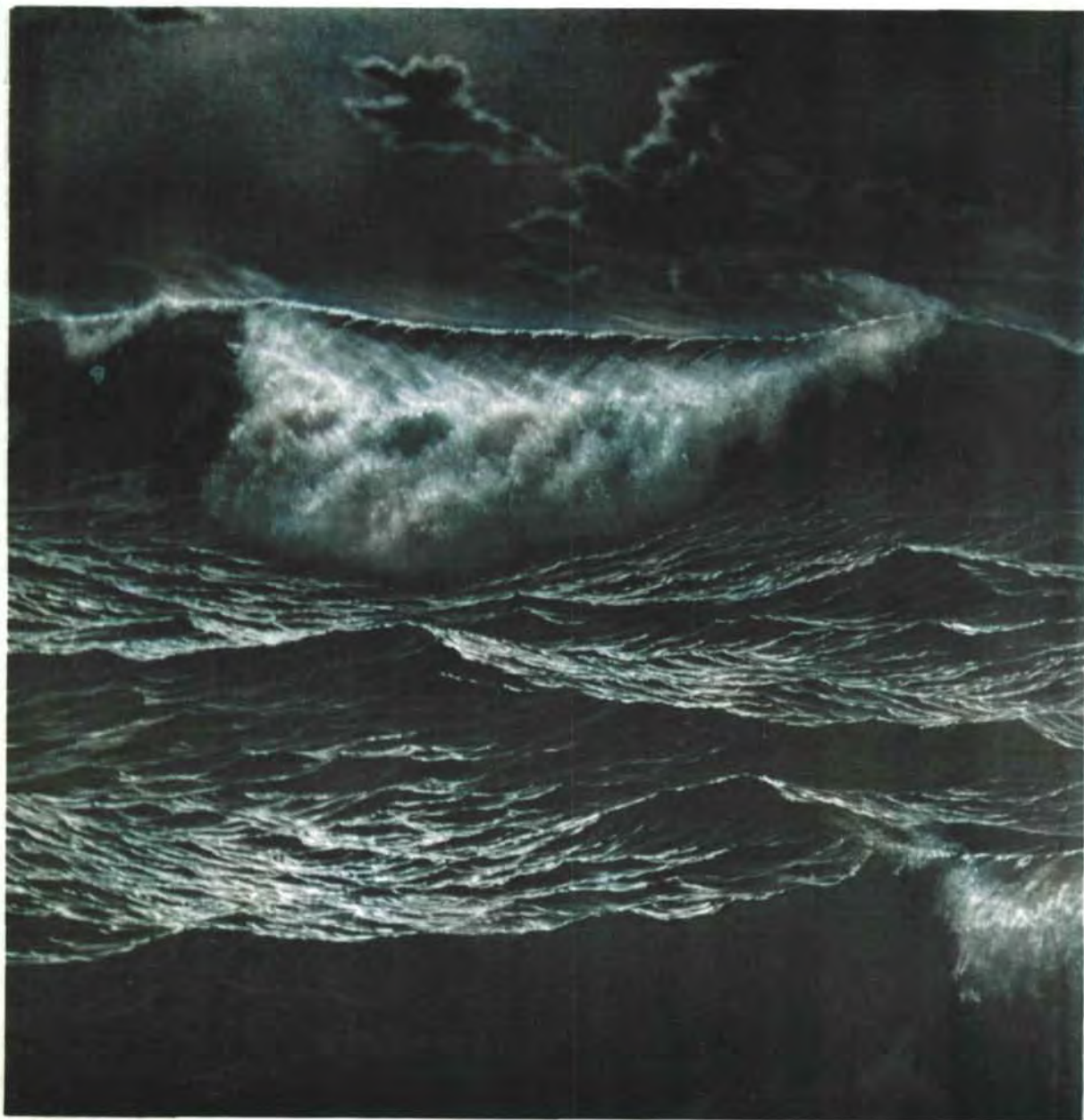


139

# JOURNAL OF THE AUSTRALIAN NAVAL INSTITUTE



VOLUME 1

NOVEMBER, 1975

NUMBER 2

## 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.

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### 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 Naval Board or the Institute.



# JOURNAL OF THE AUSTRALIAN NAVAL INSTITUTE (INC)

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\* \* \* \* \*

### SUBS! SUBS!! SUBS!!!

(No, not that sort, this sort)

**Literary.** To keep the Journal a viable proposition we need literary subscriptions — articles — items for the regular feature columns — letters to the editor. THERE IS NO PARTY LINE therefore any budding scribe who desires to air a view or is bursting to get something off his chest is invited to submit an appropriate item.

**Financial.** Members are reminded that renewal of membership subscriptions for the year commencing 1 October 1975 are due by 31 December 1975.

### OUR COVER

The front cover picture is a reproduction of a painting by Dennis Hardy, by courtesy of Mr. A. E. Stephen of Surfers Paradise.





### **President's Report presented at the Annual General Meeting held on 7 November 1975**

Members of the Australian Naval Institute. This is the first, I hope, of many annual President's Reports. It gives me great pleasure to report to you the activities of the Australian Naval Institute and the Council since we were formed.

You will recall that a Special Meeting was held in this room on 4 April this year at which 35 attended. On the books at that time were 57 foundation members. Since then a total of 95 new members have joined and our membership at today's date is 91 regular, 61 associate and 3 honorary members. Our honorary members are Admiral Sir Victor Smith AC, KBE, DSC, Vice Admiral H. D. Stevenson CBE and His Honour, Judge T. G. Rapke QC.

Since election of office bearers the Council has met monthly, in all 7 times. At these meetings the Council has dealt with applications for membership, formed sub-committees to draft By-Laws (now in the hands of the printer), Journal (first issue was in August) and publicity/membership. Additionally the Council is investigating the feasibility of building a National headquarters. A site has been tentatively reserved in Deakin ACT for this purpose. It must be realised that it would be a mammoth project and well beyond current resources. To gauge what assistance we could obtain letters have been written to the Naval Association, Naval Historical Society, the Navy League and the Canberra Naval Wives' Association. The idea is to see if a joint venture would be feasible. Negotiations are still in progress with these organisations.

I would like now to briefly mention our Journal policy. I think you will agree that our first publishing venture was most successful and a credit to those who worked so hard to put it together. It is proposed to issue the second number later this month and then quarterly. To sustain this programme we need two things. Firstly, constant and vigorous action in the form of contributions, articles and letters. This is your Journal. It requires your active support. A high quality production will also attract suitable advertisers whose backing will improve both the standard and frequency of issues. Secondly, and more importantly we need many more members. I exhort you to recruit as many as possible.

The Crest competition has attracted some high quality entries. The Council thinks that perhaps some members are diffident about their drawing ability and are therefore reluctant to submit designs. It is intended to co-opt a skilled artist who will translate any suggestion, no matter how rough, into a presentable format for judging. The Council has decided to extend the competition until 31 December 1975 in the hope that more members will forward their ideas.

Our financial position and 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.

To summarise, a most promising start; one which augurs well for the future and one of which we all may be proud.

### **CHAPTER NEWS**

#### **Canberra**

The Canberra Chapter has had three well-attended meetings this quarter. On 30 July Commander H. J. Donohue RAN read a paper on "Naval Airpower and the RAN". This subject is probably uppermost in our minds at the present and should spark off some lively debate. On the 22 October Captain B. D. MacLeod AM, WRANS, delivered a provocative paper on "The Future Role of Women in the Services". This was a most interesting talk and stimulated considerable interest and questions.

On 7 November (after the AGM) Captain T. R. Fisher RAN spoke on "The Indian Armed Services - an Overview". This was a wide ranging and informative address.

Convener: Captain L. G. Fox RAN - DNEP

#### **Sydney**

The Sydney Chapter had its first meeting at RAN House on 22 October. This was a very successful first. A film "Rise of the Red Navy" was shown and two papers "The Battleship Mentality Part 1" (Captain J. A. Robertson) and "Software at Sea" (Lcdr C. J. Skinner) were delivered and invoked considerable interest.

The next meeting is scheduled for Wednesday 10 December at RAN House starting at 2000. A paper on "Naval aspects of the Defence of Australia" will be delivered by RADM N. E. McDonald. Captain Robertson will then follow with "Battleship Mentality Part 2".

Convener: Captain J. A. Robertson RAN - HMAS *Stalwart*

Secretary: Lieutenant S. P. Lemon RAN - HMAS *Stalwart*

**WANTED:** Conveners for other centres, please inform the Secretary.



# Correspondence

Dear Sir,

Perhaps I have read something into the editorial in Volume I of the Journal which was not really intended. However there seemed to be just a hint of a political stance in the fairly explicit suggestion that approval of the incorporation of the Institute had been delayed by the Attorney-General for fear that another Naval pressure-group was being created along the same lines as the Navy League. At the risk however of being accused of being hypercritical I must throw discretion to the winds and write to say that it would be deplorable if there was any tendency by the Australian Naval Institute to become a medium for the implicit or explicit expression of criticism of government defence policy. We have the 'Pacific Defence Reporter' and surely that is enough - its credibility as an objective authoritative journal having been destroyed completely by its unashamed alignment with right-wing lobbying militarists.

Whilst I would be the first to say that our Journal should not be a facsimile of the 'United States Naval Institute Proceedings', nevertheless that journal does provide a fine example of how a professional military journal can adopt an apolitical stance. Let there be articles deploring any tendency towards liberalism in the Armed Forces and let there be articles putting a professional view different to what is current government policy but let not our editorial (presidential) comment take an aligned position, either explicitly or by implication.

The initiative to write this letter also leads me to reflect on a deeper and rather more philosophical issue. Whilst I do not wish to engage in a lyrical discussion of loyalty, I must refer however, to the increasing trend among serving military officers to take a political position virtually in public. Conversation in Army messes at the time of the 1974 General elections was blatantly anti-government. Two Army officers have recently joined the Opposition benches in the Australian Parliament. An Army friend phoned me after the Bass by-election to say that Bass is another step in the direction of the 'bloodless coup'. I

thought at the time that such attitudes were restricted to our khaki brethren but now I wonder... Naval officers are entitled to their personal political views, even to the extent of standing up and being counted by resigning and standing for election (even though reinstatement is always possible if unsuccessful), but let us keep such views personal... or reserved for our friends late at night.

The division between bona fide professional comment and non-objective biased policy criticism should not be hard to draw, and indeed it must be drawn if the Australian Naval Institute is to survive to work towards its objectives. They are worthy objectives for Australia is a maritime nation and there is much to be said of relevance to the Navy and the Maritime profession. A reactionary viewpoint on Naval matters is valid but nonetheless, being such conservative animals, it is probably more necessary that we should be exposed to the radical viewpoint.

The main thrust of this letter has I hope been apparent. We live in times of quite dramatic social and technological change and we must be prepared to accept change in all its dimensions. In political terms, there is a cold chill in the air when conversation among personnel of the Armed Forces turns to matters political and rational conversation gives way to extreme reaction expressed in narrow-minded, bigoted and ill-informed terms. I trust that the Journal of the Australian Naval Institute never serves to add to this chill.

Yours sincerely,

40 Longerenong Street,  
Farrer, A.C.T. 2607

W. S. G. Bateman  
Commander, R.A.N.

21st October 1975

## Editorial Comment

Commander Bateman has read into the article "The Australian Naval Institute - How it Began" something which does not exist. The references to the Registrar and the Attorney-General are factual. That is how it happened. The whole purpose of "How it Began" was to place on record for posterity the problems and frustrations of starting the Australian Naval Institute. The remainder of Commander Bateman's letter is best judged by members on its own merits.

## AUSTRALIAN NAVAL INSTITUTE FINANCIAL STATEMENT 1974/75

### Income and Expenditure Account for the year ended 30th September 1975

Advertising	25.60	Subscriptions Receivable	1940.00
Bank Charges	2.50	Bank Interest Received	8.93
Legal Fees	57.40	Advertising Space Sold	380.00
PO Box Rental	11.00		
Postage	28.61		
Printing and Stationery	841.98		
Surplus for the year	1361.84		
	<u>\$2328.93</u>		<u>\$2328.93</u>

### Statement of Receipts and Payments for the year ended 30th September 1975

Subscriptions Received	1940.00	Advertising	25.60
Bank Interest Received	8.93	Bank Charges	2.50
		Legal Fees re Incorporation	57.40
		PO Box Rental	11.00
		Postage	28.61
		Printing and Stationery	841.98
		Cash on Hand	309.31
		Cash at Bank	672.53
			<u>\$1948.93</u>

### Balance Sheet as at 30th September 1975

Accumulated Fund		Current Assets	
Surplus for the year	1361.84	Sundry Debtors	380.00
		Cash at Bank	672.53
		Cash on Hand	309.31
	<u>\$1361.84</u>		<u>1361.84</u>
			<u>\$1361.84</u>



# The Future Role of the Women's Services

*An address to the Australian Naval Institute, Canberra, Wednesday, 22nd October 1975,*

*by Captain B. D. MacLeod, AM, WRANS*

## INTRODUCTION

The year 1975 will undoubtedly be seen in future years as a landmark for womankind. The United Nations Organisation's proclamation that 1975 was to be termed International Women's Year (IWY), and that the member nations of the Organisation were to focus their energies and efforts towards women's roles and rights in all levels of society, has been the catalyst for a kind of female revolution.

