and ahsore would dictate against this. Career planning as part of the development process is at present, and will certainly remain in the future, a complex task. It involves assessment of job performance, officer potential, job statements, officer qualification and so on.

Before I conclude let me summarise —

a. *Firstly* there was the identification of the tasks facing the officer ashore and afloat;

b. *secondly,* we covered the staged development of the officer from the time he began, mainly in the pure professional naval aspects of his branch which then widened to encompass more managerial responsibilities and then continued with an increasing demand for professional and managerial knowledge and ability;

c. *thirdly,* I mentioned recruiting as an important item without which we are unlikely to obtain the right material for officer development. In recruiting we must present the scope and challenge of the Naval officers career and always bear in mind that we are competing in the national market;

d. *fourthly,* I covered the various aspects of the development process wich need to be formed into a comprehensive plan to educate, train, and provide the officer with experience. This covered the aspects of formal education, service education, training, and officer career planning.

That concludes what can only be regarded as an outline of the complex matter of officer development. Nevertheless I trust it gives you food for thought. I wish to add that the views expressed are my own personal ones and are not official. I will be happy to answer any questions.

Training The General List Officer

Some Problems and Possibilities

By "MASTER NED"

This article has been submitted by a subordinate officer who is at present undertaking training at the Royal Australian Naval College, as it provides an insight into the way in which the present training patterns appears to someone actually undergoing that training. For those not familiar with the pattern of training at RANC, the description taken from the RANC Handbook for 1976 is provided at the end of the article.

The Present Position

Since 1974 the Royal Australian Naval College has been operating under a scheme designed as an attempt to give the officers under training the best all-round education possible.

Two entries go to make up the officers who are selected for each tertiary course. These are the Junior Entry, who enter between the ages of 15 and 17 and complete their last two years of secondary schooling at the Naval College, and Senior Entry, who enter after the age of 17, having already matriculated.

Senior Entry join the Naval College at the beginning of February each year and undergo a short indoctrination and familiarization course (two days in 1976) before joining the just-matriculated Junior Entry of two years previous. Both then undergo the Specialization and Tertiary Education Programme (STEP). This course lasts just over a week, and is the means whereby the student officers are informed of the various branches and specializations open to them. It consists of lectures on the general organization of the RAN and its rank structure, on each branch and specialization by a qualified officer and outlines of career patterns and training schemes. To this, if it can be arranged, is added a day at sea to get the 'feel of the real thing'. In 1975 a day on board *Stuart* at Garden Island was arranged for Senior Entry only, while in 1976 they were sent aboard *Swan* in Jervis Bay. Junior Entry were left out of this since it was thought, quite reasonably, that they should aready have a good idea of the subject.

As can be seen from the diagram there are four degrees and the 'Creswell Course' for each officer to choose from. The only real restrictions on choice are: first, eyesight; second, matriculation results—for a cadet who has only just scraped a pass will inevitably be refused permission to undertake the degrees of Bachelor of Engineering or Electrical Engineering; and third, the Bachelor of Arts degree, undertaken entirely at the University of New South Wales is limited to eight places a year (it is in the process of being increased to twelve).

Cadets's Reasons for Selecting Courses—Junior & Senior Entries

Why do cadets select the branches they do? The reasons seem to be entirely different for either entry. Junior Entry, after two years at the Naval College, have a marked tendency to select the Seaman Branch and avoid the others. There are several causes for this tendency. First, a significant proportion of Junior Entry join with the definite thought in mind that they will be able to get to sea with a minimum of further scholastic effort. The bulk of these cadets originally approached the Navy with the intention of joining as Junior Recruits to enter "Leeuwin" but, because of their abilities were persuaded to try for the Naval College instead. On the whole, they do not like the thought of a degree tacked on to their secondary schooling and seek a different way. The second reason is that many cadets who joined with the original intention of doing a degree, baulk at the thought of three or four more years hard work after the two they have completed. If they do a degree it will be Arts or Science, the shorter and easier ones. It is difficult to say whether the Navy loses out on these cadets' potential. Certainly a source of possible engineers has dried up but very few of this type of cadet leaves the Navy in the immediate period—these officers will provide a return of service. Furthermore, if it is admitted that, had they joined as Senior Entry, these men would have begun BE or BEE studies, would they not have been among the many who drop out through lack of motivation on the way. It is a very difficult question and one that admits of no easy answer. The third reason is that, from no apparent source, cadets tend to pick up a dislike for the Supply Branch. No attempts by the authorities could eradicate this dislike, it is probably one that has existed as long as the College and it is an unfortunate fact that the crowning insult at the Naval College is "You'd make a good supply officer".

To give an example of the Junior Entry's tendency towards the Seaman Branch; of the 27 Junior Entry who underwent STEP in 1976, 2 selected the Supply Branch, 7 the Instructor Branch, none the Engineering, 3 the Electrical Engineering Branch and 21 the Seaman. The balance of figures in the Senior Entry is quite the reverse.

Senior Entry on the whole seem much more 'degree motivated'. There has been something of a problem with the number of SE's who join apparently with the idea of getting a degree in mind and little thought or knowledge of the Navy as a career. As a result of more careful screening this sort of thing is now happening a great deal less often.

But it is true that Senior Entry are more interested in degrees for their own sakes than Junior Entry. It is notorious at the College that Junior Entry do not volunteer for Mechanical Engineering while Senior Entry are fairly keen on the idea and while Arts is a great favourite with many Junior entry because it is done completely away from the Naval College and is fairly easy, Senior Entry of the same calibre go more for Science. Whether this is a good thing or not is hard to say, for many who go for the more difficult degrees drop by the wayside and the number of each entry completing their degree generally ends up approximately even.

The Creswell Course

Apart from the four degrees there is the programme of tertiary studies known as the 'Creswell Course' conducted by the Naval College. It was designed specifically with the less academically inclined Seaman and Supply officers in mind and is intended to provide a good 'all-round' education in the least possible time. It was, until 1974, a course of 15 months, after which the officers involved went to the training ship, and then to the fleet. After a year's sea time they return to the College for one term of navigation and preparation for the Promotion Parade on promotion to Acting Sub-Lieutenant.

The New Course

The 'Creswell Course' has now been extended to two years, with a six-week training course during the second year. This is followed by six months of courses at various establishments and further time in the training ship, after all of which they join the Fleet for six months.

In the writer's opinion the expanded course has been a failure. The general air of those undergoing the programme has seemed to be one of lassitude and boredom. The course appears excellent on paper but has the terrible trouble of not only being lengthy but also completely unique. This uniqueness means that there is no way of comparing the Creswell Course with any course of outside tertiary studies, especially as an officer graduates with no qualifications and no recognition of the course as being of diploma status; but it is difficult, bearing in mind the lack of comparable civilian diplomas, to see what effect this will have on those outside the Navy who will deal with graduates of the Creswell Course.

What makes things worse is that the Creswell Course always used to be the way, not only for non-academic officers, but also for those who were disinclined for study to get to sea early. Now the officers undergoing the Creswell Course find that they are stuck at RANC for nearly two and a half years with only two short cruises and short courses at *Penguin, Watson* and *Cerberus* to enliven proceedings. This means that they get to sea only six months earlier than their degree-stream contemporaries and end up with no qualifications to boot.

Furthermore, while degree students have a fair degree of freedom and generally have a very good time at Universtiy, the Creswell Course officers find themselves trapped in the Naval College 20 miles from Nowra and 120 miles from Sydney with relatively limited leave.

The situation of the College is a great factor in the failure of the Creswell Course. It is possible for a cadet to spend four and a half years at the Naval College. When one considers that many join Junior Entry with the idea of getting to sea as early as possible it becomes obvious that problems emerge.

Apart from the courses there are many problems of organization within the College. The bulk of these are caused by the system of two entries. To deal fairly with Senior Entry it is necessary to give them privileges and seniority on a par with their contemporaries in the Junior Entry within the least possible time and this is the source of much ill-feeling within the two pre-matriculation years of Junior Entry. Furthermore may feel that the privilege system—by which the senior classes are granted more leave and freedom—is a hangover from the 13-year old entry and treats cadets more as schoolboys than officers.

Furthermore, in order not to give Junior Entry too great an edge over Senior Entry, it is necessary to limit the naval training of Junior Entry and this is rather an annoyance to many.

All in all the system of two entries is iniquitous and must be stopped. Junior Entry, though an excellent producer of naval officers, must go for it is an anachronism and by its very presence is tending to turn Creswell into something rather like a U.S. military high-school rather than a professional Naval College.

Standards of Training

It is well-known that desperate attempts are being made to improve seamanship and other aspects of Naval training above elementary standard, but how can this be done in the present situation?

For example, the 1975 Junior Entry did not get into a warship larger than a landing craft for their entire first year! And this in Jervis Bay! Certainly no fault of the College's, this, I feel, is rather more the responsibility of the Fleet as a

whole. It seems that the Fleet want to both have their cake and eat it for thy quite correctly complain that officers from the College lack a deal of service knowledge. To quote RADM. MacDonald, then Commodore C of S to FOCAF in 1970, who was summarizing the results of a survey conducted among senior officers of the Fleet:

> *"The main professional shortcomings appear to be in General Service knowledge, leadership, Fleetwork and Midshipman's sea training".*

Now RADM MacDonald was referring principally to technical officers when he talked about a lack of general service knowledge but in view of the similarity of the training patterns of the various branches it could be said to apply to all degree-stream officers and, to a lesser extent, to the Creswell Course and, when you consider that a Cadet can spend a year at the College and not get to sea, it is not an unreasonable comment.

Why don't cadets get to sea? The system is that the RANC asks ships entering the Bay if they can take any cadets for a visit or sea-day. Of late the answer would always seem to be NO. This is quite unreasonable, for while the Fleet expects Midshipmen joining to have some knowledge and 'feel' of the situation it does not want to see them beforehand. The excuse is made that the half-day or full-day visits are of dubious value and that they are extremely disruptive to the ships' concerned but this attitude must change. Admittedly having a party on board is a nuisance but the Fleet must realise that to make omelettes it must break a few eggs–heavy work-up programmes or not.

The next problem with more advanced Naval training is the ever chronic lack of equipment. Great advances have been made in the field of boat handling over the past twelve months (due mainly to extensive pressuring by the College) with the acquisition of two fast 35' seaboats and other types. Practice on these boats will give the Midshipman some idea of boat work when he joins the fleet and much more confidence when he comes to run boats from his ship.

But other than this the College has no real facilities–no modern navigation equipment or other training aids. And with the Australian Defence Force Academy (ADFA) scheduled to (at the moment) begin within ten years the Naval College is not likely to receive any.

As one can see, then, the College is labouring under terrific disadvantages and many drastic changes must be made to remove them.

Proposals for Future Training

Appreciating the faults in the present training system, the training staff at the Naval College have proposed to Navy Office (or whatever it is called now!) that the order of training be reorganised.

What the College suggested was that both entries, in their first post-matriculation year, do their basic naval training and a cruise in *Duchess* for their first six months and then go to sea as Midshipmen in the Fleet for a further half year. After this, and only after this, would each officer choose his branch and begin his academic training.

Such a training system would be a vast improvement on the present one and would certainly relieve the criticsm of officers coming out to the Fleet on completion of their degrees with little or no knowledge of the Service. Furthermore it would give each officer the chance to see each branch at work and to decide whether or not he would be suited to his particular choice before he is committed to it.

However there is another way, a far more radical change in the training system but one that could well be a vast improvement on the present or other proposed methods.

The first basic premise is that the idea of ADFA, in its present form, should be dropped. At the moment it acts only as a hindrance to officer training in all three services as it is deferred further and further into the future. It is possible that the idea could be revived as a joint-service Staff College for Lieutenant-Commanders and the equivalent but it is difficult to see what improvement the present conception of ADFA could possibly be on the services' individual methods.

As to the scheme of training: there should only be the single entry, a post-matriculation one from the ages of 17 to 20 years. This entry would spend six months doing extensive professional training–drill, organization, boat work, navigation, and so on. A minesweeper or a patrol boat should be attached to the College purely and simply for day or week–running with Cadets. At the end of this six-month period an officer should emerge with the basics of his profession. All branches should undergo this training and at the same time. It should be impressed upon the Cadets that they are officers, albeit under training, and that they should act and be treated accordingly–it would be a great retainer of the doubtful if a real sense of 'esprit de corps' could be built up among the new entries.

After this six months the class would be sent to the training ship for three months. This time would be conducted in the same way that it is in *HMAS Duchess* at present with Cadets performing a variety of duties in the ship as she cruises in home or foreign waters.

Following their cruise the class would return to the College for two further months of advanced work–navigation, weapons, tactics and so on.

After this the Cadets would be given at least one month's leave, be promoted Midshipmen and posted to ships of the Fleet for a year's sea time. During this year they would do their task-book and begin to work towards Watch-Keeping Certificates in their particular branch. Officers of every branch should undergo this part of the training

scheme because it would be of immense value to every officer to be able to spend a couple of months in different departments to his own and a full year at sea would enable this to be done in more than the present rather sketchy basis. Although the trainee officers would only be supernumeraries, of little use to the department concerned, the exercise would pay handsome dividends in a wider general knowledge.