As was to be expected, concentration upon women's rights, duties and responsibilities has generated close scrutiny of political, legal, judicial and social mores, particularly in the more developed nations. In turn, this has resulted in international conferences and commissions, national boards and surveys, and industrial, commercial and social investigations, all stimulated by enormous media interest and coverage.

Every activity, from world forums to local action groups, and embracing every possible view and attitude from the conservative to the radical, the lunatic to the rational, has brought about some form of change. The effects are largely those of identification — the crystallising of positions, the development of aspirations and on the more practical level, the recognition of the right of women to parity with men in equal contributions to a nation's future.

In Australia, the wealth of material arising from IWY activities is staggering. Almost daily more material becomes available about the changing role of Australian women. Most reports concerning occupational equality are disappointing. Recent research by the Senior Tutor in Economics at Sydney University discloses that employment equality for women has not progressed at all over the last sixty years, that the emphasis in employment is simply a form of segregation from domestic service and factory work to sales and clerical jobs. Statistics from the Public Service Board Annual Reports support this contention. In 1973, there was one female permanent member and 850 male permanent members of the Second Division of the

Australian Public Service; in 1974 the numbers increased to four and 1122 respectively, and in 1975 to seven and 1243. Women comprise approximately 25% of the total permanent members of the Public Service.

In one area, however, an employment review has been undertaken which not only identifies occupational inequalities pertaining to a small segment of the female work force, but which also makes realistic recommendations regarding the effective and efficient use of these women in the future. For the first time in the history of the Australian Defence Force, the Women's Services of that Force have been subjected to a fairly extensive enquiry concerning the employment and conditions of service of their members. Should the recommendations of the Report on Employment of Women in the Australian Defence Force be adopted, then the Defence Force itself will be utilizing its manpower resources to the best advantage, and the Women's Services will be taking a giant step forward.

## THE ORIGIN OF THE WOMEN'S SERVICES

The Women's Services were formed and developed during the Second World War 1939-1945, and were instituted for obvious manpower reasons. Initially, the paternal belief that war was for men only gave the military hierarchy a ready-made opportunity to

### THE AUTHOR

Captain Barbara Denise MacLeod, AM, WRANS, was born in 1929 in Bunbury and educated at Perth Girls and Bunbury High Schools. She graduated from the W.A. Teachers' College in 1950 and spent three years as a primary school teacher before joining the WRANS in November 1953. She has held all administrative appointments available to WRANS Officers and has served in all States except, to her regret, Western Australia. She was appointed to the staff of Director of Operations early in 1970, became the first Command WRANS Officer to FOCEA mid 1971 and took over as Director, WRANS in April 1973. Her main leisure interests are golf, live theatre, gardening and talking, often to herself.



limit the employment of servicewomen to ladylike labour such as house-keeping, cooking and typing. As the war escalated, women were employed in virtually every job for which they were physically capable, including the more technical and highly skilled tasks peculiar to defence needs. Not including the Nursing Corps, the Services reached a peak strength of 40,000 in 1944. With the exception of Army Nursing sisters and a small number of Army girls who served with the First Army Headquarters in Lae from mid 1945, Australian servicewomen did not serve beyond Australia.

Apart from the Army and Air Force Nursing Services, the other Services were disbanded in the late 1940's. The advent of the Korean conflict and the usual male manpower shortages called for the re-institution of the Services in the early 1950's, with the stated role of providing a nucleus of trained personnel which could be rapidly expanded in emergencies.

The re-introduction of the Women's Services was effected much the same as in 1941. All the old shibboleths were resurrected and the first "peace-time" servicewomen were restricted to very small establishments, to serve in Australia only, to conventional domestic and clerical employments which required minimal initial training, and to centralisation of accommodation and administration. A great many of the benefits and entitlements enjoyed by servicemen, such as permanency of employment tenure, Defence Forces Retirement and Death Benefits Fund (DFRDB) and advanced training, were denied servicewomen.

#### THE INTERVENING YEARS — 1952 to 1975

The Women's Services of the Australian Defence Force comprise the Women's Royal Australian Naval Service (WRANS), the Women's Royal Australian Army Corps (WRAAC), the Women's Royal Australian Air Force (WRAAF), the Royal Australian Naval Nursing Service (RANNS), the Royal Australian Army Nursing Corps (RAANC) and the Royal Australian Air Force Nursing Service (RAAFNS). Additionally, there are of course, Reserve Services which are in the main, inactive. The permanent Services comprise some 4,000 women which approximates to nearly 5% of Defence uniformed personnel.

Between 1952 and 1975 significant advances were made in establishing the Women's Services as integral parts of their parent bodies. The establishment ceilings gradually increased to the current 5% of male numbers. In 1959, Cabinet approved permanent status for servicewomen which enabled them to contribute to the DFRDB Fund and led the way to the granting of permanent commissions for selected

officers. Over the years, discipline for women slowly became almost the same as for males. Retention in the service after marriage was introduced in 1969 and controversial maternity leave benefits in 1975. Other rank servicewomen began the long haul towards pay parity with their male counterparts.

Whilst conditions of service improved, the employment restrictions continued. College entry and training and Staff College courses for female officers, and technical training and apprentice entry for other ranks remained non-existent. Minimum training was the fundamental basis for employment, and only in the Army did the range of female employments broaden to any degree. Except for a handful of service women posted to Singapore between 1967 and 1974 (and five Wrens who enjoyed the excitement of EXPO's in Canada and Japan), only officers of the Army Nursing Corps received the very rare overseas posting.



#### PREVIEW OF COMING ATTRACTIONS

On the 22nd May 1974, the Convention on Discrimination in Employment and Occupation adopted by the International Labour Conference in 1954 was ratified by the Australian Government, thus effectively abolishing in Australia discrimination in employment and occupation. The Convention defined discrimination as "any distinction, exclusion or preference made on the basis of race, colour, sex, religion, political opinion, national extraction or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation". The terms "employment" and "occupation" include access to vocational training, access to employment and particular occupations and terms and conditions of employment.

In July 1974, the Australian Prime Minister invited the Minister for Defence to assess the nature of servicewomen's present and future roles in the Defence Force. He stressed the objectives of IWY as improving the status of women by, amongst



other things, achieving equality of opportunity between women and men, and ensuring the integration of women in society by emphasising their responsibility and role in the economic, social and cultural development of Australia and in international spheres.

Later in 1974, the Prime Minister advised the Minister for Defence that it was his Government's intention to accede to the 1955 Convention on the Political Rights of Women, and that this would extend to women the basic right to accept and hold public office on equal terms with men. In his letter, the Prime Minister stated his concern that "there are at present certain aspects of the organisation and establishment of the Australian Defence Force which would bring Australia into breach of the Convention". He mentioned in particular the exclusively male orientation of the Service Colleges (which prevents women from receiving training appropriate to the top positions within the Services), and the different pay and employment categories allocated to men and women.

In replying to the Prime Minister, the Minister for Defence stated that he was opposed to discrimination against women in the Defence Force. However, he considered that Australia should enter a reservation to the Convention in relation to the Defence Force regarding military tasks which require the physical capacities of men and the employment of women in occupations for possible action in a combat area. In supporting his view that his reservation to the 1955 Convention could not be regarded as discrimination, the Minister quoted from Article 1 of the Convention on Discrimination in Employment and Occupation, which states that "any distinction, exclusion or preference in respect of a particular job based on the inherent requirements thereof shall not be deemed to be discrimination".

Against this background, two Defence Working Parties were formed. Their reports have now been rendered and the outcome of both will have a major effect on the Women's Services.

One Working Party was charged with examining the basis of female pay fixation, using the principle of equal pay for work of equal value as the overriding guideline. As yet, no decisions have been reached regarding the completed report.

The second Working Party was required to develop a co-ordinated policy on all aspects of the employment of servicewomen. It is on this subject I would like to concentrate because the future role of servicewomen will be determined by the employment review.



## THE FUTURE – A HOPEFUL SCENE

The Australian Government is resolved that its actions and philosophies, which are, in essence, the elimination of discrimination against women in employment and occupation will apply in the Defence Force. In setting about its task therefore, the Working Party was bound on the one hand by the necessity to pursue as far as possible the Government's employment policies, and on the other, by the Australian reservation to the Convention on Discrimination in Employment and Occupation. As a consequence of this, Defence policy is that servicewomen will not be allowed combat roles in combat areas, and at least for the immediate future, women will not be enrolled in the Service Colleges at Duntroon, Point Cook and Jervis Bay.

Both these constraints could inhibit to a significant degree the full and effective utilization of female manpower. Contradiction can be seen in policies of occupational equality when women are prevented from gaining the experience and expertise essential to the implementation of such equality.

Common sense dictates that a direct combat role for women is not yet acceptable to Australian society or to the Australian Defence Force, but arguments denying female officers a military education similar to that of male officers are difficult to find. However, partial reconciliation of the somewhat confusing principles is relatively easy. The view could be taken that selectivity is not only justified in the Defence Force because of the nature and purpose of the Force, but is also the sensible approach in limiting the pressures of a changing external social environment, thus alleviating but not ignoring the need of the military to recognise, incorporate and apply these changes.

That there is discrimination against women in the Australian Defence Force is undeniable, but there are realistic steps which could be taken to achieve equality of employment opportunity whilst maintaining the basic premise that it is not acceptable for servicewomen to engage in combat duties.

Government policy could be altered to allow:



- a. employment of servicewomen on active service in Australia and overseas,
- b. abolition of the current female establishment ceilings (leaving the single Services control of individual manning requirements),
- c. recruitment of men and women against a common establishment in each Service, and competitive and common promotional bases,
- d. expansion of both officers and other ranks' career structures for servicewomen by:
  - (i) permitting female officers to undertake specified career training, specialist training, advanced specialist training, and staff courses, and be employed in duties commensurate with that training, and
  - (ii) opening the range of employments to other ranks' servicewomen, particularly in the Navy and Air Force, and
- e. adoption of a common approach to training of female officer trainees.

Any examination of service employments is impossible to conduct without consideration of conditions of service which affect employment. Hand in hand therefore, with an employment review, must go a study of major differences in conditions of service which currently exist between servicemen and servicewomen. Some of these matters are female officer rank titles in the Navy and Air Force, retirement ages for female officers viz-a-viz their male counterparts, retirement ages for other ranks' servicewomen, consideration of the entry of married women, periods of appointment (officers) and engagement periods (other ranks) and investigation of servicewomen's benefits and entitlements such as removals, gratuities, housing, accommodation and so on.

If all this comes about, it will go a long way towards removing discrimination against servicewomen. Reasoned and realistic implementation is essential to avoid managerial headaches, because regardless of the altruistic motives aimed at achieving employment equality, inherent differences between the sexes are not overcome by Governmental decree or executive decision.

Acute problems, particularly in the career and promotion patterns for female officers, are bound to arise. The dominant male atmosphere of the Services and the sometimes parochial attitudes of servicemen towards intruders, in this case servicewomen, will need to change if equitable occupational opportunities for servicewomen are progressed. Servicewomen will need to become more professional in their service knowledge, outlook and attitude and will need to accept that equal opportunity will carry no privileges. The Defence Force itself will need to be satisfied that the con-

siderable investment required to implement its policies will be in the best interests of the purpose of the Force.

This is an appropriate point for briefly stating my thoughts regarding the future, because I feel that in my present appointment, my professional advice and action influenced by my personal opinions, will have some bearing on what happens.

I believe that we cannot disregard the changes that are occurring in society and that must inevitably be reflected in the Defence Force. I am optimistic that servicewomen will be allowed to make a proper contribution to service manpower requirements, and they will be given every opportunity to demonstrate their undoubted abilities. I am hopeful that management has the strength of purpose to capitalize on the capacities of all personnel, and that equality for servicewomen will be willingly accepted. I predict that the moves made in International Women's Year to eliminate discrimination against servicewomen are the first of many, and that, in the long term, there will be no reason for the Women's Services to exist as entities within their parent Services.

Women now have a recognised and permanent place in the Armed Forces and over the years, their loyalty and hard work have earned the Women's Services a deservedly high reputation. After an apprenticeship of 25 years, the opening of a Pandora's box of occupational opportunity for servicewomen can only mean that they will achieve their full potential in contributing to the manpower requirements of the Defence Force.



\* \* \*

*"The first point to remember about the Australian island-continent is not that it is a continent but that it is an island" — T. B. Millar*

\* \* \*

*"He that Commands the sea is at great liberty and may take as much and as little of the war as he will" — Francis Bacon*



UNITED STATES NAVAL INSTITUTE  
ANNAPOLIS, MARYLAND 21402

30 September 1975

Commander W. B. Loftus, Royal Australian Navy  
Secretary  
The Australian Naval Institute  
P. O. Box 18  
Deakin ACT 2600  
Australia

Dear Commander Loftus:

On behalf of the President, the Board of Control, the staff and the membership of the U. S. Naval Institute, it is my privilege to convey to you and your organization our congratulations on the occasion of the founding of The Australian Naval Institute, and the publication of the first issue of your journal, and to extend a most cordial welcome from our professional society.


We of the staff of the Naval Institute have read with special interest and approval Volume 1, Number 1, of your journal and, as may be judged from the excellence of that initial effort, we look forward to a long and professionally satisfying exchange of matters of mutual benefit.

To that end, be assured that our Board of Control and staff will be pleased to cooperate with the Australian Naval Institute in any manner which may appear useful and appropriate. Indeed, may we, at the very outset, suggest that an exchange of our journals be established as a logical, valuable means of ensuring an uninterrupted exchange of ideas between our respective forums. We shall be pleased to place the Australian Naval Institute on our roll of esteemed professional organizations with which we presently exchange publications.

Meanwhile, our thanks again for your letter and for the opportunity to read your journal, which we consider to be a superb beginning for what we predict will be a significant addition to the field of naval and maritime publishing.

With best wishes and most respectful regards, I am

Sincerely,

  
R. T. E. Bowler, Jr.  
Commander, U. S. Navy (Ret.)  
Secretary-Treasurer  
and Publisher



The Australian Naval Institute  
P.O. Box 18  
DEAKIN ACT 2600  
AUSTRALIA

10 October, 1975

Commander R.T.E. Bowler, Jr., USN  
Secretary  
United States Naval Institute  
ANNAPOLIS MARYLAND 21402  
U.S.A.

*Dear Commander Bowler*

Thank you indeed for your kind letter of 30 September, 1975 in which, on behalf of the President, Board, staff and members of the United States Naval Institute, you wished us well in our venture of starting our own naval institute. I am sure it has not escaped your notice that our aims and objects bear a close resemblance to those of the US Naval Institute. Indeed in the setting up of our organisation we have constantly had before us the example of the US Naval Institute. You will understand therefore how much we appreciate your good wishes.

Of course we are starting in a very modest way, but I seem to recall that the US Naval Institute commenced in 1873 with only fifteen members. Its growth since then to an organisation of international repute and undoubted high standing in the naval and maritime professions must be a constant source of gratification to all connected with it. We shall seek to emulate your remarkable progress. In one respect we have begun well as the original idea to found both naval institutes came from a Commodore Parker - in your case Commodore Foxhall Parker and in our case, a century later, Commodore Vernon Parker who is now our first President.

We would be delighted to participate in an exchange of journals on a regular basis and to co-operate with the US Naval Institute in matters of mutual assistance and benefit. I am sure that this is only the beginning of a long and fruitful relationship between our two organisations.

On behalf of the President, Council and members of the Australian Naval Institute may I thank you again for your interest and good wishes.

*Yours faithfully,* *W.B. Loftus*  
(W.B. LOFTUS)  
Commander, RAN  
Honorary Secretary



# Naval Air Power and the R.A.N.

by

COMMANDER H. J. DONOHUE RAN

*'The whole aspect of sea war is so utterly changed by the prodigious and daily development of aircraft ...'*

*—Admiral Lord Fisher, 1919*

## INTRODUCTION

At the review of the Royal Navy at Spithead in July 1914, five flights, totalling eighteen seaplanes flew past in formation. The air arm then was only just noticed beside the huge fleet of Dreadnoughts and other types of warships and was not really taken seriously. A few, notably Lord Fisher, believed that aircraft and submarines would revolutionize naval warfare, but the general opinion was that sea power depended completely on the Dreadnought battleship with its attendant warships. The rate of development of aircraft during the First World War had been rapid and by the end of the War, although the battleship remained the unit of sea power, the Navy generally accepted that the aircraft's influence would increase substantially in the years to come.

Air power came into its own during the Second World War. The Japanese were the first to understand that it was now aircraft not ships that came first in the war at sea. To the Japanese, and then the Allies, command of the sea automatically meant air superiority over it. The great carrier battles of the Pacific confirmed that carrier-borne aircraft had replaced battleships as the units of sea power.

Although they were the new capital ship, there was a great shortage of carriers and hence a fear of losing them. This fear was justified as the carrier was also proving very vulnerable not only to air but also to submarine attack. Forty-one aircraft carriers were sunk during the war; aircraft and submarines disposed of nineteen each, while ships were responsible for three.\* However aircraft carriers had played a dominant part in the Second World War. The role of ships became one of carrying air power to sea, of co-operating with aircraft in the exercise of sea power and finally of exploiting the use of sea when command of it had been won.

What is the place of naval air in the future? Any discussion on this subject generally becomes

emotive, varying from one extreme to the other. Opponents may say the role of the carrier is outmoded; it has outlived its usefulness and has become a financial, manpower and logistic burden. The pattern of warfare has changed and so must the nature of the vehicles required to combat the new threat. Those in favour note that the navy's primary weapons for strike, reconnaissance and defence are provided by 'built in' air power — everything depends on it. Maritime aggression cannot be met without ship-borne combat and early warning aircraft. Whatever the military justification for carriers, in the present economic climate, the majority of navies need to examine any requirement for naval air very carefully before committing funds.

What then is the place of naval air-power in a Navy like the RAN? To address this problem it is intended to examine the role of naval air since 1945; look at the threats to stability in the Australian area of interest and the likely use of naval forces; and finally, examine the requirement for an Aircraft Carrier. The need to operate aircraft at sea must depend on the individual country's national policy and hence its military strategy. Although the general

## THE AUTHOR

Commander Hector Donohue RAN was born in 1939 at Devonport in Tasmania. He joined the RAN as a Cadet Midshipman in 1959, graduating two years later. Commander Donohue sub-specialised as a Clearance Diving Officer in 1969 and also sub-specialised in Torpedo—Anti Submarine in 1964. Following three years exchange service in the Royal Navy including service in the Londonderry Squadron as TASO of HMS *Hardy* and as Long Course Officer for the RN MCD Officers' Course he returned to Australia and service in Navy Office on the staff of the Director of Underwater Weapons. He served as Executive Officer of HMAS *Swan* during her first commission and after a short period when he was OIC of the RAN Diving School, he returned to UK in 1971 to serve as Staff Weapons Officer to ANRUK. Commander Donohue completed the RN Staff Course, Greenwich 1974-75 and is currently serving in Defence Central, Canberra.

\*Donal Macintyre, 'Aircraft Carrier the Majestic Weapon', p 152.



aspects of the operation of naval air by the two major users since the Second World War, USA and Britain, will be discussed to put the subject in focus, the requirement for an aircraft carrier will be looked at from the Australian point of view. Consideration will be given to a possible option of carrier open to a country such as Australia and its capability will be discussed to determine whether it has a place in Australia's defence inventory.

### NAVAL AIR SINCE 1945

#### Initial Policies

The British ended the war with seven fleet carriers, five light fleet carriers and thirty-eight escort carriers; they had twenty new carriers building. The United States ended the war with twenty fleet carriers, eight light fleet carriers and seventy-one escort carriers.<sup>†</sup> Both navies consequently had adequate resources to continue developing the art.

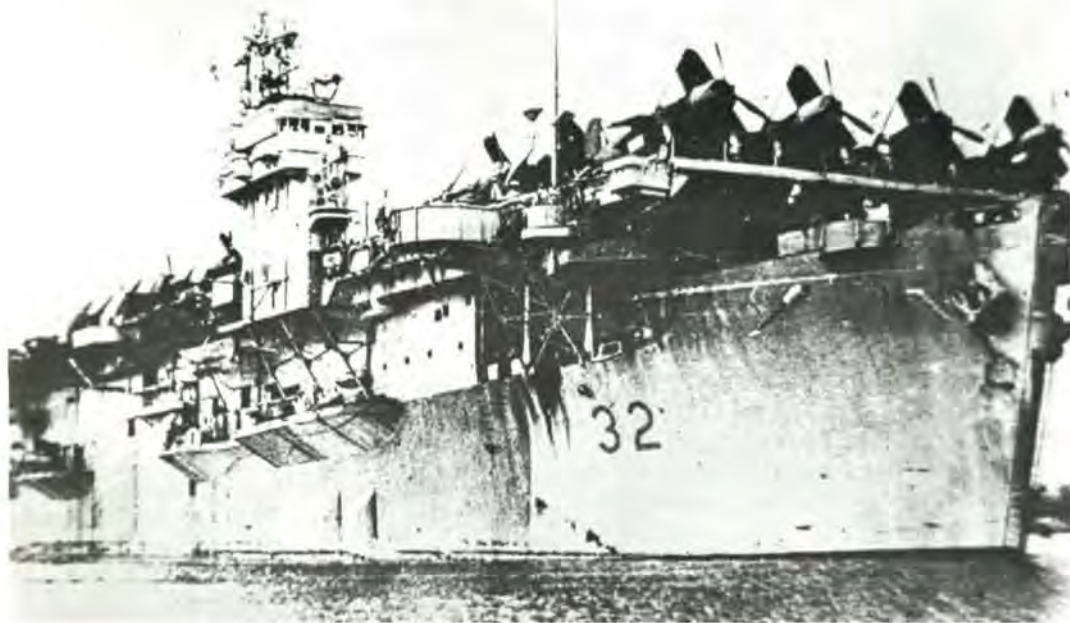
By 1950, on the eve of the Korean War, the aircraft carrier was accepted in the Royal Navy as the backbone of the fleet. British naval air policy, with USSR as almost the only potential enemy, was to put anti-submarine warfare first followed by the

<sup>†</sup>Ibid p 153.

air defence of the fleet and convoys, and finally air strike against land or ship targets. New aircraft were being developed and the Commander-in-Chief Home Fleet flew his flag from an aircraft carrier.

The ownership of the atomic bomb changed the concept of war in the USA. The United States was trying to maintain a military posture, assimilate the lessons of the Second World War, accommodate the facts of the atomic age and reduce military forces. There were two very different attitudes to air power. The strategic bombing advocates saw little need for a strike carrier and, with the cancellation of the USS *United States* in 1949, it was rumoured the navy was to be reduced to a convoy-and-escort force.

The US Air Force considered that warfare in an atomic age gave overriding importance to air power. Ground and naval forces were subsidiary; the only way to prevent a war was to concentrate great strength in atomic weapons and the superlative aircraft to fly them. The navy held the view that whilst air power held the key to victory, the enemy held the initiative and could choose the time and place for a future war. The military forces should therefore be mobile, balanced and flexible, capable of handling a variety of threats.



WORLD WAR II ESCORT CARRIER



## The Korean War

The war in Korea was the factor which decided the future of the carrier in the US. When the fighting broke out in 1950, the aircraft carriers *USS Valley Forge* and *HMS Triumph* were in the Far East. They were used on both coasts of Korea to strike at shore targets. This was maintained by relays of aircraft carriers for the three years until the armistice.

Aircraft carriers in Korea were used almost entirely to support operations on shore and to help keep air superiority. They also maintained a blockade and prevented any enemy movement by sea. The enemy's few ships never seriously challenged the United Nations' complete command of the sea and this was largely due to the cover provided by the carriers. By 1953 the USN had eighteen carriers in commission of which eleven had seen service in Korea.

By this time four more countries had acquired aircraft carriers. Australia, whose *HMAS Sydney* served in Korea, Canada, France and the Netherlands. Considerable research and development had gone on during the war to allow jet aircraft to land and three British developments: the angle deck, mirror landing aid and steam catapult solved most of the problems.