The end of this year would be the beginning of the specialist training. The Mechanical and Electrical Engineers would either, if academically clever, go immediately to a degree or else up to a more job-oriented diploma course at RMIT. Following this they would return to sea to work in their departments.

Supply Officers would similarly be divided into two. Those who wished to could avail themselves of the opportunity to do a BA or BSc while the remainder would return to the College for a year's tertiary studies directly linked to their profession in such fields as languages and the law. This year and the six months supply courses to follow would be the last stage of their training and at its finish they would begin their work in the Supply Branch.

The problem now comes with Seaman officers. Shoud they get their Watch-Keeping Certificate before any tertiary training? I think so. After the year as Midshipmen those in the Seaman Branch should be promoted to Acting Sub-Lieutenant and do a further year at sea to gain their Ticket. When this has been accomplished they would be given the choice of doing a BA or a BSc combined with an Operations and Weapons Course to last three years or else a course similar to the Supply Officers' with OW, instead of supply training involved. After completing their chosen course they would return to sea as watch-keeping officers.

This proposed system of training means that it will take a year more than at present to produce a fully qualified degree officer (compare diagrams 1 and 2) but would the result not be worth that year? There would be no difficulties of two entries or Degree versus Creswell Course because all officers would have the option of doing a degree sometime in their careers and the matter would depend simply upon the inclinations of the officer concerned.

A much more professional officer would be produced with a wide-ranging knowledge of the various fields of activity within the Navy and, no matter what the course or branch, an intelligent and well-spoken man should emerge. While it could be argued that the year's tertiary studies are not likely to have any greater success than the Creswell Course, it must be said that the proposed studies will not only be much shorter but also much more relevant to a junior officer than at the moment–if necessary more complex studies can come at a later stage in a man's career.It should be possible to introduce a system of later degrees and post-graduate studies in a fashion similar to that of the United States Navy.

Are there any other possible disadvantages? Three main arguments may be presented against the proposed system. First, officers doing degrees would have at least a two year interval between matriculating and beginning their university studies. The answer to this is that it is being increasingly felt around the universities that matriculants should spend a couple of years away from the academic world before beginning their degrees. This would mean that the person concerned would be very much more 'motivated' on recommencing his studies and it is felt that this would apply as well to naval officers as to civilians.

It is in this area that the principal difference and advantage over the new College proposals comes into effect. There is a danger with the single year Stage 1 training that officers will not be able to experience the full responsibilities and duties of their career ahead and this would apply to Seaman Officers to a great extent–there is a great difference between being Midshipman of the Watch and Officer of the Watch. To have officers get their Tickets before returning to University would mean that they would come back with a great deal more confidence in themselves and the Navy and enable them to really know whether they like their future.

The second criticism is that the time spent in the Fleet would result in a need for more training billets–already at a premium–and more training staff in the ships themselves. The cry would be that there is no space remaining in the Fleet for more officers under training and this, seemingly, is quite true. Yet is it necessary for a ship to be at sea, or even operational, for an officer to do his time in the supply branch? Do all the ships used need to be big ones? For example, with an average class of 60, would it not be possible to spread a Mishipman or two on a rotating basis to the Patrol Boats and Minesweepers; for few as they are, these ships ought to be able to take 20. While it can be argued that these ships would not be able to give the right training they would provide an invaluable insight into small ship life that engineers and supply officers might never have again. As for the other places, it is hard to think that Midshipmen have ever expected, or got, palatial accommodation so it should be quite possible to squeeze a few more into each ship. As to the increase in training staff, it must be stressed that the emphasis for this first year at sea would be an observation and 'learn by example' training rather than formal tuition so the workload should not be greatly increased.

The third difficulty is that of pay rates. Under the present system a return to university after gaining their Watch Keeping Ticket would mean a return to under-training rates for the Seaman officers. This is merely a matter of changing the relevant instructions and is simply a triviality.

That then is the proposal for a new training scheme. Admittedly it will take more time and effort than the present methods but it would go far to solve many of the College's problems. How does it seem to you?

THE PATTERN OF TRAINING

The duration of the course of training for any group of student officers varies with the type of entry and with the course of studies to which the group is committed.

Cadet midshipmen of the junior entry spend one year in Class J1 and a second year in Class J2 undertaking studies in preparation for New South Wales Higher School Certificate examinations. During these two years cadets are required to participate in character-building activities and they receive elementary naval training. Subject to satisfactory performance in Higher School Certificate examinations they are advanced to Class I at the beginning of their third year.

Student officers of the senior entry are placed in Class I on joining the College and, in company with Class I officers from the junior entry, are streamed into BA, BSc, BE or Creswell courses.

Before this can be done, it is necessary to allocate student officers to branches of the Navy (Seamen, Engineering, Supply and Secretariat, or Instructor) since admission to certain branches is conditional upon success in specific courses. For this reason the first part of the academic year for Class I is devoted to acquainting students generally with the implications following upon the choice of a branch and to counselling them individually with a view to channelling each one to a course which is suited to his ability and aspirations. An officer may express his own preference for a particular branch and considerable weight is given to his preference but final allocation is at the discretion of the naval authorities.

Student officers selected for the BA course take the whole three-year course at the University of New South Wales and are tranferred to the university for this purpose after a short period of naval training at RAN College.

Those selected for BSc or BE courses remain at RAN College for one year during which they undertake first year university studies. Subject to successful completion of first year studies they proceed to the University of New South Wales for the balance of their courses–two years to complete BSc or three years to complete BE.

While studying at the university, the student officer undergoes naval training during part of the university vacations. After completion of the university course, a junior officer undertakes further full-time naval training to fit him in all respect for appointment to HMA Fleet but this phase of training is not the responsibility of RAN College.

Student officers selected for the Creswell course spend four semesters at RAN College undertaking academic studies at tertiary level together with a small amount of concurrent naval training. The fifth semester, which is devoted to naval training includes a period of seven weeks in a training ship and shorter periods of specialised naval training at HMAS Cerberus and HMAS Watson. Successful completion of this five-semester program is followed by further naval training in ships of HMA Fleet and in shore establishments. This latter phase of training is not the responsibility of RAN College.

NOAH'S WAY

And the Lord said unto Noah, "Where is the ark which I have commanded thee to build?"

And Noah said unto the Lord, "Verily, I have had three carpenters off ill. The gopher wood supplier hath let me down–yea, even though the gopher wood hath been on order for nigh upon 12 months. What can I do, O Lord?"

And God said unto Noah, "I want that ark finished even after seven days and seven nights."

And Noah said, "It will be so."

And it was not so. And the Lord said unto Noah, "What seemeth to be the trouble this time?"

And Noah said unto the Lord, "My subcontractor hath gone out of business. The pitch which Thou commandest me to put on the outside and on the inside of the ark hath not arrived. The plumber hath gone on strike. Shem, my son who helpeth me on the ark side of the business, hath formed a pop group with his brothers Ham and Japheth. Lord, I am undone."

And the Lord grew angry and said, "And what about the animals, the male and the female of every sort that I ordered to come unto thee to keep their seed alive upon the face of the earth?"

And Noah said, "They have been delivered unto the wrong address but should arriveth on Friday."

And the Lord said, "How about the unicorns, and the fowls of the air by sevens?"

And Noah wrung his hands and wept, saying, "Lord, unicorns are a discontinued line: thou canst not get them for love or money. And fowls of the air are sold only in half-dozens. Lord, Lord, Thou knowest how it is."

And the Lord in His wisdom said, "Noah, my son, I knowest. Why else dost thou think I have caused a flood to descend upon the earth?"

–ERA-Journal of Eastern Region of the Royal Institute of British Architects

. . . ▣ . . .

"Of all the public services, that of the Navy is the one in which tampering may be of the greatest danger, which can worst be supplied in an emergency, and of which any failure draws after it the largest and heaviest train of consequences."

Edmund Burke: To the House of Commons
1769

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WJ WATKINS-JOHNSON

Pearl Harbour

This address was given to the Sydney Chapter before viewing the film Tora, Tora, Tora by Lcdr. W. M. Swan RAN (Ret) on 11 April 1976. It is printed in this edition as 7th December 1976 is the 35th Anniversary of the attack.

INTELLIGENCE ASPECTS: Prepared by a member of the Naval Historical Society.

The film you are about to see poses 3 important questions:

1. How much did the U.S. know of Japan's intentions on the eve of Pearl Harbour?
2. Were the Commanders in Hawaii derelict in their duty when they failed to anticipate the raid on Pearl H?
3. Was there a conspiracy in the White House to manoeuvre the Japanese into war, and thus bring America into war against Germany & Italy?

Six major investigations, including a marathon Congressional Committee have examined these questions; but doubts still linger on them all.

QUESTION 1.

In February '41, in reply to a question by State Dept., USN Intelligence (ONI) replied: "Based on known data regarding the present disposition & employment of Japanese Naval & Army forces, no move against P.H. appears imminent or planned for the foreseeable future." However, despite this, secret planning for just such an attack started in Tokyo about this time. The main US Intelligence on Japan came from signal intercepts, in the breaking of which the Americans were very successful. They not only broke the Japanese diplomatic code in 1940, and constructed its machine, but were reading the Japanese Navy's secret messages long before 1941. They held all the variants of the Japanese Fleet Code, the SA Code for the Japanese call sign list, the precious AD Code of the Japanese Admirals, as well as a Met Code and a Japanese Joint Planning Board Code. Fantastic intelligence. One would think all Japan's secrets were known to the Americans in 1941. Yet none of this material gave direct evidence of an attack in peacetime on the US Pacific Fleet at Pearl. It is true there were clues, hints, of such an attack in MAGIC intercepts from 15 Feb. 41 onwards. It must be remembered that hundreds of intercepted messages piled up in in-trays in Washington for weeks before the attack, calling for such top secret work that not enough special personnel were available. Then there was the human situation of Army versus Navy versus State versus White House, with harassed officers running around 24 hours a day trying to pass on vital information to seniors with the need-to-know, and being scoffed at or sent to someone else in another building. It could be said that the Americans should have paid more attention to Japanese directives, to Consul-General Kita in Hawaii, to "Secure intelligence even by bribing your informants". There were delays. The Americans took 26 days to process the first of these. Another was in an officer's in-tray for 43 days before he got around to translating it. This also concerned Hawaii. Although these two incidents were some months prior to the attack, there were no doubt other delays nearer 7th December, one of which concerned a secret clerk who picked a long Japanese message out of a'Deferred' pack and started to process it herself. Finding it concerned Japanese signals to be sent by spies on Hawaii, even bonfires, she went excitedly to her boss, who told her to go home as it was Saturday, and "We'll finish the editing some time next week." You are going to have human error.

It's easy to be wise after the event. The truth was that such an attack was too incredible to swallow. A Cmdr. McCollum, in ONI at the time, doubted the Japanese had any aggressive designs on Pearl Harbour. It did not make sense to him. He told Colonel Bratton, another intercept wizard, "They know as well as you and I that the fleet would not be just sitting there waiting to be attacked." And of course the Americans just could not believe they would be attacked before a declaration of war. The answer to this question can be summed up in the words of the Judge-Advocate-General in his later report to the Secretary of War, "A keener and more incisive analysis by the Intelligence sections of either Service of the overall picture presented by these intercepts might have led to an anticipation of the possibility, at least, of an attack on

Pearl Harbour at or about the time it actually occurred." Finally, what of the actual naval orders for the attack? Did the Americans intercept anything on the 32 ship Task Force steaming acorss the Pacific to attack them? No, they did not; because the Japanese were too clever. Several codes, including the Admirals',were suddenly changed and, when the time came, Admiral Yamamoto radioed NIITAKA YAMA NOBORE, which means ASCEND MOUNT NIITAKA, which in turn meant LAUNCH THE ATTACK ON THE ENEMY AS PREVIOUSLY ARRANGED. So even if the Americans had broken this message, they would not have known where the blow would fall.

QUESTION 2.

NO. Admiral Kimmel and General Short were not derelict in their duty. They had received serious warnings from Washington. But it was peacetime, 7.00 a.m. on a Sunday, when the fleet of a democracy not at war would be at its lowest state of readiness. The same for the soldiers and aircraft ashore. The Japanese chose their time well. There were church services to attend, and some ships had their watertight doors open for an inspection. Once again, it's easy to be wise in hindsight, and say those W.T. doors should have been closed. The Commanders probably thought the Japanese would strike south, not east, and after a declaration of war–not before. The Commanders were told a great deal, but of course they could not be shown or told everything because much precious equipment was not in Hawaii. Some officers in Washington tried to send them more, and one was told when he attempted to do so that he would be insulting Admiral Kimmel. On 27th November, '41 Alert No. 3 Message (a high priority warning)- was sent to the two Commanders, and read as follows: "JAPANESE FUTURE ACTION UNPREDICTABLE BUT HOSTILE ACTION POSSIBLE AT ANY MOMENT." The Navy Dept. followed this up with a signal to the Admiral stating this Presidential Alert No. 3 was a War Warning, and that certain measures were to be executed against a possible Japanese aggressive move in the next few days. Admiral Kimmel might be criticised here for not having the ships in Pearl on a war footing; but the answer to this question is still considered to be NO, as he implemented all the steps required by Alert No. 3.