## Post Korea

By the mid 1950's the B52 strategic bomber with inflight refuelling could reach any target in the world. The concept of strategic bombing by carrier planes was therefore out of date before it could be put into practice. However, with the signing of the North Atlantic Treaty, the sea communications across the North Atlantic became of increased importance to the US. The strategy was devised of commanding the sea by making a devastating carrier-borne attack on the enemy's bases. The task of the US Navy was to ensure the 'strike fleet' could successfully complete its mission.

British progress during and after the Korean War was substantial but on a much reduced scale compared to the US. In 1956 the RN fleet of three carriers combined with two French carriers was used in the Anglo-French intervention against Egypt to gain air superiority and to support the landings. This powerful carrier force showed its value not only for the aircraft but also for the command and control facilities. A carrier rightly was the centre of the complete task force.

The British decided the mobility of a carrier could be exploited to deliver their nuclear weapons. Whilst not considering an attack on the scale of the US, the British concept of operations was for the carrier to approach the coast unannounced, launch its aircraft under the radar coverage and deliver the attack using toss-bombing. This technique was also to be used for anti surface shipping.

The helicopter had also come into its own at sea. It was used to carry a dipping sonar for anti submarine tasks and the idea of ferrying troops ashore was proven at Suez. The US developed carrier based 'hunter-killer' anti submarine task groups, using fixed wing ASW aircraft as well as helicopters.

The USN in the early 1960's, based on the large super carrier, was a most powerful force. This carrier had a devastating nuclear strike capability; with replenishment at sea, it had world wide endurance and could strike any place on earth which was within one thousand miles of the sea. It had substantial conventional weapon strike power and had the capacity to defend itself from air attack. It was a flexible force able to carry out many roles.

## The Role of the Carrier To-day

By the mid 1960's a number of doubts on the role of the carriers were beginning to come to a head. Firstly the nuclear deterrent role was queried. The increasing number of ICBM's and the Polaris submarine force, both being relatively invulnerable, made them greatly superior to a carrier-borne aircraft as a means of delivering the deterrent. The role of nuclear deterrence was therefore deleted from the carrier force. The commanding of the sea by preemptive strikes on Soviet Territory also was in doubt as the Russians gained a nuclear capability. The mounting of such an attack could cause retaliation and an escalation to all-out nuclear war and was no longer a valid strategy. The number of Soviet submarines at sea, especially the tactical cruise missile types, the new air to surface missiles and long range surface missiles re-inforced the vulnerability of such a large asset as a carrier.

The carriers could still give air support to NATO forces ashore but in 1962 they became involved in limited action which can now be considered their principal role. The first was the blockade or 'quarantine' of Cuba and the second was the Vietnam war where carriers were used as in Korea. Again the flexibility of this force was demonstrated and today remains as the centre of the USN fleet.

The British carrier force by the mid 1960's, although much smaller than its American counterpart, was still a powerful force. The nuclear strike role was not really taken seriously and their role became more and more one of limited war. Kuwait, the East African mutinies, the evacuation of Aden, and the Indonesian confrontation, all utilised to good effect the aircraft carrier. The RN saw the role of the carrier as reconnaissance, tactical strike, close support and air defence for amphibious operations. The rising cost, the ending of the British presence East of Suez and the doubts about the





## ...at sea

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effectiveness of one carrier with about thirty aircraft to support a landing caused the British Government to decide not to replace its carrier force. They have commenced building a 'through deck carrier' or 'anti submarine cruiser' to provide a platform for Sea King helicopters. The ship is also capable of operating Harrier fixed wing aircraft.

### **The Platform**

The high cost of a modern carrier and the introduction of the vertical/short take off and landing (VSTOL) aircraft has given rise to considerations of a cheaper hull known generally as a seaborne aircraft platform. The USN called the concept a sea control ship and had a preliminary design for one. It was to be an austere ship of about 14,000 tons capable of operating VSTOL aircraft and helicopters. It would not require catapults or arresting gear. The number of aircraft was intended to give limited air defence and permit limited strikes against surface targets. The ship would be employed in complementary and supplementary roles to that of the attack carrier in low air threat areas. Although \$29.4 million was made available for the design and development of a mini-carrier (The Navy asked for \$143 million),\* the concept has now been abandoned.

This basic concept of a cheap carrier has attracted attention from many navies and of course was the rationale behind the conversion of merchant ships i.e. the escort carrier, in the Second World War. Before examining its possibilities in detail, the role of naval forces in future warfare will be considered.

## **FUTURE NAVAL WARFARE**

### **The Possibility of War**

In the nuclear age, neither the US nor the USSR can win a general war; their massive nuclear arsenals have guaranteed mutual destruction. Although in basic ideology and principles the two countries are opposed and therefore likely to be aligned on opposite sides, they have a mutual interest to prevent major conflict. If a limited war involving their allies or proteges did occur, such as the Arab-Israeli October 1973 War, it should be in their mutual interest to keep it to as low intensity as possible. The super powers can eventually be expected to join forces to stop any war for fear of involvement if it looks to be escalating dangerously.

War as an instrument of policy therefore can only be used at a very low level to ensure a level relatively safe from nuclear escalation. Wars of more dangerous levels can only have a short time to achieve their aim because the super powers will in-

fluence the antagonists, for their own safety, to bring it to an end.

Over the past thirty years Western powers have been involved in a number of conflicts involving internal security operations, counter insurgency and limited war. A distinctive pattern emerges from a study of these. Operations of a low intensity where escalation to a dangerous level was avoided have generally been drawn-out affairs e.g. the Indonesian Confrontation. International clashes where limited war is involved have tended to be over quickly e.g. Pakistan-Indian War 1971. The Korean War and Vietnam War are exceptions but these may be considered as special examples of low intensity operations as only one super power was directly involved. These operations were also intensified in a very cautious manner to prevent escalation.

The possibility of a general war in the current political climate remains remote. However, limited war and lesser conflicts continue to occur in this changing world; the lower the intensity, the longer it will last.

### **South East Asian Stability**

The turbulent history of South-East Asia since the Second World War provides little support for a view that the region will be free from trouble. The internal conflicts and international clashes of interest which have been responsible for the disturbances over the past thirty years can not be expected to cease immediately. Whether trouble in the area will cause great power conflict will depend on how and to what extent the great powers will permit themselves to become involved.

The 'Nixon Doctrine' emphasising primary Asian responsibility for coping with insurgency and the strong view held by most Americans that there should be 'no more Vietnams', greatly reduces the possibility that US forces will be drawn into fighting insurgency in South-East Asia. Even if the insurgents receive substantial support from outside, the only likely way to cause US military ground forces to be committed would be overt military aggression by USSR or China.

A possible scenario could be conceived in which the People's Republic of China would commit its forces outside its borders, say in Thailand, but there is little evidence that such action is probable. Whilst China may be happy to support 'people's wars' covertly, the country is most unlikely to commit its forces which are primarily defence oriented and not equipped, at present, to conduct large scale warfare at any distance from China's borders. The Soviet threat to the Northern border would also inhibit military moves to the south of China.

\*Aviation Week & Space Technology. 26 August 1974.



The Soviet Union, although keen to expand her influence in the area, does not have a large enough interest to risk a major war. (The Sino-Soviet confrontation is not considered in this context). Japan has established a rapprochement with China and increased her diplomatic links with the USSR. She is unlikely to increase her military role, especially when the general pacifist inclination of the country is considered. However, Japan's requirement to secure the sea-lanes if Indonesia should go ahead with its 'Archipelago Doctrine' may influence their non-military posture.

Although there is little prospect for a major war in the region, the countries in South-East Asia are faced with threats to their orderly growth as independent nations. In Indochina, a lasting peace has yet to be achieved. A new outbreak of hostilities could be envisaged in Korea; further strife between India and Pakistan, and further disputes between the Philippines and Malaysia. These events are possible rather than probable but increase the chance of turbulence in the region. The communist inspired/nationalist insurgency problems in Burma, Thailand, Philippines and Malaysia are also potential sources of instability in the region.

### Maritime Threats

The claims that there can be no direct threat to the Australian mainland would appear to be well founded. However, the sea-lanes used by shipping to and from Australia and vital to the nation's economy are not necessarily free from interruption of their innocent passage. The vast expansion of the Soviet Navy and its influence world wide must be remembered in this context. If the Soviets wish they could initiate a deliberate policy of naval interference at sea for political or economic reasons.

Activity at sea throughout the world is increasing and the whole maritime environment is becoming busier and more competitive, more surveyed and more regulated. With the changes in technology and increasing sizes of ships and their density, pollution, if a VLCC founders, is a very real consideration for states owning narrow straits. Fishing is becoming more intensive; oil and minerals are being found at the bottom of the sea. The requirements for free passage and the question of ownership of resources is a probable cause of future friction in the South China Sea and East Indies. The Chinese invasion of the Paracel Islands because of the oil is the first example of this. As a major owner of seabed and sea resources, their protection is of vital interest to Australia.

The problem is exacerbated both by international pressures to own or control resources and the proliferation of national naval forces under the control of perhaps unstable or unpredictable governments near the areas of interest and trade routes. These smaller navies are obtaining sophisticated equipment and weapons. Backed by land air forces they can pose a potential threat to shipping. The oceans were thought of as infinite but most nations now realize their finite nature. There are new politics on the seas: extension of territorial waters, fishing zones, national sovereignty have divided countries. The considered right to deny access to large merchant ships, naval forces, submarines are all sources of potential dispute.

### Australia's Defence Policy

Australia's current foreign policy is difficult to summarise but basically aims to retain national security, strengthen collective defence treaties, promote peace and prosperity in the neighbourhood, and help in the defence of South-East Asian countries. 'On the assumption that there will be no major international conflict involving Australia in the next ten years, Australia's resources will be used to ease tension'.\* This will entail increased economic and military aid to try and prevent the causes of conflict and discontent in the region.†

The Australian Government considers that Australian mineral resources will provide an ever-increasing influence in the shaping of foreign policies of other countries, especially in a world suffering from a shortage of minerals. Also, the Australian Government considers that 'Australia—the richest, most powerful and most advanced country in a part of the world that is otherwise empty of influential states'\*\*, is in a strong position to bring stability to South-East Asia. Therefore, Australian foreign and defence policies will concentrate on diplomacy before defence.

This emphasis on diplomacy has concentrated Australia's defence forces within mainland Australia. Isolationism is not the intent of this policy, although the virtual withdrawal of Australian armed forces from South-East Asia has resulted. Australia must retain the ability to act alone for brief periods and defend the mainland as well as the shipping lanes which are vital to her survival.

\*Mr. E. G. Whitlam, Prime Minister and Minister for Foreign Affairs, Canberra, 24th May 1973.

†Mr. L. H. Barnard, Minister for Defence, Canberra, 23rd May 1973.

\*\*Mr. E. G. Whitlam, Prime Minister and Minister for Foreign Affairs, Canberra, 27th January 1973.



As the current Government's policies draw Australia more and more away from the West, and towards a more individual approach and greater alignment with the Third World its defence forces can expect to be employed: in coping with intrusions into territorial waters and fishing and resource zones; providing support to civil authorities; providing a credible deterrent to harassment or interference with assets under Australian sovereign control; and in the last resort, protecting Australia and its immediate environment.

### **The Role of Sea Power for Australia**

Arguments to support the need for Sea Power in Australia must be general ones. The area of Australia's prime interest is a turbulent one and as the power base changes, so can the threat to Australia's interests. The need for a strong navy in a nation which has some influence in the area may not always be obvious. However, apart from the provision of security of the country, the contribution to foreign policy and the security of trade must be noted. In the final case it is the insurance against the failure of policies to solve problems peacefully.

Australia will always rely heavily on sea lines of communication. The last decade saw a trebling in the volume of Australia's goods shipped overseas, and a doubling in the volume of trade shipped interstate. The security of the Pacific and Indian Oceans and coastal trade routes is essential to the nation's economic wealth. The role of the Royal Australian Navy must be to provide the sea power which protects Australia's trade at sea and to deter any aggression and should there be an attack, to respond effectively. Up till now the navy has had an aircraft carrier, *HMAS Melbourne*, and is used to having naval air power to assist in its roles.

### **THE REQUIREMENT FOR A SEABORNE AIRCRAFT PLATFORM**

#### **The Role of the Aircraft Platform**

The problem of the place of naval air in Australia assumes some urgency, as *HMAS Melbourne* will be at the end of its active life in the early 1980's and a decision on a replacement will have to be made very soon. In a country which spends some 2.6% of its Gross National Product on defence, amounting to \$1200 million in 1974/75, the acquisition of modern carriers is beyond its even wildest dreams. The current British equivalent, the Anti-Submarine Cruiser is rumoured to cost in the order of \$170 million, discounting aircraft costs. Judging from the US Navy estimates of \$143 million, the US concept of Sea Control Ship is beyond Australia's resources.