Strangely enough, on the night before the attack Colonel Bratton, in Washington, asked Commander McCollum if the Japanese might attack Pearl Harbour, and McCollum replied that, "No major units of Admiral Kimmel's fleet are at Pearl."

"Are you sure these people are properly alerted?" Bratton asked. "Are they on the job? Have they been properly warned?"

"Oh yes." McCollum replied, "The fleet is either gone or is about to go to sea."

Unfortunately, the Japanese had different information.

QUESTION 3.

A book has been written on this theme, and several articles have appeared in magazines.

In the opinion of this research officer, no such conspiracy existed, not would one have been possible. The target here is President Roosevelt, and this seems an attempt to discredit him and topple him from his secure place in history. Actually F.D.R. was rarely given a copy of all this Intelligence, being shown them as necessary. From June to end September '41 he did not see any at all. In November '41 he started to knock the Navy's and Army's heads together, and asked for copies of intercepts. But the President was more interested in diplomatic Intelligence rather than military. In addition to which he was very busy with a host of other matters, and his health occupied some of his time. It is considered that F.D.R. thought the Japanese were on the brink of going to war, and would strike at Thailand, the Philippines or the Dutch East Indies. He did not want America to be accused of shooting first. It is doubtful if it even entered his head that the Japanese would attack Pearl Harbour, let alone create a set of circumstances to allow them to do so.

It must also be borne in mind that the President was never shown Intelligence intercepts dealing with clandestine matters, so he was unaware of the overwhelming evidence of Japanese interest in Hawaii. The material shown him he always read very quickly, while trying to fathom the Japanese thinking (always a a difficult task). Sometimes he could not spare much time on his intercept pouch. One morning, when he could have been studying it, he spent studying the budget with the Treasurer. Another time, with Intelligence pouring into Washington, he went south to dine with the patients in a hopsital and had to be brought back.

FROM THE EDITOR

You are all probably a little fed up with exhortations for Journal contributions, if you contribute we would not have to keep at you. We are due to go to print in mid-February and, so far, only one article. Ship Handling, Technical Topics, Classic Signals and I Was There When columns are dry. With over 250 members we should be able to do better. Whilst away from Service pressures on Christmas leave why not spend a short period producing something of benefit to the Institute as we do not want the Journal to die.

Objectivity in Ship Procurement

By LIEUTENANT COMMANDER C. J. SKINNER, RAN
An address to the Sydney Chapter, 21st July, 1976

SUMMARY

The procurement of ships to replace ageing escorts and patrol boats is now an urgent matter that has already gone too far for an optimum solution. This essay proposes the everyday use of systems analysis in such RAN decision-making.

Operations research (OR) and scientific business management (BM) techniques are discussed to a certain depth in officer 'post-graduate' educational activities including OETC (1), staff courses and Defence Systems Management courses. The term 'systems analysis' (SA) is familiar to most servicement, yet the application of the scientific discipline on which these techniques are founded, has largely been left to the brains in Defence Central and to OR-specialist establishments like CSE, WRE and RANRL. (2)

While the applicability of OR, BM and SA is broad, there is now possibly the most urgent application yet for the RAN to employ these most useful techniques. In addition the subject matter also presents a convenient opportunity to move toward increasing familiarity and employment of SA techniques by RAN servicement in their everyday work.

Replacement of Naval Ships

As the title suggests, I refer to the matter of naval surface-combatant replacement. Originally the DDL project was expected to fill the gaps in the RAN inventory as they occurred. However the decision-making involved in replacing the Daring-class in the next decade, and other units thereafter, has been complicated by:

- the demise of the DDL,
- the rapid escalation in 'sail-away' ship prices,
- the increase in world deployment of surface-to-surface missiles (SSM), and
- the added need to replace the attack-class patrol boats.

The time has gone to produce the best (optimal) solution. Admiral McNicoll put the situation succinctly recently while discussing the options 'Much time has . . . been wasted and nothing can now prevent the naval weakness that is already built into the 1980s . . .'(3)

The Options for Replacements

Formerly replacements for DDs and DEs were considered on a one-for-one basis or better. Then with costs rising, and changes in Australia's political and strategic situation, the option to consider smaller and cheaper ships of about 1200 tonnes (corvettes) was added. The selection of the FFG-7 for the first buy was clearly a compromise between these two; on the one hand the FFG-7 meets only three of the four stated requirements for escorts (4); on the other the size and manning and hence cost are much greater than those for the corvettes.

Patrol Boats

The age and depleted numbers of the Attack-class patrol boats, allied with their proven effectiveness in the surveillance role, indicated a clear need for replacement action to begin. In addition D of D(Navy) have clearly anticipated the division of craft of this size into two roles—attack and patrol—as discussed by recent writers. (5)(6) The procurement of pure patrol craft is proceeding and since these craft have limited combat capability they may be excluded from further discussion; although the proposal by Jones (7) for the building of patrol craft that can be converted instantaneously to attack craft has much merit.

THE AUTHOR

Lieutenant Commander Christopher John Skinner was born in England in 1943. He entered the RANC, Jervis Bay in 1959, graduating in 1962. After a year at sea as a midshipman he proceeded to the UK for undergraduate studies in electrical engineering and a further period of WE application studies. Returning to Australia in 1967 he served in HMAS Parramatta and then, after courses in the U.S.A., in HMAS Hobart. After two years of secondment to the then Department of Supply, working at WRE, he returned to the U.S.A. for courses leading to his present employment in HMAS Perth. Lieutenant Commander Skinner has maintained an interest in the application of modern business management in the RAN, and has completed several units towards the award of a Master of Business Administration degree, including the application of Systems Analysis and Operations Research.

ATTACK CLASS PATROL BOAT

Continuum of Options

Decisions regarding attack craft, probably SSM-armed, have not yet been made pending the definition of their role. The field is wide open however; Grazebrook discusses a size range from 60 to 1000 tonnes, which verges on the 1200 tonne corvette option. Thus the reequipment of surface combatants must look at a continuum of options from 60 (hydrofoil) to 4500 tonnes (DDL).

Across this continuum discussion has waxed mainly for or against the extremes, both camps considering the corvette option as an acceptable compromise.

On the one hand the 'larger' case stresses that Australia's strategic and geopolitical situation demand range and endurance. On the other, the cost differential between the extremes indicates we could have many more units if they are smaller. The Head of Strategic and Defence Studies Centre, ANU recently stated '. . . the RAN should buy sophisticated missile-firing patrol craft before patrol frigates . . . fifteen patrol craft can be bought for the price of a destroyer.'(8)

This paper is not intended to beg the question; rather it attempts to demonstrate a means of objective consideration.

THE METHOD

The method chosen is 'Linear Programming' (LP)—a rather undescriptive term for a set of disciplined methods for choosing the best compromise, or in the parlance—the optimal solution.

Objective Function. The key to LP is the choice of an appropriate objective function. The most obvious is 'best value for money'. unhappily this is too imprecise until we define 'value'. So far I have alluded to five characteristics that have some part in 'value'—range, endurance, number of hulls, combat capability and cost (here is meant total life or 'through' cost which includes all maintenance costs for ship, personnel, combat systems and support infra-structure).

We may then define the following parameters:

r = range or radius of action in nautical miles
e = endurance in days
x = number of hulls
c = combat capability or fighting effectiveness (non-dimensional factor)
d = cost in 1976 $M

and our overall 'value' we will call Utility U where

$U = f(r, e, x, c, d)$

Our objective in this case will be to maximise U subject to certain constraints caused by the scarcity of resources.

Simplification of the Objective Function (OF). When there are many defined parameters the process becomes so unwieldy that:

- only a computer can produce the solution, and
- invalid assumptions are difficult to perceive.

Some years ago the Harvard Business School commented that the best PERT network were those that were simple enough to be manipulated without a computer. The same may be said about many SA problems. Thus a most important function is to simplify the objective function as far as possible by making certain explicit assumptions. Often one variable is a function of another so one can be excluded.

FFG–7

Assumption 1. The endurance of other factors will always be greater than that implied by the radius of action, that is $e \geq Ar$ . . . . . eqn 1 thus endurance may be excluded from further consideration.

Assumption 2. For a given tonnage of ship the range r and combat capability c are inversely proportional; in other words increasing one implies a reduction in the other. Thus we may define a new variable t = tonnage in tonnes where

$t = Brc$ . . . . . eqn 2

Assumption 3. The through life cost d is a function of three parameters, namely:

- the initial procurement (sailaway) cost; defined as p in 1976 $M,
- cost of maintenance of ship and combat systems; assume that this cost is proportional to tonnage, and
- cost of maintenance and training of the crew and shore-support personnel assume this cost is proportional to crew size

Thus we may say $d = d_1 + d_2 + d_3$

$= Dp + Et + Fm$ . . . eqn 4

where m = number of men in the crew of one ship. Thus we can now say that

$U = g(t, p, m, x, r, c)$ . . . . . eqn 5

Now certain of these parameters are subject to constraints, in particular:

Constraint 1. The maximum force that can be maintained is limited by the dockyard and other infrastructure available and is proportional to force tonnage

$T = tx$ . . . . . eqn 6

Constraint 2. The maximum force is limited by the number of men available M where

$M = mx$ . . . . . eqn 7

Constraint 3. The maximum force that can be procured is limited by the money available for initial procurement $P = px$ . . . . . eqn 8

Since t, p, m are constrained then U is now

$h(x, r, c)$ . . . . . eqn 9

However by assumption 2 r and c are related thus

$U = j(x, r)$ . . . . . eqn 10

or $U = k(x, c)$ . . . . . eqn 11

Since r is more easily obtained we will use equation 10 and assume that the relationship is linear that is

$U = Grx$ . . . . . eqn 12

We should stop at this point to consider this relationship. What we are saying is that our best value is obtained from the maximum number of miles covered by the total force–put in these terms a certain logic will hopefully be apparent. Additionally we have said under assumption 2 that if we are more worried about combat effectiveness then since force tonnage is limited, we may still consider our objective in terms of force miles since there is a fixed relationship between range and combat effectiveness (tonnage being equal).

Statement of the Problem. In this case the variables will be the number of hulls x since we will be considering the utility of a force containing varying number of known ship-types. Nevertheless other parameters could be made to vary if one wished. Specifically we will consider three types of ship:

- 3500 tonne long range escorts similar to the FFG-7 (subscript 1)
- 1200 tonne corvettes (subscript 2), and
- 500 tonne attack craft (subscript 3).

Objective Function: maximize

$$U/G = r_1x_1 + r_2x_2 + r_3x_3 \quad \ldots \text{eqn 13}$$

Subject to the following constraints:

$$t_1x_1 + t_2x_2 + t_3x_3 \leq \text{Tmax} \quad \ldots \text{eqn 14}$$

$$m_1x_1 + m_2x_2 + m_3x_3 \leq \text{Mmax} \quad \ldots \text{eqn 15}$$

$$p_1x_1 + p_2x_2 + p_3x_3 \leq \text{Pmax} \quad \ldots \text{eqn 16}$$

Plugging in the Figures. The reader will undoubtedly wonder about the accuracy of the figures used in the following analysis; the truth is that they are not intended to be accurate—merely representative in order to show the method at work.

Table 1 – Values used in the example.

Parameter		Units	Escort	Corvette	Attack Craft
tonnage/ship	t	tonnes x 100	35	12	5
crewmen/ship	m	units	185	120	30
procurement cost/ship	p	1976 $M x 10	20	12	2
radius	r	naut miles x 100	40	25	6
combat effectiveness implied from t and r		relative values	0.88	0.48	0.83

Table 2 – Values of the Constraints

Constraint 1 – T max is equal to ten ships of DE/DD/DDG average size, say 3850 tonnes, that is
10 x 38.5 = 385 (tonnes x 100)

Constraint 2 – M max is equal to the crews of ten ships each with a crew of 30, that is
10 x 300 = 3000

Constraint 3 – P max is equal to the cost of ten replacements by the largest type, that is
10 x 20 = 200 (1976 $M x 10)

The following demonstrates the means of obtaining a solution by longhand methods:

$$\text{Maximise OF} \quad 40x_1 + 25x_2 + 6x_3 \quad \ldots \text{eqn 13}$$

Subject to

$$T = 35x_1 + 12x_2 + 5x_3 \leq 385 \quad \ldots \text{eqn 14}$$

$$M = 185x_1 + 120x_2 + 30x_3 \leq 3000 \quad \ldots \text{eqn 15}$$

$$P = 20x_1 + 12x_2 + 2x_3 \leq 200 \quad \ldots \text{eqn 16}$$

	Variables			Constraints			
Step	x_1	x_2	x_3	Tmax-T	Mmax-M	Pmax-P	OF
0	0	0	0	385	3000	200	0
1	10	0	0	35	1150	0	400
2	9	1	0	58	1215	8	385
3	9	0	6	40	1155	8	396
4	9	0	10	20	1035	0	420
5	8	3	2	59	1100	0	407
6	8	2	8	41	1040	0	418
7	8	0	20	5	920	0	440
8	7	5	0	80	1105	0	405
9	7	0	30	–10			
10	7	0	28	0	865	4	448
11	6	2	30	1	750	–4	
12	6	2	28	11	810	0	458
13	5	3	32	14	755	0	467
14	4	4	36	17	700	0	476
15	0	8	52	29	480	0	512
16	0	7	58	11	420	0	523 optimal
17	0	6	64	–7			
18	0	6	62	3	420	4	522

At this stage it is interesting to impose a new constraint, namely that the number of escorts must be at least two, that is $x_1 \geq 2$ starting from step 14:

14	4	4	36	17	700	0	476
19	3	5	40	20	645	0	485
20	2	6	44	23	590	0	494
21	2	5	50	5	530	0	505
22	2	4	56	–13			optimal
23	2	4	53	2	560	6	498

Thus the result now is that a penalty of 523 - 505 = 18 x 100 force miles has been invoked. Put another way the opportunity cost of constraining x_1 has been 1800 less miles of force coverage. Naturally this figure has no more significance than the figures and relationships used throughout–it is brought out to indicate how one can investigate the sensitivity of the solution to new requirements.