However, naval air power is important to a country such as Australia with long sea routes and vast coastlines. Given a suitable platform, manned aircraft may be deployed wherever active intervention of tactical air power or the threat requires. Naval aircraft can make long range reconnaissance of a land base and can provide quick reaction close air support. They can also provide all means to 'hack' the shadowing enemy aircraft on reconnaissance in passing vital fire control information to a cruise missile fitted ship or submarine.

The aircraft carrier is the most complete projection of maritime power yet devised. It has an excellent strategic value and as well as reconnaissance, early warning and fighter defence, it can provide a flexible anti-submarine force; it also has the capability to support land forces. The value of air power (although not carrier borne) was well illustrated in the Turkish invasion of Cyprus in 1974. The considerable number of submarines possessed by USSR threaten the continuing function of maritime activity both commercial and naval. The anti submarine helicopter provides a major contribution to combatting this threat. To maintain credibility as a deterrent a navy must be able to deploy helicopters on as wide a basis as the submarines which they seek to destroy.

History has shown that there is nothing static in international relations. Although the Australian Government's emphasis is on diplomacy, if the country's point of view is to be considered in any regional or world forum it must be negotiated from a position of strength. Only the mobility and striking reach of a floating airfield in the shape of a carrier can swiftly and effectively deal with an emergency or situation requiring a show of strength. Australia may not be able to afford the full spectrum of defence capabilities and therefore some rationalisation is required. With the isolationist type of policies being pursued by the Government and the virtual disappearance of an effective defence alliance in the area, this rationalisation must take part within the individual Australian services.

Air power is one area for such rationalisation and given suitable aircraft, the roles of air defence, fighter ground support, reconnaissance and naval offensive air power could be combined. Apart from the operational aspects, logistics, maintenance and training costs could be much reduced. A discussion of whether the air-force or navy should provide the pilots for such aircraft is not the purpose of this paper and will not be considered. Australia's economic situation makes it obvious that she cannot afford to build or buy a conventional aircraft carrier like *HMAS Melbourne*. If seaborne air power is to be maintained in the RAN, another type of plat-



form must be utilised. Before discussing the platform, the capabilities of the aircraft which can be flown from a deck without catapult and arrestor gear facilities will be considered.

### The Harrier Type Aircraft

The design concept of the Harrier arose in 1957 during studies undertaken by Hawker Siddeley Group Ltd (now Hawker Siddeley Aviation Ltd) aimed at evolving a lightweight Vertical and Short Take Off and Landing (V/STOL) strike/reconnaissance aircraft. By 1962 prototype aircraft had flown and the UK, US and West German Governments agreed to fund the procurement of nine aircraft to assess the practical merits of jet V/STOL operation. By 1963 no problems of an insurmountable nature had emerged and when the joint evaluation-squadron disbanded, the concept of V/STOL by vectored thrust jet aircraft was proven.

In considering the concept and effectiveness of the Harrier type of aircraft for use by a 'rationalised' Australian defence force, the ground based, as well as the seaborne, aspects must be taken into account. There are systems and features in the aircraft arising from V/STOL that lead to increases in cost and weight which are indisputably additional to the corresponding numbers appropriate to an equivalent conventional aircraft. However there are features and applications which make this type of aircraft superior to an equivalent contemporary which may require in excess of 5,000 feet of hard runway.

In normal peacetime operation, the Harrier type aircraft can enjoy the benefits of operating from the standard air stations already in existence. Excursions into the field, operating from unprepared strips at VTOL sites would only be done as an exercise. In a time of tension the force could be disposed at minimum notice. Disposed sites can be supported, pre-stocked or unsupported. This is of particular value in a large continent such as Australia although the unsupported sites would need to be near a maintenance area (seaborne aircraft platform?).

Once dispersed, the force is almost completely hidden. Missile air defence of the sites is both unnecessary and undesirable. Experience in Europe has shown that detection of such sites has been extremely difficult and presents the enemy with an enormously increased surveillance and detection effort. Similarly, the parent main base of a Harrier force need not be defended to the extent necessary to ensure survival of a conventional force.

Its ability to operate away from standard bases can place the V/STOL aircraft much closer to the area of interest. The choice of operational area

in Australia (and Papua New Guinea) is thus very wide and as the aircraft should be deployed near the operational area it should have a much more rapid response time than the conventional equivalent. Given short take off (STO) conditions, the weapon load/flight time is not degraded and could be considered better if the aircraft is deployed. The carrier could be used to deploy and support the aircraft ashore, much in the way a commando carrier operates its helicopters.

This aircraft is probably the first truly common multi-service aircraft. It is certainly the only tactical jet aircraft which can operate, without a single design change being necessary, from both land bases and ships at sea. The aircrew and maintenance personnel do not require any further extensive training to operate in either role and, of course, the seaborne platform does not need to be as large as a conventional carrier nor does it need the catapult and arresting facilities. For long-term operations at sea there are some modifications needed: elimination of magnesium components in the engine and air frame; provision of rapid tie down arrangements and hold back facility. The aircraft would also need a modification to avionics to delete the inertial navigation system and incorporate in lieu a forward looking radar and navigation system.



The Harrier is applicable to a wide range of ships and to date has operated successfully from 10 different ships ranging from 75,000 to 6,500 tons with flight decks varying from 1,000 ft length (USS *Independence*) to 98 x 56 ft (*Andrea Doria*). Trials have shown that the aircraft is capable of operating from a moving deck to approximately the same limits as naval helicopters. A flight deck length of about 600 ft, in the free take off or STO mode, will allow the aircraft to achieve maximum mission performance capability with full capacity ordnance load.



The US Navy purchased about 100 of the aircraft and have operated them from USS *Guam* to prove the concept of the Sea Control Ship. Their experience has proved the aircraft's remarkable reliability and two aircraft airborne continuously and one at immediate stand by out of a total of five aircraft is most realistic. One other interesting factor from their experience has been the use of the vectored thrust in forward flight to give the aircraft vastly improved performance in an aircraft versus aircraft role.

The aircraft's overall performance could possibly be compared in conventional terms to the Skyhawk. However, the advanced Harrier with uprated engine and increased range and weapon capability would probably be more suitable for a multi-role aircraft. Although the aircraft would not perhaps meet all the air-force or naval requirements in European or North Atlantic environments, it has many attractions for a country such as Australia.

A variety of armament and operational equipment, including cannon, bombs, air-to-air and air-to-surface missiles and reconnaissance passive equipment could be carried. The low level speed of the advanced Harrier is over 640 knots with a Mach 1.3 number in a dive. Ceiling is more than 50,000 ft with range and endurance with one in-flight refuelling of more than 3,000 miles and seven hours.\*

Since the advent of the first operational jet fighters some 25 years ago, technical progress in the offensive power of tactical aircraft has been formidable. Technology can now provide a literally awesome capability in attack, even with conventional weaponry. But the price of this has been paid in greatly increased complexity and the consequent dependence on sophisticated maintenance equipment. For a country faced with only a conventional threat and a wish to provide a credible capability amongst relatively unsophisticated nations, this type of aircraft cannot be ignored.

### Anti-Submarine Warfare

A significant aspect of Soviet naval strength lies in its submarine fleet comprising about 380 submarines, of which three-quarters are long range ocean-going types, capable of operation almost anywhere in the Atlantic or Pacific. This impressive Soviet submarine force, like the rest of the fleet, has been undergoing extensive modernisation and has rapidly increased in recent years. Older submarine types can be expected to be given to smaller nations and the potential threat posed by the USSR or nations under its influence cannot be ignored by Australia.

As well as long range maritime patrol aircraft (two RAAF squadrons of P3B Orions and SP2H

Neptunes) the RAN operate the S2E Tracker ASW aircraft and Mk31B Wessex helicopters. Sea King ASW helicopters are currently being delivered. Maritime patrol aircraft can provide an effective contribution to the detection and destruction of submarines but are limited by range. As was found in the Second World War and proven in exercises since, carrier based aircraft are an essential component of the forces required to combat the submarine.

With the ranges and areas involved the active sonar of helicopters has a limited role in area surveillance and must be complemented by fixed wing aircraft. The passive sensors controlled and operated from the Tracker and its follow-on aircraft are possibly more suited to the future ASW battle. They are also most suitable for any surface surveillance operation which is an equally probable task in the Australian area of interest.

An aircraft which has potential for operating from a basic deck at sea to fulfil these roles is the Canadian CL84. This is a twin engined tilt wing V/STOL aircraft which first flew in 1970. The Canadian Armed Forces have now successfully evaluated the concept. Their programme included gun firing trials in the hover, conventional and slow-speed-tilt-wing flight. The aircraft conducted a series of trials from USS *Guam*, first flying on some 17 miles off the Norfolk coast. A second aircraft has undergone joint UK, US and Canadian trials concerning terminal area guidance and control and the evaluation of design parameters as they might apply to shipboard use.

In terms of a potential production model of the CL 84, emphasis has shifted to an advanced aircraft using two turboprop engines. This version, known as the SCS CL84 has been designed to meet ship-based ASW and radar surveillance requirements, operating from a short deck where mission profiles require STOL or VTOL operating modes. The dimensions of the aircraft with wings folded is estimated as 27 ft. wide x 51 ft. long x 19 ft. high. (The Sea King stowed is 16 ft. wide x 57 ft. long x 15 ft. high). It has an empty operating aircraft weight of 16,500 lb. and a maximum weight for short take off (250 ft. deck, zero wind or 20 kts) is 36,000 lb. It will be designed for a maximum level speed of 375 kts. and best endurance speed of 220 kts. Ceiling will be 30,000 ft. and range with 7,000 lb pay load is in the order of 1,400 miles or 6 hours endurance.†

This type of aircraft would be ideal for ASW surface surveillance, and electronic countermeasures (ECM) operations from a simple base such as the Seaborne Aircraft Platform and would be an appropriate follow-on aircraft to the Tracker as well as

†Ibid p 19.

\*Jane's 'All the World's Aircraft', 1973/74, p 208.





CANADAIR CL84

complementing the Sea King helicopter. As a helicopter is only efficient in the hover, the CL84 concept may well replace helicopters for seaborne ASW and surveillance operations.

### The Platform

A study of past and recent naval history shows that no matter how much theorizing is done on scenarios or concepts of operations, it is nearly always the unexpected which happens. Ships last a long time and the strategic background against which they were conceived, designed and built has usually changed by the time their mid-life is reached. Therefore, flexibility in outlook and purpose is necessary when considering future ships.

One of the vital roles the carrier played in the Second World War was the victory over the German U-Boats in the Battle of the Atlantic. These carriers were not the fast, lavishly-equipped mobile airfields which operated with the fleets, substituting their aircraft's striking power for that of the battleships' guns; they were the small utility carriers. These carriers, later designated escort carriers, were converted initially from merchant ships with a primarily defensive role. The British converted a number of merchant ships to this rôle

and a large programme of such ships was instituted in the US. Initially the US similarly converted freighters or tankers but, as the demand grew, special purpose ships using pre-fabrication and 'production line' techniques were built. Although originally conceived for convoy escort duties, the ships were used in a number of roles, including supporting landings in the Mediterranean, because of the overall shortage of aircraft carriers.

To date, helicopters are the only aircraft to have been deployed continuously from other than specially designed aircraft carriers. Helicopters were first embarked in small ships in the early 1950's when HMS *Vidal* embarked a Bell 47. Since then purpose built facilities have been provided in most RN destroyers and frigates as well as RFA's. Considerable experience in their operation has been gained and the helicopter in this time scale has evolved as an essential integrated force weapon system for ASW and surface surveillance.

The main aim of deploying helicopters to RFA's was to find an alternative platform for short periods as the number of aircraft carriers in the RN decreased. The RFA's design complies to normal commercial standards and in the first ships only arrangements for short duration deployments were



provided. Since then they have been improved by the addition of permanent facilities for all weather flying. However, the flight deck on the fleet oilers and supply ships is aft, and flying operations are limited by weather conditions.

RFA *Engadine* was accepted into RN service in 1967 and provides greater aircraft facilities. It was introduced to provide a platform for training helicopter crews in deep water ASW operations. Sustained operations may be conducted for many days from *Engadine* and she can take four Sea King helicopters with a deck area of about 180 ft. x 50 ft. (two spots). First and second line maintenance are able to be provided. However, the flight deck takes up the after third of the ship and weather limits flying operations or restricts ship movement during these operations.

The centre of movement in a ship is its centre and hence this area is the best for aircraft operation. Given a suitable ship with sufficient width, V/STOL as well as helicopters could approach from either side. This would allow operations in poor weather conditions and place the least restrictions on ship movements. The flight deck for an Aircraft Carrier would, with the advent of V/STOL, be best placed in the centre of the ship.

To provide a relatively cheap hull for an Aircraft Carrier, if the high design costs are to be avoided, an existing design must be used; ideally a hull which is in current series production or is easily made. To find such a ship, the merchant navy fleet must be examined. Whilst appreciating such ships are not built to naval standards, if the high costs are to be avoided and a ship procured at all, a lowering of these standards must be accepted.

The rationale behind this, apart from the all important cost aspect, is the concept of operations, i.e. countering intrusions into Australian territorial waters and fishing and resource zones; providing support to civil authorities; providing a credible deterrent to harassment or interference with assets under Australian sovereign control; and, in the last resort, engaging in offensive/defensive operations. When the potential capability of weapons which can be deployed by even minor navies is considered, the vulnerability of this platform is hardly lessened to any great degree by increased ship-building standards. This is not to say that these standards are not necessary, and if we lived in an ideal world they would, of course, be advocated. But the cost penalty is so great that if Australia is to ever have a replacement for HMAS *Melbourne* in the current economic climate, a much lower standard must be accepted.

General purpose merchant ships are cluttered with equipment on the upper deck and would

require considerable modification to make them suitable for aircraft operations. The VLCC—oil and grain—do carry helicopters for communications purposes. However, they have derricks and cranes which would require to be removed as they would obstruct aircraft approach paths; their lower free-board gives them poor manoeuvrability and would not be suitable for aircraft operations; the internal construction would also require extensive modifications.

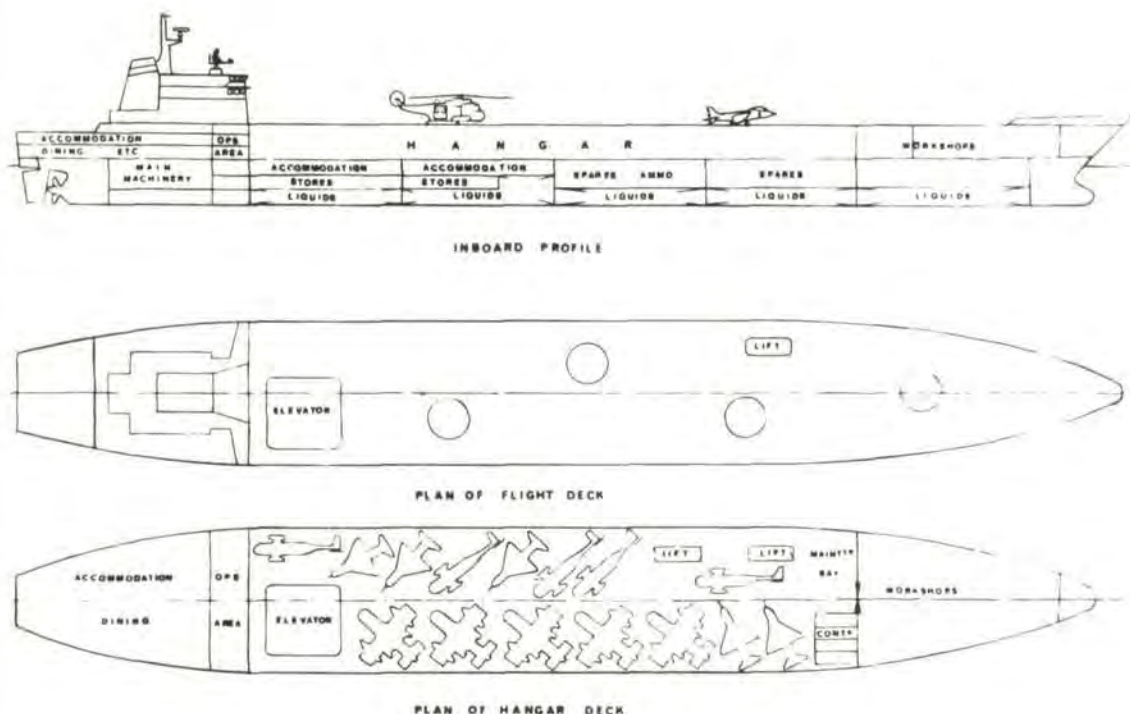
There is one ship which is being built in increasing numbers and in classes: the container ship. This type of ship has a large deck space free of superstructure, derricks or cranes. It has a high free-board, is stabilized, has a high cruising speed and normally has multi-shafts. The bridge design is large and space is available in that area for communications, radar, and command and control equipment necessary to control naval aircraft. The majority of these ships have the bridge, accommodation and engine room aft, leaving a vast area forward to fill with containers. As the area forward of the bridge is necessarily empty, little problem would be found including the necessary facilities to make the ship a sea-borne aircraft platform. These would include: the extra fuel; generating capacity; weapon magazines; storerooms; workshop, test and maintenance areas; hangar space; and additional accommodation.

The diagram shows a conceptual arrangement in a typical container ship of about 23,000 tons deadweight, about 700 ft. long, 95 ft. beam and 32 ft. draught—speed approx. 25 knots.



TYPICAL CONTAINER SHIP





Cost in 1974 prices before conversion would be in the order of \$24 million.

The cost of purchasing and converting a modern container ship of 20,000 tons plus to make it an aircraft carrier would be less than the cost of a modern frigate (aircraft costs excluded). A similar hull could also be suitable for the amphibious role as an amphibious heavy lift ship and an LPD (the Japanese ACL class has a roll-on, roll-off facility aft). This aspect will not be discussed further but is mentioned to show the potential of this type of ship for Australian defence use.

A container ship of about 24,000 tons would allow a deck length in the order of 600 ft, which is adequate for jet and turboprop STO mode operations. Given the advances in aviation technology it is now feasible to operate an advanced Harrier type aircraft, helicopters and the CANADAIR CL84 type aircraft from such a basic flight deck. The numbers of these aircraft carried would be typically five Harriers, five CL84's and four or six Sea Kings. These numbers may be small compared to the US carriers but compare favourably to HMAS *Melbourne* and would be adequate if Australia had to operate alone and would contribute in proportion to the RAN's size if incorporated in a larger allied force.

Such a conversion would allow the RAN to maintain naval air power and hence maintain the

flexibility and effectiveness of its fleet, giving it a credible deterrent and the ability to act if necessary. This is a viable solution to the problem facing the RAN when HMAS *Melbourne* reaches the end of her life and perhaps the only one within the diminishing Australian defence budget.

## CONCLUSION

Naval air power came into its own during the Second World War and replaced the battle ship as the major unit of sea power. By 1950, the aircraft carrier was accepted in the Royal Navy as the backbone of the fleet. The aircraft became accepted in the West as the most complete projection of maritime power yet devised. It had a strategic capability as well as giving complete conventional defence, reconnaissance, airborne early warning, fighter defence, flexible ASW, long range tactical strike and land forces support.

In 1967 the rising costs, the ending of the British presence East of Suez and the doubts of the effectiveness of only one carrier caused Britain to cancel plans to continue with a carrier force. Since then the ASW cruiser concept was born and the RN will continue to maintain helicopters at sea for ASW purposes. The continuing USN carrier building programme would indicate they continue to have no doubts on the validity of these type of operations today.



Although the possibility of general war remains remote, limited war and other conflicts continue to occur. The turbulent history of South-East Asia since the Second World War provides little support for a view that the region will be free from trouble. There may be no direct threat to Australia in the foreseeable future but, despite a policy of diplomacy before defence, this country needs a credible defence force if only to back her diplomatic efforts.

Australia depends on sea trade for her economic strength. The task of protection and surveillance of the sea routes and sovereign areas is complicated by the vast distances involved. To carry out its role of protecting Australia's interests at sea effectively the RAN needs to retain a naval air capability. The speed of response, ability to operate over wide areas and the flexibility offered by naval air will continue to remain important, especially as countries to the north of Australia improve their navies.

The problem of replacing HMAS *Melbourne* assumes some urgency as the end of her life approaches. The RN ASW cruiser and the US Sea Control Ship are both beyond the economic capabilities of Australia. If high design costs are to be avoided an existing design must be utilized. To achieve this, a merchant navy hull should be used, accepting the lower build standards.

The advances in technology in the aircraft industry have made V/STOL aircraft a viable option for use on land as well as at sea. The advanced Harrier jet V/STOL has a good overall capability and is most suitable for operations at sea. This is a most reliable aircraft and has good capabilities in fighter ground support, reconnaissance and air defence. A rationalization of Australia's aircraft requirements involving a realistic assessment of the threat and concept of operations would suggest that

an advanced Harrier type aircraft has a role in the RAAF as well as the RAN.

Another V/STOL aircraft, the CANADAIR CL 84, a twin engined tilt-wing aircraft, is showing considerable potential as an ASW surface surveillance and ECM aircraft. This aircraft is being developed for shipborne use, being similar in size to a Sea King helicopter with better overall performance.

Experience in operating helicopters in the RN from a number of platforms, including RFA's, has shown how susceptible they are to deck movement caused by weather. The centre of movement of a ship is its centre and hence this area is the best for aircraft operations. Given a suitable ship with sufficient width, V/STOL aircraft as well as helicopters could approach from either side thus avoiding the main limitation caused by a flight deck being situated aft.

The container ship with its large free space forward of the bridge and machinery spaces aft, lends itself to conversion as a seaborne aircraft platform. It has a high free-board, is stabilized, has a high cruising speed and normally has multi-shafts. Their unit cost is small and conversion to the seaborne aircraft platform role would probably be less than the cost of a modern frigate (excluding aircraft costs). A container ship of about 15,000 tons would be large enough to operate Harrier and CL84 type aircraft as well as helicopters comparable in numbers to HMAS *Melbourne*.

A sea control ship would allow the RAN to maintain naval air power and hence maintain the flexibility and effectiveness of its fleet, giving it a credible deterrent and the ability to act if necessary. A converted container ship is a viable solution to the problem facing the RAN when HMAS *Melbourne* reaches the end of her life.

#### From the President

Early comment on the first issue of the Journal of the Australian Naval Institute has been most favourable. As mentioned elsewhere there were a few teething troubles but as we gain more experience we hope these will be eliminated. From the remarks I have heard, the Institute is filling a real need. The only way to meet this need is for all of us to take an active part in the affairs of the Institute by writing articles, commenting on articles printed and attending meetings. Only by vigorous and sustained support will we grow in strength and influence and provide the forum so obviously needed. I also take this opportunity to wish all members and their families a Merry Xmas and a happy and prosperous 1976.

#### Editors' Note

The article, "The Australian Naval Institute - How it Began", in the inaugural issue of the Journal described in some detail our very enjoyable and mildly intemperate conception, our prolonged gestation and our somewhat painful birth. It seems that in our hurried efforts to make the world aware of our presence so soon after parturition - by producing an early issue of the Journal, we committed some editorial blunders. Not only did we reduce one of our Councillors in rank, Captain B. G. Gibbs, but we eliminated one, Captain E. V. Stevens, entirely from the list of Councillors. Our apologies to both gentlemen.

*Seapower is a necessary factor in the general progress of a nation.*

ALFRED MAHAN



# Software at Sea

AN ESSAY BY LIEUTENANT COMMANDER C. J. SKINNER, RAN

*Summary: three classes of software are defined and examined. Certain problems in dealing with the third class, newly introduced to the RAN, are discussed. Throughout, software is treated as an entity in its own right.*

## SOFTWARE AT SEA

The amount of software at sea in the RAN has recently taken a quantum increase with the return of a modernised DDG, newly fitted with the Naval Combat Data System (NCDS) and the complementary Digital Tartar Missile System. That this is but another milestone in a continuing trend would perhaps be obvious to most people. Inevitably the future will see an exponential trend towards whatever balance between hardware and software is considered best at the time.

However, the everyday dealings with software at sea in the RAN have until recently involved little more than loading an operational program (op. program) or diagnostic (program) and using them without real knowledge of their content, and with no attempt at optimisation of their performance; the assumption being that if it works\* seemingly correctly then all is well. This assumption has been based, to a large part soundly, on extensive proving ashore of the particular program either in the equipment for which it is intended, or if this is not possible then in as close a facsimile as is possible using simulation programs to make up discrepancies in the test rig. In addition a large proportion of RAN software has been imported from other countries who themselves carried out all apparently-needed optimisation at sea.

For many reasons, not least the variety of tactical scenarios with which a ship must deal, this policy may no longer be adequate.