Luckily LP has available shorthand methods using matrix algebra to carry out the above. In three iterations one reaches the optimal result of $x_1 = 0$, $x_2 = 6.39$, $x_3 = 61.67$, Mmax - M = 556.1 and OF = 529.7; there is a further development of LP called Integer Programming which takes much longer but does give the result we obtained by longhand. In practice though LP provides a rapid means to arrive at a close answer and then a small amount of investigation reveals the best integer answer.

Change of Objective Function. The reader may well feel that the relative utility of the escort vis a vis the attack craft is much greater than the 40:6 ratio we have used; provided the constraints remain the same it is only necessary to recalculate the values of the OF to save a lot of work in arriving at a new optimal solution.

In addition the objective function may call for the mimimisation of some variables, or some variables may not appear in all of the constraints (as in the second example above)–these and other requirements can be accommodated in the shorthand method. One major limitation however is that the expressions must be linear–non-linear programming is under development but is sufficiently complex to require both a computer and expert practitioners. My earlier statement that the simpler the formulation the better is thus particularly relevant.

CONCLUSION

The pronounced preference of the result for smaller ships was quite unintentional and is only as relevant as are the formulation of the problem and the constraints and assumptions. The writer formulated the problem to obtain an insight into the matter. The point here is that one does not need any very specialised aptitude in order to do just this. Nor is it a means of baffling the layman. A properly done formulation of the problem must be argued just as cogently as a staff paper, with extensive justifications of assumptions (lacking here unfortunately in the interests of space). In fact the final manipulation of numbers is by far the least important feature of the method.

There is no barrier to the use of this and other techniques of systems analysis in everyday applications in the RAN, save a sad lack of awareness of their existence. This gap in our education should be filled as soon as possible.

Notes:

1. Officers Extension Tutorial Course–pre-staff course study by correspondence; mandatory for RAAF selection for staff course, optional for RAN.
2. Central Studies Establishment, Canberra. Weapons Research Establishment, Salisbury, SA. RAN Research Laboratory, Sydney.
3. McNicoll, Vice Admiral Sir Alan, KBE, CB, GM. 'The Escort Game'. Pacific Defence Reporter, Vol 2, No 10. April 1976. page 16.
4. Essentially: two helo's, SAM, SSM, medium-range gun; the FFG-7 mounts a 76mm gun that does not meet all the requirements. See Grazebrook, A. W. 'Escorts, The Next Generation'. Pacific Defence Reporter. March 1976.
5. Grazebrook, A. W. 'Attack and Patrol Craft'. Pacific Defence Reporter, Vol 2 No. 11. May 1976 page 30.
6. Coles, LCDR RAN. 'The Patrol Boat in Continental Defence'. Journal of the Australian Naval Institute, Vol 2 No. 1. February 1976. page 21.
7. Ibid.
8. O'Neill, Dr. Robert. 'The Defence of Australia . . . 3. A need for new ideas, smart weapons'. The Sydney Morning Herald. February 20, 1976. page 6.

BIBLIOGRAPHY

Brabb, George J. Introduction to Quantitative Management. Holt, Rinehart and Winston. Sydney. 1968.

Cleland, David I. and King, William R. Systems Analysis and Project Management. McGraw-Hill. Sydney. 1968.

Horowitz, Ira. An introduction to Quantitative Business Management. 2nd Ed. McGraw-Hill. Sydney. 1972.

United States Naval Institute. Fundamentals of Naval Operations Analysis. USNI. Annapolis. 1970.

Proposed Projected Cruiser for Australia

This article is a reproduction of letters and a document pertaining to ship procurement in the 19th century. It is printed as a comparison between what happens now (see previous artilce) and what happened then.

The Honorable,
The Minister for Defence

Sir/

With reference to the plans of cruisers designed by Sir William Armstrong & Co. which have been forwarded to me for report, I have the honor to state that I consider the vessels shown in plans A and B, are, generally speaking, well suited to the defence of the port and would also be efficient vessels on the high seas, though I should prefer a heavier class of vessel such as proposed in my report of the 29th June last, but of which I have heard nothing further.

As I have always endeavoured to show that if Melbourne is ever attacked it will be by a foe that has fully estimated the risks, and that consequently the attack will be made by a force that at any rate would be superior to the present floating defences, so that probably powerfully protected cruisers, and possibly an ironclad or so would be sent; and therefore any increase to our ships should be of a class able to cope with all comers.

Nevertheless the class of ships sent to me for report would undoubtedly be a valuable addition to the defences, as they possess a powerful armament, considerable speed, and light draught of water.

Design A I consider the best, the armament being heavier, though I do not approve of the Gatling guns, and consider they should be replaced with Nordenfelts. The position of the pivot guns appears to admit of but little depression, and it is difficult to imagine how the foremost ones can be fired right ahead without damage to the forepart of the ship, though undoubtedly slight alterations could rectify them.

The square sails and yards, except for the passage out, should be abolished as useless hamper, and only such poles or masts retained as would be required for signalling purposes.

It is not stated what proportion of ammunition per gun these vessels will carry, but it is of great importance, as all the guns are rapid consumers, and plenty of magazine and shell room space will be required.

The boats appear to be of the same type as those supplied to the gunboats Victoria and Albert, and if so, should be replaced by better ones.

The arrangement for compartments, steering gear, protection of engines and boilers appear to be as good as could be arranged for vessels of the class.

The complement required for Class A will be at least 150 officers and men all told.

I have the honor to be Sir/-

Your obedient servant

A. B. Masters

HMS Nelson
26th October 1888

Elswick Works
Newcastle upon Tyne
22nd July, 1887

Sir James Lorimer,

Dear Sir,

Referring to the interview the writer had with you and General Steward with reference to cruisers for the colony of Victoria, we have now the pleasure to forward herewith copies of the designs we have prepared, together with a description and an estimate shewing the cost of the vessesl.

Captain Noble is to be in London on Monday next, and will be found at the Athenaeum Club. Should you require any further information he will be happy to wait upon you to afford it.

We may add that as the order for these vessels cannot be given immediately, the prices must be taken as approximate only.

We are, dear Sir,

Yours faithfully,

W. Noble

Elswick Works
Newcastle upon Tyne

July 22nd 1887

ESTIMATE FOR CRUISERS

To accompany our letter of this date to
Sir James Lorimer

	Design A as per tracing 4127	Design B as per tracing 4128	Alternative armament
Hull & engines	55,000	53,000	53,000
Armament	24,100	21,700	20,650
Torpedoes & gear	7,550	7,550	7,550
Electric lighting	2,250	2,250	2,250

Note: the above prices are only approximate.

PROPOSED PROTECTED CRUISER for AUSTRALIA

The accompanying drawings No. 4127, 4128, and 4129, shewing alternative designs for a PROTECTED CRUISER have been prepared to fulfil the conditions laid down by Sir James Lorimer during his recent visit. The designs are named A and B respectively. They differ from one another chiefly in the armament carried; the slight difference in the size being due to differences in the weights of these armaments.

Principal Dimensions, etc.

The following are approximately the principal dimensions of the two vessels:

	Design A	Design B
Length between perpendiculars	195'0"	190'0"
Breadth	33'0"	33'0"
Draft (mean)	11'6"	11'6"
Displacement (about)	1040 tons	1020 tons
Indicated Horse Power	2600	2600
Speed in knots (with forced draft)	16	16

On the midship section tracing No 4129, which may be taken as applying to both vessels, will be found the principal particulars of the structural arrangements. These will be equal in every respect to those of a vessel of a similar class in the British Navy and will provide ample strength for carrying the guns, machinery, etc.

Protective Deck

The disposition of the protective deck and the thickness of the plates are also shewn on the midship section. It will be seen that on the inclined portions or slopes of the deck the plates in combination are 2½ inches thick, and on the horizontal portion of the deck, which is less liable to be hit fairly the plates are 1½ inches thick.

The longitudinal extension of the deck is indicated on the profile views (Tracings No. 4127, 4128). From these it will be seen that the deck will reach over all the length occupied by engines, boilers, and magazines at about the same level, the horizontal portions being about 9 inches above the water-line–at the extremities the deck will fall below the water-line as indicated; the forward end supporting the ram and the after end sheltering the steering gear.

Above the protective deck the coal bunkers are arranged to assist the defence.

General Features of Armament and Accomodation

These are indicated fully on the plans (Tracings No. 4127 & 4128). The high forecastle and poop add considerably to the seaworthiness and accomodation and they also allow the bow and stern chase guns to be lifted to a great height above water which adds greatly to the fighting efficiency of the ships in a seaway. Both officers and men will have excellent quarters with natural light and ventilation.

As regards watertight sub-division this has been carried out to a great extent. There are seven transverse watertight bulkheads and two independent engine rooms besides numerous minor compartments, magazine, shell, and store rooms, etc. below the protective deck. Above the protective deck the coal bunkers are built into numerous water-tight cellular compartments which will contribute towards the buoyancy and stability to a very great extent if the ships are injured in action.

Disposition of Guns & Torpedoes

The arrangements for the two designs are as follows:

Tracing–Design A–No. 4127

Two 6 inch B.L. Guns mounted on a twin platform on the Forecastle.

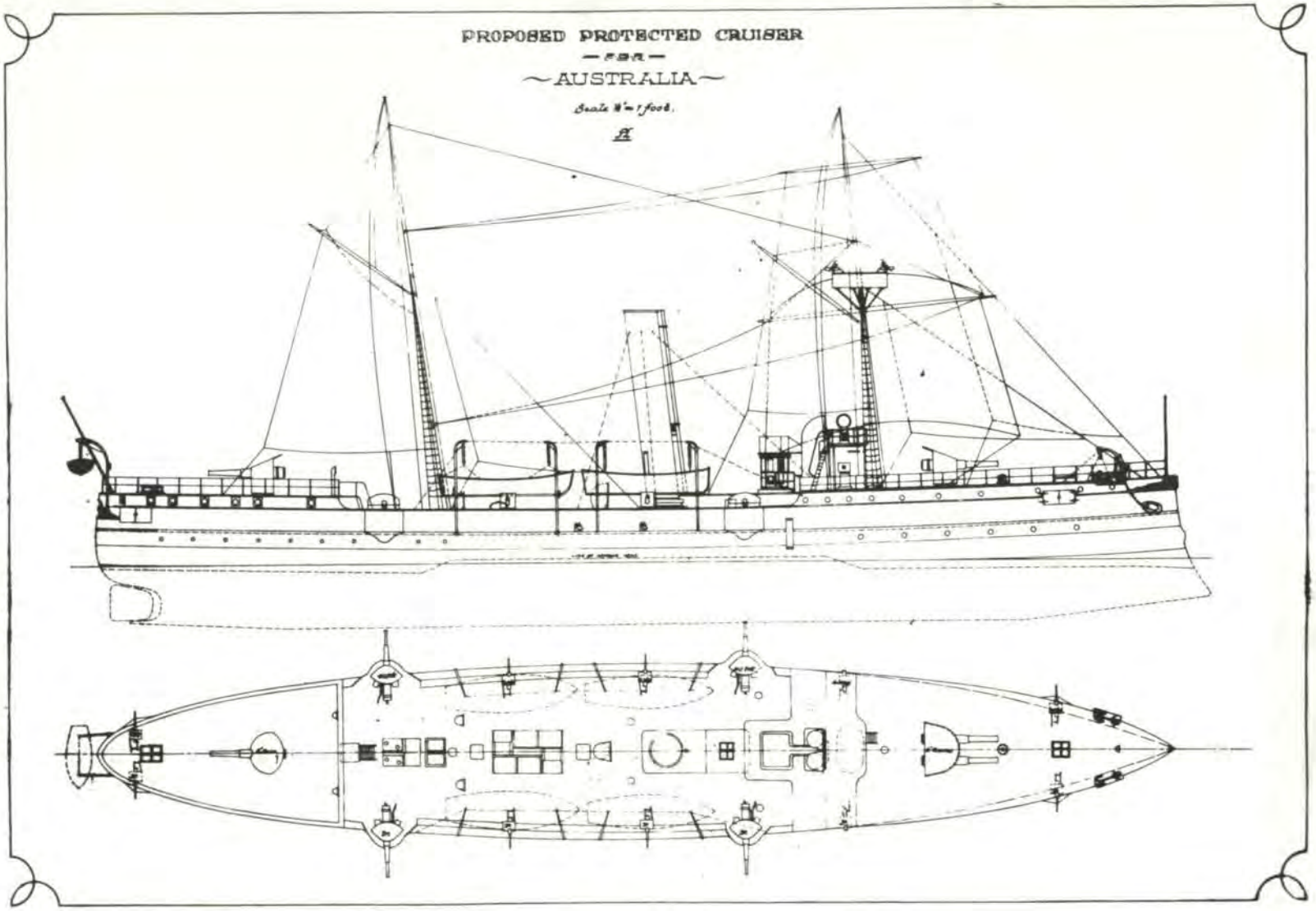
One 6 inch B.L. Gun on a platform on the Poop.