## WHAT IS SOFTWARE?

Before enlarging on the broad subject of management of software at sea, we must first establish what the expression 'software' means. The Chambers Dictionary of Science and Technology defines software as: 'programming or compiling accessories used for computing or data-processing systems.' In more specific terms, in the RAN this has come to mean the programs themselves in whatever medium, the working documents of the analyst and pro-

grammers who developed the program, and other documents written describing aspects of the programs. However the term is loosely and variously used as evidenced by use of other terms like 'firmware' in some civilian applications. The most important and most difficult attribute of software for the initiate to grasp is that the actual product is the written word rather than the latter being merely a necessary adjunct of some hardware development. There has been what one may call a concentration of knowledge (and power) in software areas by comparison with hardware areas, caused entirely by the designer of software being so much the producer of the software. It is against this background that all the following matters are discussed.

## Computer Organisation

While it is quite possible to consider software without reference to the computer in which it will reside or even to the operation of computers in general, a few points relating to hardware will not

## THE AUTHOR

Lieutenant Commander Christopher John Skinner RAN was born in Birmingham, England in 1943. His family emigrated to Australia in 1951 and settled in South Australia where he attended the Adelaide Boys High School. Lieutenant Commander Skinner joined the RAN as a normal-entry cadet midshipman to RANC, Jervis Bay. He graduated in 1962 and after a year's service as a midshipman in HMAS Melbourne and HMAS Anzac, proceeded to RNEC, Manadon for electrical engineering studies. He graduated in 1966 remaining in the UK for a further 15 months of WE application training. After a year in HMAS Parramatta he went to the USA for training preparatory to serving in HMAS Hobart for two and a half years until early 1972. Then for two years until 1974 he was seconded to the Department of Supply for service at the Weapons Research Establishment, Salisbury, where he was part of a design team developing an advanced sonar project. In 1974 he returned to the USA for courses relating to DDG modernisation and is now serving in HMAS Perth as the Combat Systems Engineer Officer.



go astray in the following discussion. In essence there will be in most cases at least the following:

- a central processing unit (CPU) in which the control and manipulation of data is performed,
- an Input/Output (IO) section that allows communication with the outside world, in particular with people via peripheral equipment, and
- a memory unit that permits the retention of data and program from one point in time or space until needed again (often termed core).

In the simplest machines there will be one of each, however in any practical machine the division of areas would be much less distinct than the three given above were it not also clearly defined by tradition or descriptive documentation. As an example of what I mean: a register in a calculator may be called a memory but in any computer the CPU will inevitably contain many registers, not to be confused with the computer memory; with larger computer systems due to differing data rates the design may call for a smaller i.e. less capable, computer, with its own memory etc., to perform the task of IO controller for the larger machine. Further more complicated examples do exist where several CPU's and IO sections share each other and a common memory.

### Programming Languages

All computers work actually in binary numbers, however binary is cumbersome and is usually abbreviated by using octal or in some cases hexadecimal (base 16) numbers. This level is called *machine language* since it directly corresponds to the machine operation and can be observed on indicator lights.

The great drawback of machine language is that reading it is so wearisome, the more so the larger the word size. (The size of a word is the number of bits that are processed in parallel, that is simultaneously, in the machine and will range from 8 bits for a microprocessor up to 128 or even 256 bits for the largest machines. At sea one is unlikely to meet more than 32 bits with 16 bits being more common).

The immediate solution is to use *assembler language*. An assembler program translates instructions written in alphanumeric mnemonics (called source code) on a one-for-one basis into machine language instructions (called object code). The mnemonics are readable given suitable training and allow much easier editing of a written program, using a side-by-side listing which gives both assembler and machine code. At sea the program listing provides an essential aid for software diagnosis; modifications (called patches) to the program will normally be written in machine language since few assemblers operate on-line (that is concurrently with the op. program).

Two further levels of programming language exist. The first called *compiler language* generates several object code instructions from a single source code statement; a good example is the ubiquitous FORTRAN language. Other even higher-level languages are called *simulation languages*; here the programmer is hardly aware he is actually writing a program. Compiler and more so simulation languages suffer severely from a problem that increases with the level of the language — modifications to the program at the machine level become increasingly difficult with compiler language-level to the extent that any modifications must be done in source language and then recompiled each time. The penalty for this is the vast increase in memory capacity required to hold the compiler. For the immediate future the RAN software at sea is unlikely to extend much past low-level compiler language so that available core can be used for more productive purposes.

A highly useful aspect of assembler and higher level languages is the facility to document what is being done in descriptive terms line-by-line as the program is written. Without this any involved program is virtually unreadable with only the source code, especially if, as is normally the case, great use is made of subroutines and logical decision-making. A diagnostic advantage of assembler language with respect to compiler language, is that documentary remarks called comments relate directly to single lines of both object and source code.

### THE PROGRAMS THEMSELVES

Thus far the language in which programs are written, and the machines in which they will reside have been discussed. What of the programs themselves?

#### Program Design

The first step toward a program is to define a need, and then a plan to meet the need. Without dwelling on the intricacies of the design process, suffice to say that a very careful examination is required of peripheral hardware available, computer hardware capabilities and perhaps most important interfaces with other hardware and software. The initial design of a new program will only be as good as the accuracy of the specification of the existing elements. In its turn the accuracy of specification of the new program will determine the initial success of the next program and so on.

In general the two following statements relate to the design process:

- to design a program that interfaces only with hardware is easier than for a program that interfaces with software as well as/instead of hardware, and



- to design a program that interfaces with other software (in another computer of perhaps different type) via hardware is more difficult than with software in the same machine.

Some generalised reasons of why these are true are given later in this discussion. In the meanwhile let it be said that *what is difficult to design or specify will be difficult to diagnose and manage.*

### Program Quality

The writer has pondered the reasons why the latest additions to the RAN software inventory are apparently different from that existing before and has come to the following conclusion: the quality of a program is determined by the quality of the assumptions made in the design of the program.

In some programs especially those interfacing only with well-specified hardware, the requirement is only for a giant calculator and any assumptions and approximations lend themselves to individual validation. This might be the case in a simple sensor system, or in a display system containing micro-processors. Call this category I.

In more advanced and complex systems, certain parameters are no longer deterministic in that they are either subjective (human) assessments or randomly determined. Provided the time rate-of-change of the parameters is sufficiently low, then a trained operator can be permitted to vary control settings to counteract unwanted tendencies. ASW systems exhibit this comparatively slow rate of change. Call these category II.

Until the recent increase in the RAN inventory, the writer believes that all existing software fell in one of these two categories. However the latest acquisitions do not, on two counts: firstly extensive software interfaces exist leading to problems of design in the first place, and secondly the application to AAW drastically curtails the opportunities for operator intervention.

### Rapid Reaction Software

The new programs working with sensor, processing and display, and weapon hardware, and with each other form what has been called a Combat System (CS). CS software is such that: firstly it is modular, that is broken up into discrete subprograms; these were designed by different groups of people to reduce the task to manageable proportions; the corollary however is that extensive software interfaces are immediately invoked with attendant problems of accurate specification. Secondly, separate computers are employed communicating via hardware by so-called intercomputer communication. Call these category III.

### Diagnostic Access

In order to verify the correct operation of software interfaces, further programs are necessary due to the speed of operation of the interface. However a further and potentially more difficult problem arises with programs of the third category. If as stated above the quality of a program is judged by the quality of the assumptions built into the program, then let us consider the sort of assumptions that will appear in the third category.



### The Dilemma of Assumptions

Let us take an over-simplified example: which is the more threatening: the high fast closing aircraft at long range or the low slow aircraft at short range? You may well say the one or the other or perhaps say that you need more information. Naturally as much relevant information as is available will be fed into the algorithm that controls the program decision to deal with the one or the other, but inevitably the decision will depend on a lot of inbuilt design assumptions. In addition the computer may only need to monitor the information for microseconds to make its decision but have no time to inform fully the operator of exactly why it decided *what* it decided, thereby giving rise to two corollaries: firstly the operator will be working by power of veto rather than conscious decisive actions, and secondly the means by which the diagnostician confirms that the algorithm is working correctly is far from complete. The latter leads us logically to discuss the whole area of program verification.

### PROGRAM VERIFICATION

Ideally a program used only to deal with inputs of known ranges of values and to produce prescribed outputs at relatively slow rates is best verified statically by inserting a known problem and confirming the expected solution. However in many cases when



the same problem is solved dynamically different results will be obtained due to inbuilt delays and other timing differences.

How much more difficult then is the situation where the solution to any normal complex situation is not known, and where dynamically timing effects of all sorts render the diagnostician able only to judge subjectively that all is well. Unfortunately this seems to be the case with category III software. A limited aid in this respect is the ability built-in to record masses of relevant data for analysis at another time. This in itself does not record the reasons for operator actions, nor the environmental conditions, nor many other aspects that must rightly be considered in evaluation of performance. In general there is just too much happening in too short a time to be able to say that operation is correct. Furthermore in an environment where the same situation precisely may never again be duplicated, the task of verification becomes more difficult even to the point of impossible if full verification is required.

### **The Practical Approach to Verification**

Because the difficulty of exhaustive verification especially at sea has been recognised, a practical approach to verification has been formulated by the countries employing such software. This approach is fundamentally to verify as much as can be in the initial stages and then to correct problems that occur thereafter as they are perceived. This methodology has been adopted by the RAN also (there was not much choice).

Perhaps because those people involved in software development gain greater satisfaction from the development itself rather than the writing of explanations of how the software works, the standard of software operating and descriptive documentation leaves something to be desired. The RAN may well be forced to learn the hard way the analogous lesson to hardware acquisition, that with inadequate documentation the performance of the acquisition will likewise be degraded. Certainly there appears a need for a Defence Standard covering software description.

### **An Alternative Approach**

An alternative approach in the future might be to define in the program the measures of effectiveness (MOE's) that will be used to verify the program and then make the software adaptive, that is, able to vary certain parameters itself in a search for an improvement in MOE's. Unfortunately this approach, although intrinsically desirable, is still not the full answer because inherent in the MOE's will be further assumptions that bear heavily on the results.

### **The Problem of Core Size**

The next problem of program verification is that of lack of memory available. In order to test a dynamic entity like a program, especially of the third category I have mentioned, the program must be monitored in many ways and at a rate comparable to that of program execution. The latter more or less eliminates any other method except a further (diagnostic) program. This diagnostic program has its own requirements: time for execution, core space for the program to be placed and above all a method of verifying the diagnostic (and so on ad infinitum).

The provision of time and space for the diagnostic may be approached in differing ways; non-essential sub-program modules may be removed from core and replaced by diagnostic modules; pure data may be recorded and the diagnosis performed later when the diagnostic may replace the op. program; or both time and space may be made in one computer at the expense of other functions, that computer then being used to monitor the software in another.

### **The Ultimate Problem of Program Verification**

The catch to the above is that verification using diagnostic programs has only thus far been applied to the mechanistic features of programs (that is those features akin to category I). The verification of the qualitative aspects is left in the final analysis to the knowledgeable observer who is presented with much data but little on which to judge acceptance tests of qualitative software, save suck-it-and-see (and if the observer notes what he considers is a deficiency, the means to propose changes).

I do not mean to sound negative in my remarks; improvements fall off exponentially — once the bulk of the software has been examined and accepted this then leaves time to improve the remainder. The point being made above is that however good (or bad) a qualitative program is adjudged, the judgment is not based on any mechanistic yard-stick, but rather on the subjective opinions of observers experienced with the environment in which the program has been called upon to operate. And who shall say that this is not the proper means of judgment?

### **The People Problem**

On first consideration, people should not be a problem. Naturally extensive training and education is required; the quality of this training will reflect in part the quality of the software documentation, and the general level of software experience. This is not a long-term problem given sufficient effort to whittle down the knowledge-gap. The philosophical grasp



of software is fortuitously not limited to super-intelligent people and thus with the whole area of computers becoming an increasingly familiar matter, the level of community-wide experience with software is growing every day, as once did the familiarity with electricity or the telephone.

What then is the problem? The answer lies in two inherent features of software. Firstly it is precise, that is, exact, and very unforgiving of mistakes; people are not so precise and can cause huge problems by 'finger-trouble'. Where software was mechanistic this did not matter so much — overall the program either worked or it didn't. As we have seen though, with qualitative software we are never quite sure if it is working properly, or rather we *are* sure that it is not working completely correctly but may adjudge the present status to be satisfactory or at least preferable to the prolonged setbacks involved in improving the software. Thus errors may go unnoticed.