Four 40 Pr. Rapid-firing Guns mounted on sponsons on the broadside so as to have considerable range of fire.

Eight 3 Pr. Rapid-firing Guns as shewn on Tracing No. 4127.

Four Gatlings–two in the military top and two on the broadside.

Two Torpedo tubes are provided–one firing right forward through the stern and the other directly aft through the stern frame. Stowage space has been reserved for the bodies of six torpedoes and magazine space for their explosive heads.


PROPOSED PROTECTED CRUISER
—FOR—
AUSTRALIA
Scale 8 in = 1 foot.
A

Tracing–Design B–No. 4128

Two 6 inch B.L. Guns mounted on a twin platform on the Forecastle.
One 6 inch B.L. Gun on a platform on the Poop.
Four 6 Pr. Rapid-firing Guns on the broadsides.
Six 3 Pr. Rapid-firing Guns placed as shewn on Tracing No. 4128.
Six Gatling Guns–two in the military top and four on the topsides.
The same Torpedo attack as in Design A.

Besides the arrangement of armament of designs A and B a third arrangement was named by Sir James Lorimer as follows:

Two 6 inch Guns–one on the Forecastle and the other on the Poop.
Six 40 Pr. Rapid-fire Guns on the broadside in sponsons
Four 3 Pr. Rapid-fire Guns
Four Gatlings, and
Two Torpedo tubes.

This may be regarded as a possible variation in the armament of Design A; one of the 6 inch guns forward and four of the 3 Pr. rapid-fire guns being replaced by two 40 Pr. rapid-fire guns.

Electric Search Lights

Two search lights will be fitted to the ships in the positions indicated on the plans. (at each end of Bridge).

Propelling Apparatus

There would be two sets of triple expansion engines of the horizontal direct acting type placed in separate Engine Rooms each giving motion to one of the twin screws. There would be two main boilers similarly placed, supplying steam to the engines and also an auxiliary boiler for supplying steam to pumps and auxiliary engines when the main boilers are not in use.

The stokeholds would be arranged so as to work under forced draught the necessary appliances for closing them down in an air-tight manner being provided, and powerful fans fitted for drawing air down to the furnaces.

Speed & Horse Power

With closed stokeholds the engines would develope power sufficient to drive the ship at a speed of 16 Knots and with open stokeholds the speed attained would be as much as 14¾ knots.

Coal Supply

Bunker space is provided in each design for about 180 tons of coal of which 90 tons would constitute the normal supply, that is to say the amount to be carried to bring the ship to her designed mean draft of 11½ feet. This amount of coal would also be the amount carried in the speed trials with the ships.

This normal supply will suffice to carry the ships about 3,500 Knots at a mean speed of 10 knots an hour, and a distance of more than 700 knots at full speed with open stokeholds. With the full supply these distances would of course be about doubled.

Steering Gear & Conning Tower

Hand and steam steering gear are both provided for. The rudder head and the engine and mechanism for working the rudder are under water and therefore well protected.

The principal steam steering wheel is placed forward in the Conning Tower which will be the station of the commanding officer in action. This Conning Tower is of 2 inch steel and occupies a commanding position on the Forecastle.

Steam Pumps

These will be arranged as usual in ships of the British Navy.

Rig

The nature of the rig proposed is indicated on the tracings No. 4127 which makes provision for a military top on the foremast in which two Gatlings may be fought as described above.

This rig is not in the way of the guns and it would be of assistance in the journey to Australia, and in cruising generally; it need not however be fitted if considered undesirable.

Stability

Ample stability has been provided for both as regards stiffness and range and the ships at the same time would be very steady in a seaway.

Outfit & Completion

It is to be understood that the price named in the covering letter which accompanies this report includes the supply of:

hull and fittings complete; also all anchors, cables, boats, masts, rigging, sails, and warps; engines, boilers, and spare gear; the cooking apparatus for the crew; tanks for the water, oil, etc. throughout the ship;

the vessels would, in fact, be ready for sea, except:

provisions, consumable stores, nautical instruments, surgical instruments, charts, plate, bedding, cutlery, crockery, napery, and personal effects of the officers and crew.

Should an order for other of these vessels be placed with us detailed plans and specifications could be prepared in about one month and the vessel could be completed for sea in from 11 to 12 months from the date of the order.

P. Coalts

Elswick Shipyard
22nd July, 1887

"The sea service is not so easily managed as that of land. There are many more precautions to take and you and I are not capable of judging them."

— Duke of Marlborough
1650-1722, to a
fellow Army officer

Wargaming

By LIEUTENANT S. P. LEMON, RAN

"But War's a game, which were their subjects wise,
Kings would not play at"
–William Cowper, 1731-1800

Introduction

Naval Wargaming is unfortunate in that its name implies a purely recreational activity rather than a serious educational activity. Ever since Lieutenant von Reiswitz of the Prussian Guard Artillery revolutionised military training by the introduction of the table top Military War games, people have been trying to change the name to something more serious. Von Reiswitz did not like the name but could not think of any more suitable. In 1911, Captain McCarty Little USN who introduced the wargame to the US Naval War College echoed Von Reiswitz when he said,

> *". . . the name, 'War Game' has had much the same depreciating effect as the term 'Sham Fight' with regard to field manoeuvres"* [1]

In reality they probably suffered the fate of 'Ferdy' in Len Deighton's 'Spy Story', a civilian on the staff of the 'Institute of War Studies', London, who remarked,

> *"Once we made a strenuous effort to stop the word 'game' being used about anything we do here–'studies' being the operative word–but it was no use, people like game better"* [2]

The USN have tried "Chart Manoeuvre", "Exercises in the Art of War", "Strategic Model" and "Operation Simulations". The term Wargames has remained and the tendency is to put 'The serious use of' as a conditional phrase to differentiate from the 'Avalon Hill' players.

Historical Development

In the late 18th Centruy, John Clerk and a friend studied the despatches of actual battles such as Byng at Minorca in 1756 and refought them with scale models. He said models eliminated confusion and his subsequent 'Essay on Naval Tactics' published in 1790 had a great impact on Naval Warfare. In the mid-19th century Captain Philip H. Colomb RN patented a game "Duel" of which in 1879 Rear Admiral the Hon. Edmund R. Fremantle commented,

> *"I am very sorry that it has not been adopted in the Navy. It certainly was extremely useful. It gave you certain rules which were of great service and it also afforded some general information as to the tactics of the gun and torpedo action between a couple of ships".* [3]

Colomb's game was subsequently introduced into the US Naval War College by Lieut. William McCarty Little USN after he became a member of the staff in 1867. The College developed wargames themselves and in 1916 they were introduced at the Naval Academy.

In 1901, Fred Jane published 'Hints on playing the Jane Naval Wargame' which was a complex set of rules capable of playing full campaigns, and taking into account such points as fuel consumption, breakdowns, intelligence, weather and logistics. These games involved large models and up to 70 people acting as players, referees, and judges. In 1912, aircraft and balloons were added when the definitive version of his rules appeared. Jane struggled to achieve realism, even to the point of considering the effect of electric gun hoists on ships. In the 1930's, the American, Fletcher Pratt, began developing Naval Wargames, using similar techniques to Jane. He took into account the aircraft carrier, improvements in artillery and new ship designs. Presumably Jane's, and subsequently Pratt's rules formed a framework for the extensive gaming at the US Naval War College at which the US Navy studied possible war scenarios in the Pacific. Of this period, Admiral Nimitz said that the games had produced everything that the Japanese attempted between 1941 and 1945 except the kamikazi. [4]

THE AUTHOR

Lieutenant S. P. Lemon was born in 1952 and joined the RANC as a junior entry in 1968. After fleet time he went to the U.K. for OW courses in 1973, then did the Basic Supply Course in the latter half of '74. He Joined FOCEA additional and was sent to Nirimba as SO (Cash) for 4 months. Joined HMAS Stalwart as Secretary in May '75 and in September '76 joined FHQ as Divisional Secretary Operations. His interests include chess, wargames, military history, political and social history.

All major combatants in the Second World War played Wargames between the two World Wars to develop tactics. The Royal Naval Tactical School was founded in 1925 at Portsmouth, and remained there until it was closed in 1939. Jane's rules were used, and the equipment was a Naval Stores item. In 1941, the Western approaches Tactical Unit was formed in Liverpool and instruction in Convoy manoeuvering and Anti-Submarine Warfare was given. The US also used wargame techniques during the war to develop anti submarine air search and mine warfare tactics. In 1939, the Battle of the River Plate validated Pratt's rules. In fact, when news of the impending battle was broadcast, Pratt and a large number of assistants played out the action to predict the outcome: the result? Graf Spee and Exeter sunk.[5] The rules were finally published as "Fletcher Pratt's Naval War Game" in 1940.

Since the war, computer technology has been applied to Naval Wargaming and the scope and capacity of the systems have expanded considerably. The Royal Navy Action Speed Tactical Teacher was installed in the new Tactical School at Greenwich in 1957. It featured computer analysis, individual command cubicles with PPI's sonar consoles and communication nets. This ASTT has been exported in various forms to Australia, Canada, Pakistan, Brazil and Greece. The US Navy has a multi-million dollar war gaming complex and in 1958 formed office of the Assistant to the Chief of Naval Operations for Wargaming Matters (a 2 star position), and is also involved in the Joint Wargames Agency (JWGA) which organises wargames for the Joint Chiefs of Staff.

The Objectives of the War Game

All wargames are designed to fulfil one or more of the following objectives:

a. to give decision-making experience,
b. to give commanders experience at war, and
c. to analyse tactics and systems.

These objectives are straightforward in their meaning but the relationship between them is not so clear as each objective determines the method and accuracy of simulation required. As will be seen it is quite possible, even desirable, to incorporate a and b type objectives and equally impossible and undesirable to incorporate b and c type objectives.

The Decision Making Experience

The first objective is defined as making the player choose his best way of achieving an objective within a specific set of rules. From the rules the player must work out tactics based on his assessment of the probabilities. This objective is most easily achieved, and is realised in nearly all commercial wargames. There is no requirement for a high degree of realism; in fact, too much realism often confuses the issue by making an accurate assessment of the true situation difficult. What is essential is that the scenario establish a conflict situation; i.e., the aims of the opposing teams being incompatible, or that the player must be in a dilemma.

To Give Commanders Experience at War

The second objective is simply to give commanders at all levels experience in situations that they will face in time of war. The military are somewhat handicapped in that the general populace tend to get justifiably upset if they practice their profession in peace time,[6] and peacetime manoeuvres tend to have severe safety restrictions and are limited in that it is difficult to really analyse the true outcome of an engagement. In fact, for any realistic assessment to be made at the washup, actions have to be evaluated on probabilities–that is, they resort to wargaming methods. Before proceeding, this should not be taken to mean that exercise are a waste of time, but only that they do have limitations. Exercises are indispensible for the purpose of training ships' personnel, testing equipment, practising tactics and, probably most importantly, exercising communications and seamanship. The wargame is not in competition with, nor is it a substitute for, exercises but it is a very useful tool for exercising the pure command function in that it allows the command to study any type of operation in any theatre, using any forces and without any limitations. In the words of Paul S. Deems, a US Air Force analyst–

> *"Even if it is not possible to test plans conclusively with the techniques now available, it is at least possible to glimpse the elusive and manifold shapes of future conflicts and to harden by fictional exposure, the officers who may some day come face to face with the hideous visage of the real thing".*[7]

The design of wargames to simulate accurately the war situation is necessarily complex and to a great deal, limited by effects of scale. How simulation is achieved will be discussed later in the paper as similar problems arise in the third type of objective. The RAN, using the system at HMAS Watson achieves this objective during its command training exercises.

The Analysis of Tactics and Systems

The analysis of tactics and sytems is a self-evident objective. Wargames have a proven record in this field as both Admiral Nimitz and Admiral Yamamoto would testify. The Japanese had mixed success–their analysis of the Pearl Harbour attack and the allocation of forces was an outstanding success but their wargame of Midway was a disaster. In May 1942 on board the *Ijn Yamato*, the throw of a dice destroyed two Japanese aircraft carriers but Admiral Akage overruled the decision. The Japanese failed to consider that:

a. the Americans had broken their code and knew the plans, and
b. the Americans would attack from the north.[8]

This demonstrates a valuable truth. A wargame is only as useful as the information used in formulat-

ing the scenario. In the example given, dice gave a truer indication than expert opinion.

In a less well-known but equally important case wargames had an important influence on the course of history. In 1919 Rear Admiral W. S. Sims USN was appointed President of the War College. Sims, was a gunnery officer loyal to the battleship. Admiral Sir Percy Scott addressed a letter to the Times on the 12th December, 1919, in which Scott said of the aeroplane: *"It is the most important arm of offence and defence"* and of the battleship, *"I, and a great many naval officers think she is more than dead, if that is possible"*. Sims remarked:

> *"I should think that he (Scott) would keep reasonably quiet–All the aeroplane carrying ships in the world could not make an attack upon a foreign country unless they were supported by a battleship force superior to that of the enemy"*[9]

Sims made extensive use of wargames for instruction of officers in tactics, and in 1920 a game was played in which one side used only aircraft carriers while the other used carriers, battleships and battlecruisers. The result? A fleet of 22 carriers destroyed a fleet of 16 battleships, 6 battlecruisers and 6 carriers. Naturally this aroused much interest and was replayed many times, and the results were the same. By early 1921, Sims was a firm convert to the aircraft carrier, and through his position in the War College, very influential in the development of the carrier force in the USA. He wrote articles and testified before many committees and bodies, notably the Courts Martial of Lieutenant Colonel William Mitchell in 1925.[10] Sims himself did not convert the Navy to carriers, the final responsibility for that goes to Admiral Yamamoto in 1941, but he was the main force in keeping the development of carrier tactics going in spite of heavy opposition from many senior officers, including the office of the Chief of Naval Operations.

Modern analysis is carried out by computer simulations. In these cases the tactics, capabilities and scenario are programmed into the computer which plays out the game and displays the results. There is very little, if any, command control over the situation and all decisions are made well before the game is played. More than one man year is required to programme a complete game using techniques of systems analysis. The same games are played and replayed, changing a few variables to examine their effect. The RAN does not, as far as the author is able to determine, engage in full-scale analysis using wargaming to any great extent.

Methods

Wargames may be played manually, on machines or computers, or a combination of the three. Almost all pre-wargames were manual; i.e., all ships' movements and engagements were done by hand, and results of engagements were decided by consulting tables. This had the advantage of being cheap, but was very time-consuming and required a large number of personnel to move models and act as umpires. Analysis of 3 minutes of real action time often took 30 minutes when several ships were involved in combat.

Machine games are played on equipment especially designed to play wargames such as at the US Electronic Warfare Simulator at the US Naval War College. These games are really manual games, using electro-mechanical devices to simulate sensors and resolve combat and hence speed up the process. The games may incorporate artificial operations rooms and facsimilies or real apparatus. Personnel requirements are still high and control groups are still required. If stochometric* devices are used, they tend to be random number generators; i.e. electrical dice. Computer games are completely different and do not require either players or control groups. The game is pre-programmed and uses its own logic programmes to make decisions. If the game is not used for a pure analysis function, stochastic* resolution of probabilities is carried out by a random number programme. These games are very expensive but are very powerful tools for analysis due to easy replication and the capacity to vary the time scale as desired.

Probably the most useful games of all are combinations of the computer and mechanical or manual games. The combination of computer and mechanical games gives very realistic training in all aspects of command because the officer can be placed in the operations room, but are very expensive to set up. Tying the computer to manual games is a very good way of expanding the information which can be handled, and speeding up the games. It also removes the largest problem of all in manual games, that of assessing intelligence, as it permits all movement outside the immediate tactical area to be hidden effectively. It lacks in realism in that the officer cannot assess his information directly from a PPI as in the mechanical games but is comparatively inexpensive.

The Theoretical Basis of the Wargame

The theoretical basis of the wargames, irrespective of the method of play or the ultimate aim, is that the real life situation can be reduced to a mathematical model. In this most fundamental concept lie all the capabilities and limitations of the wargames. Admiral of the Fleet of the Soviet Union Sergei G. Gorshkov has stated:

> *"Today the criterion of compatibility of naval capabilities is the relative strength of their combat might calculated by the method of mathematical analysis"*[11]

and

> *"We have had to cease comparing the number of warships of one type or another and their total displacement (or the number of guns in a salvo, or the weight of this salvo), and turn to a more complex but also more correct appraisal of the striking and defensive power of ships, based on mathematical analysis of*

their capabilities and qualitative characteristics".[12]

In these statements he is supported by Vice Admiral Sir Stansfield Turner RAN. and Rear Admiral George H. Miller USN.[13] From these comments, the architect of the world's most modern navy is obviously convinced that the real life situation can be–in fact must be–reduced to mathematical terms. Pratt's game evaluated ships on a point sytem using the formula given in table A. This formula reflects World War 2 values, not those of Gorshkov, but is an attempt to place a relative value on ships, and can be modified to suit modern warships. Pratt also constructed tables of the effects of weapons, and tables of defensive armour. The effect of a hit on any point of the ship could be determined by comparing the destructive ability of the bomb or shell with the resistance of the armour at the point of impact.

The first requirement in constructing any wargame system is to establish a satisfactory mathematical relationship between various units, (ships and planes) and weapons systems using probability theory. At the simplest level this would involve, say, a destroyer is twice as hard to sink as a frigate and a cruiser is three times as hard to sink as a destroyer (in terms of actual damage sustained). Therefore if 10 points sink a frigate, then 20 points sink a destroyer and 60 a cruiser. Weapons are ranked in the same way, and points allocated for the damage they inflict. The system is then complicated by taking into account hits in critical areas; e.g. a small bomb exploding in a cruiser's magazine would probably destroy it, whereas a frigate could probably survive a similar hit in the cable locker. The extent to which these individual variations are taken into account vary with the scale of the game, ship to ship tactical or world-wide strategical, as in the strategic game minor damage to a small unit may not be worth considering. The method of play also affects this variation as computers make it considerably easier than in manual or machine games to handle damage to individual ship's equipment.

The second requirement is to construct tables of probability of the effectiveness of the weapon systems and sensors. These tables reflect such variables as range, relative speed, target attitude, etc. ECM, ECCM and ESM can be treated in the same manner. Most of the data required for these tables should be available in records of weapons trials, exercise records, design analysis reports, and technical publications. In some cases, especially in some foreign systems, educated guesses may have to be made. In the analysis game the known probabilities are used to predict the unknown probabilities and devise tactics or force allocation to maximise the probability of success. Examples of the application of probability theory to tactics are the old gunnery tactic of breaking the line and battleship T formation. The former, pioneered by Rodney, Howe and Nelson (reportedly influenced by John Clerk's essay on Naval Tactics)[14] involved bringing both broadsides to bear and raking two enemy ships while minimising the exposure to the full broadside of the enemy. The effect on the leading ship in the enemy line, whose transom was exposed, was usually devastating as the weak stern members offered little resistance to the shot in comparison to the stout (about 12") side timbers. (Sketch 1) In the T formation first used on a large scale at Tsu Shima, the enemy could bring less guns to bear, thus reducing their firepower, and the target offered the best probability of a hit. Firing a gun on a bearing was considerably easier than to fire at a given range. The reasons for this are that deflection is largely a constant factor, given barrel wear and the wind conditions. The bearing of the target was easy to establish, but range could vary for each shell, due to minor variations in the propellant (a 0.1% variation in charge characteristics would give an error of 22 yards at 10nm range) and it was more difficult to measure range accurately using short base optical range finders. As the ship's length was in the order of 3 to 4 times the beam, the probability of a hit increased accordingly when the 'T' was capped. (Sketch 2).

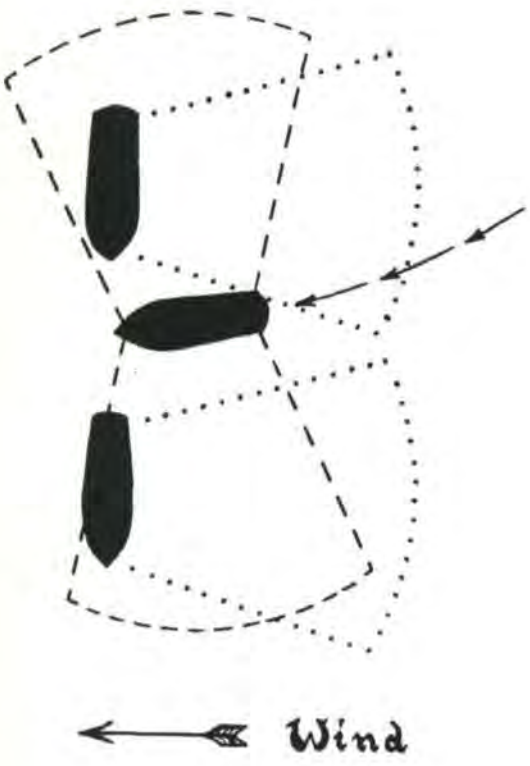
Chance in Wargames

Very few people would challenge the statement that chance is one of the basic elements of war. The statement that 'nothing is left to chance' is both absurd and demonstrably untrue, unless it is taken to mean that all foreseeable events have been considered and the probability of failure minimised as much as possible. In this interpretation of the statement, chance is not eliminated because chance is the resolution of probabilities.

Clausewitz stated:

"The objective nature of War makes it a calculation of probabilities; now there is one single element still wanting to make it a game, and that element it is certainly not without: it is chance. There is no human affair which stands so generally in close connection with chance as War" [15]

Throughout history, the element of chance has been recognised as a decisive factor in war, whether it be in the form of luck, good or bad, or making the correct decision for the wrong reason. Most decisions in war are not made in a clear, well defined environment as estimates must be made of many factors which are completely unpredictable, unknown or–worse still–thought to be accurate but false (incorrect intelligence). The best a Commander can do is to assess the probabilities and make a decision that gives him the best CHANCE of success. Another consideration is the role of chance in particular aberrations of equipment where, for some inexplicable reason, in the same environment, similar units perform totally differently. A very good example of this case is the sink-

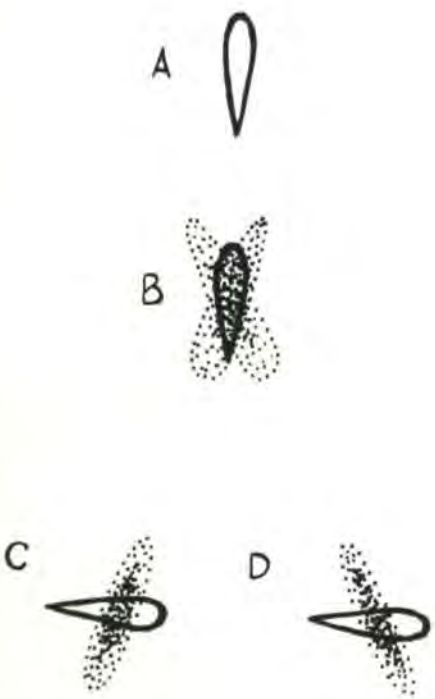


Sketch 1 – BREAKING THE LINE

This manoeuvre was suggested by Clarke as a means of bringing both broadsides to bear and expose your own ship to less damage. Apart from attacking through the weak end timbers, the shot had the full length of the enemy to wreak its havoc. In addition the attacker could trap the damaged hulks to windward.

Although first used by Rodney it became known as Lord Howe's Manoeuvre because he was the first to plan a battle using it.

(diagram not to scale)



Sketch 2 – CAPPING THE 'T'

A simple study of probability shows the advantage of this manoeuvre.

The shaded areas represent the probability areas in which a shell will land given the correct range. It is obvious the area is greater as the target approaches the head-on aspect.

In addition ships C and D can concentrate their fire and double their probability of a hit whereas ship A has both gun arcs and visibility reduced. Ship A is also firing at a larger range which increases the spread of her shells.

(diagram not to scale)

ing of the two sister ships *USS Juneau* and *USS Atlanta* in the first Battle of Guadalcanal on the night of 12th November 1942. *Juneau* was sunk by two 24" long lance torpedoes, but *Atlanta* was sunk only after two 24" torpedoes, fourteen 8" shells (American) and thirty-five Japanese shells, mostly 14" HE from the IJN battleships *Hei* and *Kirishma*. [16] These ships were as nearly identical as any two ships can be; both built at the same time and joining the fleet at the same time, with similar crews and the same battle experience. To what extent *Atlanta* suffered from 'overkill' is a matter for debate, but she floated long enough to become detached from the main force and be later mistaken for a Japanese ship (that's when the Americans shelled her). This apparent performance difference is largely dictated by chance, i.e. where the torpedoes hit, where the shells hit, etc.

Once one accepts that chance is a fundamental aspect of war, the application of chance to wargaming itself must be considered. This is a function of the game design; if the aim is to duplicate war realistically then it should be, in fact has to be, introduced. Chance must be used to resolve probabilities to determine the outcome of any event, but it is 'refined' chance–that is the application of stochastic methods to a probability relationship. An example of this is if a missile system has a 98% probability of hitting a target in a specific set of conditions, then application of a stochastic device to tables would give an average of 2 misses per 100 shots. If the wargamer is unfortunate to miss the one time he really needs to hit the target, it is pointless his claiming the outcome is unrealistic; it is realistic or the system would be 100% effective. The realism of the game is directly dependent on the number of variables that can be handled and this in turn is dependent both on the data available and the system of playing the game. A Canadian in Len Deighton's "Spy Story" sums up the problem of chance when he says:

> *"If you don't introduce the element of chance–dice or random machine–you get no idea of what happens in war. But introduce it and you're in the gambling business."* [17]

For analysis games chance is undesirable so a form of game termed 'deterministic' is used. In these games, if the probability of shooting down an aircraft is 98% then exactly 98% of the target is shot down. This is manifestly unrealistic but the aim of these games is not to simulate real warfare but to use the mathematical model to obtain the best odds. This means all decisions and tactics are preplanned and the end sum is calculated; essentially no action takes place. An example of this would be if the final probability of a target being destroyed by a bomb delivered using one type of attack compared with another type of attack was required, all the probabilities of accuracy, defensive systems employed, weather effect on the type of attack, time allowed for manoeuvre etc., are fed in to the sum, and an answer obtained, say for the first method 21% and for the second 52%. All this determines is that one is better than the other, NOT that in each individual case a plane using the second method will destroy the target, only that it has the better CHANCE. If resolution of probabilities is required, i.e., action is being simulated, chance must be used.

Possible Developments in the RAN

Wargames have a great deal to offer any Navy, but moreso in the small navy with a limited budget such as the RAN. Paradoxically the very large navies spend vast amounts of time and money on wargames, yet the smaller navies with the most to gain, use them in very limited tactical applications –or worse still–ignore them to a point of exclusion. The USN, for example, can gather sufficient units to carry out large scale exercises in any theatre they wish and by using some specially fitted ships and aircraft can simulate the EW aspects of modern warfare in the multi threat environment. Similarly the NATO forces can carry out effective exercises because of the well defined threat and their common aim. Australia is limited in her capacity to conduct large scale multi threat exercises and relies on participation of the US forces and on joining in exercises such as RIMPAC. While these exercises are invaluable there are inherent disadvantages in that our tactical doctrine is tied to the USN with her large fleet and logistic train. In view of a US Defence spokesman's reply to Prime Minister Fraser's call for an American build up in the Indian Ocean ("the Indian Ocean is only a secondary theatre to the United States"), the RAN may conceivably be left to control this area on her own as was the Royal Navy in 1942. It would seem the only way to study the implications of this unpleasant reality would be to wargame as many scenarios as possible and then conduct exercises to test the most important ones.

The most valuable contribution that wargaming can make to the small navy is in the analysis of force requirements. A few million dollars spent on a project which is subsequently cancelled is not a total loss to the USN as it reveals some of the limitations and possibilities in that field and this has value in itself. But, to a small navy on a very limited budget, every dollar spent on cancelled projects is a dollar wasted. The USN still have wargame requirements and have used the techniques to establish actual design parameters. An example of how this could be employed in the RAN would be in the selection of the design requirements for the new RAN patrol boats. Many discussions have been held on what type is needed and some authoritative backing can be found for any of the options available, from slow fishery protection vessels to high speed missile boats. In such polemical discussion the final decisions tend to be made not on an objective assessment of the

requirements but on peripheral considerations such as the current political attitude, cost[18], the hierarchical position of the arguer and an imprecise concept of how the vessels will be employed. [19] If wargamed, the practicability of the various types in performing all their expected roles could be determined with some accuracy.[20] The costs involved in wargaming the possible alternatives would be an insurance against expenditure on unsatisfactory equipment.

Examples given throughout the paper should indicate the value of wargames and suggest even further uses for them. The question remains as to how they could be developed in the RAN. The following comments are offered, not as a definitive programme, but rather as an indication of the many possibilities open to the RAN in this field. Although the analysis game is the most complex, they are the easiest to introduce as the only capital equipment required is a computer, and the only other requirements are some trained systems analysts and a realistic assessment of the main scenarios. This function could be carried out in Canberra on existing defence computers but the time requirements would probably be too much for the existing establishment when combined with its existing responsibilities.[21] Alternatives would seem to be updating the AIOTT at HMAS Watson so that the computer could play the required games, or hiring time on the USN system. If HMAS Watson was to be used, arrangements would have to be made for appropriate feed in from the RAAF, JIO, Maritime headquarters and other concerned organisations.

If wargaming was to be introduced more widely, then a logical place to start would be at the Naval College, where the computer already available would enable quite sophisticated computer assisted manual games to be played. The basic rules could be adapted from Pratt or from the US Naval War College and the games used to give cadets considerable professional training in tactical doctrines, the 'threat', capabilities of our own ships and aircraft while at the same time developing initiative and the logical process. In this training environment the classification of information used would probably be limited but using the latest data available the computer could produce refined probability tables for use in resolving engagements in Fleet exercises and in wargames played in ships. Most of the Fleet Units have a computer system available (Ikara, M22 fitted ships and DDG's) which, with the provision of a suitable terminal and software could carry out wargames. This would enable the ship's command teams to practice tactical manoeuvres before going on exercises and this improves the actual value of the exercise in that the ships should have a greater understanding of the possible courses of action available to them. The CDS fitted ships offer an almost unlimited capability for this type of wargaming due to integration of the computer system with the sensors and with suitable software it should be possible to conduct highly realistic 'wars' alongside. The USN has an extension of this system which uses a caravan based computer which connects to the CDS system and an external team run the 'war' to work up the AIO team. A similar system could be established in Australia by a secure land line to the AIOTT at Watson. Data could also be transmitted on this to non-CDS fitted ships to wargame as well and several fleet units could be engaged in a 'war' while still alongside. In pre-exercise planning and briefings this would be a facility that could aid the ships considerably. The possibilities are many and it is not suggested that the discussion has been exhaustive but, hopefully, enough points have been given to suggest other avenues.

In conclusion wargames always seem to face a polarising of opinion into two schools: 'Wargames are useless and a waste of time' and 'Wargames are the absolute answer to all problems'. This is regrettable and it should be remembered that the Wargame is not a panacea for the problems of procuring equipment, giving battle experience or developing tactics. Decisions still have to be made, exercises carried out and budgets met, but, they do provide a flexibility of investigation not provided by any other source and help detect many of the planning and policy errors which inevitably occur in any large system. The question is not 'can we afford Wargames? rather 'can we afford to do without them?'

TABLE 1

Pratt's Formulae for Evaluating Ships

$$\text{Valve} = (Gc^2 \times Gn + Gc'^2 \times G'n + 10TT \times 10A^2 + 10A'^2 + 10A''^2 + 25Ap + M)SF + T$$

where:

Gc =	Calibre of Main Battery
Gn =	No. of Guns in Main Battery
G'c =	Calibre of Secondary Battery
G'n =	No. of Guns in Secondary Battery
TT =	No. of Torpedo Tubes
A =	Thickness of Main Armour Belt
A' =	Thickness of Turret Armour
A'' =	Thickness of Deck Armour (each armoured deck is treated separately)
Ap =	Number of Aircraft
M =	Number of Mines
SF =	Speed Factor = $\frac{\text{Speed}}{2} + 10$
T =	Tons Displacement

All calibres and armour in inches

Examples using this formula would be:

HMAS Canberra (1942)	= 42,326
HMAS Sydney (1942)	= 25,671
Bismark	= 179,866

NOTES:

1. Fundamentals of Naval Operations Analysis, USNI, Annapolis, 1970, p. 131, cited as USNI in remaining notes.

2. Deighton, Len. 'Spy Story' Panther, St. Albans, 1975 p. 60.

3. USNI op. cit., p. 220.

4. Carter, Barry J., 'Naval Wargames', David & Charles, Devon, 1975, p. 107.

5. Featherstone, Donald F., 'Naval War Games', Stanley Paul London, 1965. p. 158.

6. There are of course other considerations such as the political implications of the time. Large scale exercises north of Darwin would not have been very politic when the Timor Crisis was going on.

7. Deems, Paul S., 'Wargaming and Exercises', quoted in USNI, op. cit. p. 144.

8. Fuchida, Mitsuo and Okumiya, Masatake, 'Midway, The Battle That Doomed Japan; The Japanese Navy's Story' USNI, Annapolis, 1955. pp. 94-99. — In fact the reference reveals that at least one Staff Officer raised the possibility that the USN would appear on the flank and this suggestion was supported by Rear Admiral Ugaki but the reply of the Nagumo Force Staff Officer was "so vague as to suggest there was no such plan" (to counter this possibility).

9. Hough, Richard, 'The Hunting of Force Z', NEL, London, 1970, p. 22.

10. Hough, op. cit., p. 49. — The appearance at the Courts Martial was notable for the publicity it received rather than its effect on Carrier development. Mitchell was a side issue, it was the Battleship that was on popular trial. Sims was even described as "opinionated, narrow-minded, hobby-horse riding, egomaniacal" for his support of the Carrier.

* A stochastic model is one in which repeated reruns will reveal the distribution of all possible outcomes. The alternative is the deterministic or expected value model which will always give the same answer. This is shown best by a simple example. If the probability of shooting down a plane is 0.8, then in a deterministic model 8 out of 10 will always be shot down but in a stochastic model, any number from 0 to 10 will be shot down in any one run but the average of a large number of runs will give an average of 8 out of 10.

11. Gorshkov, Sergei G., 'Red Star Rising at Sea', USNI, Annapolis, 1974. p. 131. — This book is a collection of essays written by Admiral Gorshkov for publication in the Soviet Union in 1972 which were reprinted in episodic form in the USNI's Proceedings in 1974 with commentaries by American Admirals. Both essays, commentaries and a brief biography make up the book.

12. Ibid, pp. 1-2.

13. Ibid, in the commentaries.

14. Featherstone, op. cit., p. 12.

15. Leonard, Roger Ashley, 'A Short Guide to Clausewitz On War', Weidenfeld & Nicolson, London, 1967. p. 54.

16. Information obtained mainly from 'Strategy & Tactics' No. 38, 'CA'. Simulations Publications, New York, May 73.

17. Deighton, op. cit., p. 59.

18. Cost in the economic sense of opportunity cost, i.e. in the terms of what is forgone to obtain an object is probably quite a reasonable alternative form of decision tool but normally it boils down to a simple evaluation of which is cheaper in outlay. In crude terms is it cheaper to spend $100 on two canoes and thus not be able to go deep sea fishing or cheaper to buy a deep sea fishing boat for $1000? The decision rests on whether you want to go deep sea fishing or not and how much you will have to pay to do this on top of your $100, i.e. the cost is measured in terms of the alternatives you have lost.

19. This is not to imply a criticism of our planners but is a normal trend in that our demands tend to fluctuate with what is available rather than what should be or possibly could be made available. This means that our aims are reduced to overcoming the immediate hurdle, e.g. getting some sort of patrol vessel to meet our immediate needs and limiting our requirements to this goal.

20. Providing the scenarios are realistically constructed, of course.

21. This was proposed as early as 1961 according to an article from the Sydney Morning Herald quoted by Dr. Desmond Hall in an article 'Data Processing in The Defence Establishment Part 1' in June's Pacific Defence Reporter.

A CHILD'S VIEW OF COMMAND AT SEA
(Out of the Mouths of Babes Division)

When our first America's Cup challenger, *'Gretel'*, was undergoing trials in Sydney some years ago, a naval officer was one of the aspiring crew members. On the day this incident occurred he suggested to the skipper, also hoping for selection, that no provision had been made for lunch and it might be an idea to get some fish and chips for the crew at Manly. The skipper agreed and proceeded in towards Manly, whereupon the NO pointed out that *'Gretel's'* draught would be too great for the depth of water alongside, and why didn't he call up the youngster sailing that surf-board with a sail and see if he would take him, the NO, in to the pier to buy food. So it was arranged. The youngster agreed, and off they went with the surfboard with a sail being driven hard, well over on one side. Being somewhat alarmed at the prospect of swimming, the NO suggested to the littley, all of 8, that he had better ease his sheet. Upon which the 8 year old replied, "Shut up, Mister, I'm skipper of this boat; what's more I own it. You don't even have a share in that one" (scornful gesture towards *'Gretel'*).

MARINER

BOOK REVIEW

'BUILD A FLEET, LOSE A FLEET'
The Hawthorn Press **by Captain R. McDonnell**

Captain McDonnell tells the unvarished story of the Australian Commonwealth Line of Steamers founded by W. M. (Billy) Hughes in 1916. Founded on prize ships of the Great War without Parliamentary sanction the line was formally constituted by 1923, but in 1928 tenders were called for the disposal of the Line's remaining 7 ships. Although the history of the ACLS was short it is clearly pointed out in this book that here in fact lies the beginnings of the Australian National Line.

'Build a Fleet, Lose a Fleet' has been well researched and is a factual, direct and uncomplicated history of the Australian Government's attempts at ownership of a line of merchant ships. Interwoven with the story are interesting asides into the ships themselves including the famous Bay Class steamers, their men and conditions that prevailed at the time.

Revealed as the book progresses are little known facets of the early Australian shipbuilders, both good and bad and their shipyards. Some of these yards still exist but the majority are now only interesting history.

HMA ships *Biloela* and *Kurumba* receive mentions as Royal Australian Fleet Auxiliaries, together with some of the constrictions of their operation whilst not accompanying the Fleet on "cruises". The authors word, not the reviewers.

Not a book to appeal to all interests, 'Build a Fleet, Lose a Fleet' fills a gap in maritime history of this country that has been long neglected. Eminently readable, with a brisk style and plenty of historical data, both in the text and in the appendices, it will appeal to those interested in little known maritime history and Australia's tentative steps on her own feet into the world of blue water trading.

In short, a wealth of information to win those after dinner discussions when putting the world to right.

L.J.S.

'COMMAND AT SEA' **by Oliver Warner**
Cassel Australia Limited. $12.95

Reviewed by Commodore P. J. Hutson RAN.

Oliver Warner has added a worthy book to his already impressive list of naval works.

To cover in 188 pages the essential details of the careers of some twelve Flag Officers from three countries, spanning two centuries is no mean feat. This attests to his mastery of taut prose for he readily captures the essential character of each man.

As he states in the prologue the attribute of command is easier to state than define. This is precisely how he has tackled these potted biographies. He does not attempt to analyse but leaves the reader to decide what qualities were important.

It is hard to find a common denominator to these diverse characters but in Warners' words "the quality of command always takes for granted that the leader knows his business from top to bottom and will not throw lives away".

The naval historian will find many familiar names flitting across the pages, many of whom could have been included in the series.

Perhaps there has been over emphasis on British Admirals in the days of sail but they were glorious days in British naval history and the author once again brings to life many famous named battles.

Although he rates mention in the chapter on Admiral Saunders and the capture of Quebec, it was disappointing that the author did not see fit to include that magnificent seaman and leader, James Cook.

Having had the pleasure of talking with Admiral Nimitz in his home on Treasure Island in San Francisco Bay a year before his death in 1966 I was pleased that the author saw fit to include this great commander who, uniquely in this book, was without personal experience in combat.

Little has been written of Chester Nimitz, Commander in Chief, Pacific during World War II and the chapter on this self effacing, master strategist and architect of victory in the Pacific whets the appetitie to know more of Nimitz the man.

My one criticism of this excellent book is that it was too short.

'AUSTRALIA AND IMPERIAL DEFENCE 1918-1939'
A Study in Air and Sea Power **by John McCarthy**
Q.U.P. $9.95

Dr. McCarthy and the Queensland University Press are to be congratulated on the publication of this book. A study of Australian Defence Policies between the wars was needed, and this work is not before its time. It has been researched thoroughly; the select bibliography runs to 19 pages. Amplification of the text in footnotes is particularly easy to follow by the method used; and just as well, there are no less than 41 pages of notes to text. The printing is clear and the binding adequate.

Having got those basic matters out of the way, what is the book all about? Between the wars the argument about defence policies in Australia, a country without a foreign policy, was a simple triangular contest. Shaw ('The Story of Australia') puts it succinctly, "(Australian Governments) placed (their) faith in Empire Defence, of which the basis in this region was British sea power and the Singapore naval base, and which Australia could support by the co-operation of the Australian Navy and an efficient system of home defence. But many feared that it was dangerous to rely too much on British aid, for in an emergency even her naval strength might be committed to action in European waters. Therefore, it was argued, Australia should rely more on her own efforts, and in

particular should develop her air force at the expense of her navy–a policy which gained much support from isolationist sentiment and from the air minded. Others, while assuming that British naval assistance would be sent, argued the increase of land defences to resist an armed invasion until help arrived. This school included the leading spokesman of the Army. But in fact none of these policies was fully adopted." That's about the scope of it, though McCarthy deals only with the first two options; seapower, Singapore and Empire Defence on the one hand, and air power, self reliance and anticipated economies on the other. He puts the view that the loss of Singapore, and the sinking of *Prince of Wales* and *Repulse* shows that the policy most closely followed was proved wrong, and therefore it would have been better to go for the air power option. The author makes it quite clear that this is what he thinks. It is also clear that he had begun the work with that conclusion already drawn. To my mind, this inevitably slants the presentation.

The author quotes the reasons given by the two older services against having a separate Air Force in the 1920's, and their proposals for each to have an air arm. He also acknowledges that Douhet's air power theories would not apply in Australia, and that the RAAF would therefore have two main roles, maritime, and army support. In all the logic to which Dr. McCarthy appeals, it seems to me that Army and Navy, in fact, took the more sensible position at the time. Yet it is quite clear that in the author's opinion, the formation of a separate air force, and maintiaining it separately was the right decision. Why? He never says why in specific terms, though he does indicate the unhappy plights of other Dominions' air services which came under the authority of either the Army or the Police. The fact that separate Army and Navy air services were highly successful in America and Japan–and a number of other countries as well–is not mentioned at all. The book lacks this sort of balance; a balance that one might reasonably expect.

An attempt to form a Fleet Air Arm in 1924 is described as a direct assault on the infant RAAF and he quotes with approval the arguments used by the CAS of the day, Williams, opposing this Naval wing. One need not comment on Williams saying that the Navy's proposal "cannot be taken seriously", as a reason, while the reasons quoted from the official documents are predictably about duplication of services which could be provided by the RAAF, and restated in another form as 'uneconomical'. Again, the author's unquestioning acceptance of the need for a single air service before 1939 leads him support dogma rather than to logical argument.

The Navy of those days is the principal villain throughout the book and one cannot help feeling that its attitude to air warfare cold be likened to the lady's rueful comment about sex, "You're damned if you do, and damned if you don't". Much is made of the fact that the Navy took far and away the largest slice of the Defence vote right up to the outbreak of World War II; Navy was allocated about twice as much as the Army, (which then consisted only of a Staff Corps and the Militia), while the RAAF got as little as one tenth of the Navy vote until 1936/37 when it rose to one third. What is not mentioned in the book at all is the fact that the sums involved were pathetically small. Shaw is again apposite, "A sense of isolation, together with a desire for low taxation and increase social services combined to check (Defence spending). Australians were unwilling, as yet, at least in peacetime to undertake the responsibility of defending themselves, and during 1938-39 spent less than 17,000,000 pounds on all three armed services". It should be noted that this was nearly twice as much as the year before, almost six times that of the Depression years–and then after only six years of the Sino-Japanese War, and because of the frightenting prospect of an imminent war in Europe. The defence budgets of the few 1920's boom years had been eaten into by large payments needed to meet World War I debts, and these repayments had barely ended when the Depression hit. The fact that the Navy had to pay off its seaplane tender 'Albatross' and its two submarines in 1931, as a result of the Depression, is cited as proof of a bungling approach to Naval defence force development. Dr. McCarthy does not find it necessary to mention that it was economic circumstances as much as anything else which made a mockery of coherent planning.

I believe I have already shown that there are some important, and one cannot help feeling, deliberate, omissions from this book, not the least, though less deliberate, is a complete failure to define seapower beyond "the doctrines of Admiral Mahan". Where this puts the aircraft carrier is not clear, and consequently what Dr. McCarthy understands by 'seapower' is equally obscure. Though the author is prepared to say that the policy adopted failed because the British-seapower-based-on-Singapore-planning failed, he apparently does not feel the need to mention, if only for the irony of it, that it was American seapower, and its naval aviation component in particular, which actually stopped the Japanese advance at sea in 1942.

One may ignore the lead-footed implication in the captions to each of the photographs of the pre-war Australian cruisers ('sunk at . . .') and get to the essence of Dr. McCarthy's position. Having acknowledged that strategic air power doctrines had little relevance to Australia before 1939, he then goes on, "But the writings of American Brigadier General Billy Mitchell did". Mitchell had conducted a highly arguable demonstration to 'prove' that aircraft could sink ships, and, in McCarthy's view, "the prime weapon worth developing, therefore, was air power". That is all very well, but this conclusion really implies that an Australian maritime strike potential not only should, could, but would have been developed by the RAAF. I doubt it. The RAAF's principal source of material, strategic, and tactical thought throughout the period was the RAF, and that Service's record in the maritime role up to 1941 at least, gives no cause for believing that its Australian dependant would have done any better even if it had been given the entire Defence vote. In David Divine's words, the RAF's pre-war Coastal Command was "the runt of the litter" and his description of the wartime attacks on *Scharnhorst* and *Gneisnau* concludes: "At the end of July (1941) after four months of intensive effort, a daylight raid by the new Halifax bombers secured five hits on *Scharnhorst*. Two bombs which had penetrated the armoured deck failed to explode. A lull in the bombing followed. It was resumed in September and again in December. No further damage was achieved; 1,875 aircraft in all were used in the attacks. 1,962 tons of explosive were dropped. Ten hits were acknowledged, two of them duds. Those who had accepted Brigadier General Billy Mitchell's 'bomb in an apple barrel' claim of the 1920's, those who remembered the 'bomb down the funnel' guarantees of the supporters had reason to ponder" (from 'The Broken Wing', page 247). It might be noted that this was after two years of war. There is not much profit in reworking history in such a speculative fashion, but it would seem to be a pity if this book is used as a text for instructing in military establishments unless someone had a chance to offer counter views to the essentially simplistic line adopted by Dr. McCarthy.

The centre section of the book about the aircraft industry in Australia is good, and will be of value to those who want to look into that aspect of our Defence industrial base. And, as I indicated at the beginning, the author deserves praise for taking on the problems he faced in researching and writing the study. It is a matter for lasting regret though, that he adopted such a committed position from the outset, and lost the chance to make a better fist of it.

J.A.R.

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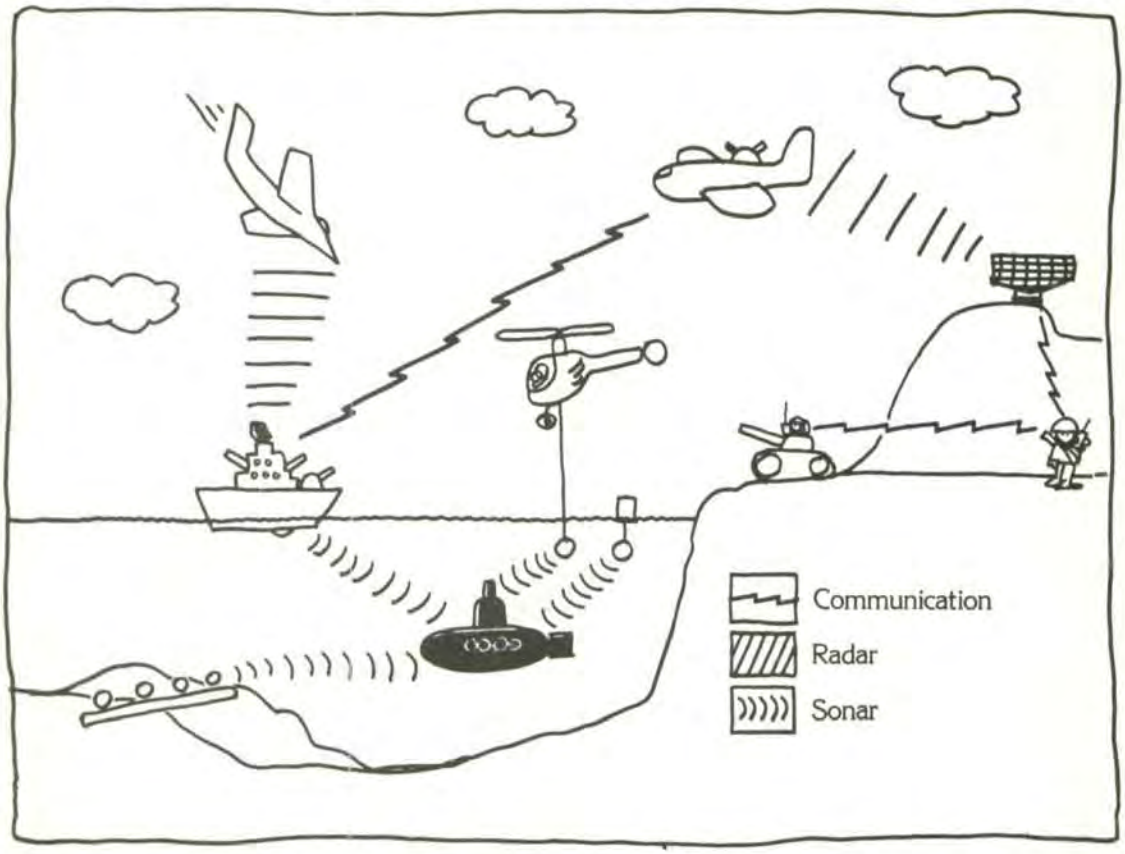

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