Setbacks? The second aspect of the people problem is that they may never ever come to know fully any representative piece of software, or at least never be able to visualise all the implications of their actions in modifying software, all at once. Hardly surprising you might say. Unfortunately it leads to a further axiom of software that: the incorporation of improvements always results in an initial degradation (catastrophic at times) until the improvement is tailored to fit properly; unhappily the degradation may only be noticeable (in qualitative software) at the time one first tries to use the program exhaustively.

### THE VAST GAINS

On balance even with the philosophical problems already described, vast gains have been made by the acquisition of qualitative software systems. Much that I have called problematical will be accepted in the near future as nothing more than unavoidable limitations for which due consideration must be given. At present however there may be some who might not have expected such complication, and for whom hopefully a more meaningful viewpoint has been provided.

The gains may be summarised as three: super-human powers, flexibility and reliability. Since possibly the 'good' side of software is better known than the other, I will not dwell so long on these three. The super-human powers are those powers that: enable mathematical and logical problems to be solved to better than human mental accuracy in milliseconds or less; provide tireless operation over long periods; provide the ability to detect events below the threshold of human perception; and

above all provide the long-term continuity that is otherwise precluded by the mobility and changeability of human operators.

Reliability is a related attribute, but is here intended to imply that once an acceptable standard of software performance is attained (remember the performance of qualitative software will never be perfect) it will then be repeatable time and again. There will be some changes in both people and peripheral hardware that will affect the software, however the reliability of software then provides a useful means of verifying that corrections to return the peripherals to their previous operating standard have been effective.

### The Flexibility of Software

Undoubtedly the greatest asset is the immense flexibility inherent in software. A change in environment whether tactical or natural can be quickly compensated for by a change in software. Values of parameters can be varied rapidly until optimised. The whole posture of the combat system can be altered in minutes or less, to reflect a change in conditions.

The possibilities of such flexibility have barely been addressed in present-day software. At present the flexibility is offered by macro-changes in program modules and by micro-changes at the press of a button. For the future the flexibility will be offered in a manner less obvious to the operator; he will merely have to specify to the software what it is he wishes to achieve and the program will carry out its own metamorphosis to achieve this. A further possibility is the adaptive change of posture under operator-aided program control, in a similar way to the adaptive program optimisation already mentioned. Thus the posture might reflect the activity of the last few hours projected to provide the features the operators most need. Operator-override capability would naturally be required.

### The Penalties of Flexibility

Never something for nothing! There are several penalties that will be incurred increasingly with greater flexibility; perhaps this is the reason for some obvious caution in the process so far.

The first penalty relates to the most important element of the system, the operator; he will become confused to a greater or less extent with changes of posture and needs a stabilisation period to regain his normal efficiency. This time constant of operator adjustment could be of the order of 20 minutes. If changes are made more rapidly he will be constantly below his most efficient.

A related penalty is the difficulty of keeping program documentation in step with the program,



in such a manner that the operator has a useable publication he can turn to at any time. Verification of software will become an even more difficult task since the range of discrete states to be verified will be greater.

A further aspect has been mentioned before in another context — that of core size; to provide flexibility requires software itself. On the other hand if the design for flexibility uses some alternative slow memory, such as magnetic tape, there is in fact a reduction in the required core, thus this does not have to be a problem.

Finally a problem not previously addressed is aggravated; the configuration management of what program one really has is made greatly more difficult with greater flexibility. One of the people problems included under the collective heading of software comprehension is that of controlling the improvements to software so all due processes of consultation and approval are carried out. If the software is less easily described then it will less easily be known and thus less easily managed; this is likely with increased flexibility.

### CONCLUSION

My intention is to conclude on an optimistic note; there is certainly no reason not to do so.

Software has existed in the RAN for some time in mechanistic and slow-reaction forms, but there recently has been added fast-reaction software that shows many different attributes to the previous two forms; a large part of the recently-added software is non-mechanistic and is based on in-built design assumptions that can not be verified practically. This form of software has been termed 'qualitative'.

Some of the problems inherent in dealing with qualitative software have been described, in particular that of verifying satisfactory performance. The proposition has been made that such software will never work 'correctly'; rather it must be evaluated over a period by experienced operators, who should then propose improvements; by this means sufficiently satisfactory software will result.

Finally the many important benefits of software, and some further allied problems have been described.

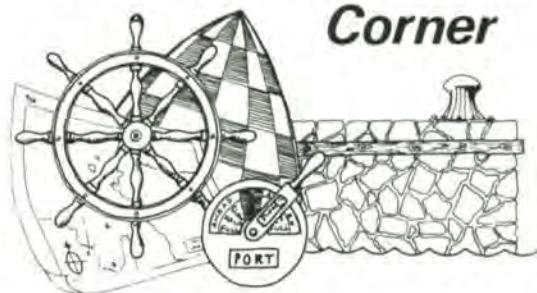
In conclusion, the reader hopefully will see that few if any of the problems mentioned are likely still to exist in the long term, whereas the desirable attributes gained, while beneficial and tangible now, will be of even greater advantage in the future.

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### MEMBERSHIP

Although our numbers are steadily increasing we still need to extend our membership. Therefore members are exhorted to invite the attention of friends and acquaintances, both Service and civilian, to the existence of the Institute. Remember it pays to advertise.

## Shiphandling Corner



Possibly the RAN's most wayward-handling vessel is the oiler *Supply*. She can behave beautifully, but the constant variations in her draught and the consequent varying windage on her enormous sides, can occasionally combine with her classical single-screw characteristics to make her into a real "bucking bronco" of a ship.

Creeping slowly (always a wise precaution in her) towards our port-side — to berth at Fitting Out Wharf in Sydney one day, the crew of a wooden minesweeper berthed at the extreme outer end of the wharf — all stopped work to watch us slide past. "Ooh, ain't she big!" seemed to be the feeling behind the admiring looks on their faces.

But these looks soon turned to horror as they suddenly realised that *Supply* was moving sideways towards them at an alarming rate. A wooden minesweeper would crack like an egg if pressed too firmly by 26,000 tons, and the bigger ship had picked on that moment to start a crab-wise sheer towards the smaller vessel.

To go astern would only throw the stern more violently to port. The tug secured aft was already trying its hardest to hold the stern off, but seemingly to no avail. Ahead of *Supply's* berth, at Woolloomoolloo, lay a large merchantman, looming alarmingly close.

In retrospect the answer was perhaps obvious, but at the time it seemed a difficult decision to make. "Full ahead, hard aport"; and almost immediately, as we lunged at the ship ahead, the sheer was stopped and the minesweeper was saved. Then "Full astern, stand-by both anchors", (and hope that those fenders over the bow won't be needed).

In fact, she settled very neatly into her berth, without having to use the anchors as a brake.

A simple enough story, but one that supports a softly-softly approach for big ships. Furthermore, although we didn't on that occasion use an anchor, there were many times when, in *Supply*, we indeed found that an anchor was "as good as another engine".

D. H. D. S.



# Australia's Long-Term Defence Requirements

by

COMMANDER GEOFFREY W. FURLONG RAN

*An essay awarded the Admiral Richard G. Colbert Memorial Prize at the Naval War College, Newport, USA – May 5, 1975*

The Australian armed forces need to be re-structured to accord with the changing circumstances of the late 20th century. A long-term program should be initiated which will provide strong maritime forces to back a new strategy of deterrence.

The roles and priorities of the armed services must reflect this national strategy and a new force structure must be created to carry them out. Value criteria should be applied with some firmness.

Balanced force considerations should not enter the equation. What is required is that our forces should be armed with equipments which will enhance the primary aim of deterrence. Forces for this role can carry out secondary roles in conjunction with a few special units, but if they are not suitable for such secondary purposes their limits ought to be accepted. Equipment for secondary roles should take second place.

The new force development plan should be based on a realistic estimate of the future allocation of resources for defence and should take account of those trends in technology which are likely to pay dividends in the long term as well as in the immediate future.

These objectives can be met by building a maritime strike force of low-cost attack submarines, vertical-take-off attack aircraft, short take-off patrol aircraft and mobile-coastal defence batteries. All these elements should be armed with anti-ship missiles of the Harpoon type.

## I

The determinants of Australia's present "balanced force" defence capability are easily understood, and logically they provide a point of departure for any analysis of "what ought to be."

The first element which has helped mould today's force structure is historical precedent. Since the beginning of this century, Australia has been involved in four overseas wars: two world wars, Korea, and Vietnam. Each time Australia contributed conventional naval, army and air forces. These

forces have fought in Europe, in the Middle East, and in Southeast Asia. Historically our military commitment has been global, with recent concern for the Pacific. The armed services have always had broad roles (missions) and feel at home with Western attitudes towards technology, mechanized war, and conservative politico-military environments. Thus history and tradition have fostered the maintenance of balanced forces.

The second determinant of Australia's present force structure has been organizational process, for the interactions of the military, bureaucratic and political organizations have affected policy in a predictable way. Each service produces force requirements in response to possible threats or deficiencies in capability, based on the current strategic assessment. Thereafter a bargaining process

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Commander Geoffrey Furlong, RAN, was born in 1936 at Melbourne. He joined the RAN College in 1952, graduating two years later. Then followed Midshipman's training in HMS *Triumph* and HMAS *Sydney*. After completing Sub Lieutenant's courses in the UK, Commander Furlong joined HMAS *Quickmatch* as a Sub Lieutenant in 1959. He qualified as a Gunnery specialist at Whale Island in 1961 and after two years in HMS *Agincourt*, returned to Australia in 1963 as the Gunnery Trials officer. In 1966 he joined HMAS *Perth* after training in the USA and deployed to Vietnam in 1967. This tour of duty was followed by a posting as Officer in Charge Jervis Bay missile range and Gunnery officer HMAS *Albatross* until 1970. Commander Furlong stood by HMAS *Torrens* during her construction at Cockatoo Island Dockyard and commissioned that ship as Executive Officer. He was promoted to Commander in 1971 and served in Navy Office on the DDL project and as the Director of Surface and Air Weapons. In August 1974, he attended the USN War College at Newport, R.I. where he was awarded the Admiral Colbert prize for his essay on "Australia's Long Term Defence Requirements". Commander Furlong returned to Australia in September 1975 and is currently serving as the Commanding Officer of HMAS *Parramatta*.



takes place in which each service seeks to obtain a fair share of the defence budget. In consequence, the program which the Minister for Defence receives tends to have the expenditure apportioned between the services and it attempts to rectify as many deficiencies as possible within each service, given the funds available.

During development of individual service proposals or as a result of inter-service disagreement, the bureaucratic organization of the Department of Defence imposes budgetary and effectiveness criteria. Committees flourish in this environment and the resultant smoothing process tends to favor compromise and balanced forces.

The Government, in the form of House review committees and ultimately the Cabinet, then examines the program. In addition to legitimate political concerns such as resource allocation priorities, other considerations such as ministerial rivalries and individual preferences influence the debate, so that there are further compromises. Moreover, balanced force rhetoric is politically appealing because it suggests that each service will get something and that the country will have "all round" defence.

The annual defence program is therefore a compromise of the concerns of the military, bureaucratic, and political leaders. It tends to give a share of the defence dollar to each service and to favor balanced forces, even though this may not be the most objective solution.

The third determinant of our force structure has been the economic factor, which has had a significant influence both on the size and nature of the armed forces because it has controlled the money allocated to defence. People and politicians generally translate low-threat perceptions into minimal defence requirements, so that defence budgets are often the first to be reduced in time of economic hardship. All responsible governments recognize that a balance must be struck between national security and other components of national welfare, yet, there is an undeniable tendency to trade off defence requirements as a short-term political measure which is unlikely to arouse public resistance. In recent years there has been a tendency in Australia to reduce defence expenditure in real terms and there has been a corresponding reduction in the size of the armed forces.

The final and most important determinant of the present force structure has been the strategic outlook. Since the Second World War, this factor has dominated all the others. It is important to realize that since 1945, Australians have never felt directly threatened and this fact has been reflected in strategic assessments. The spread of Communism throughout southeast Asia has been perceived as a

long term danger, but until the collapse of Vietnam, survival has never been an issue.

Australia is a very large country with a very small population, an island continent far removed from Europe, from America, and from our new industrial trading partner, Japan. Although basically self-sufficient, we depend upon sea lanes for our present high standard of living since most of the country's exports, currently about six billion dollars annually, must be carried by sea.\* The majority of the people understand that the maritime envelope is vital to well being and probably to national security.

In the past ten years there have been many economic changes in this region of the Pacific. Japan's spectacular economic growth created new markets for our raw materials, China stabilized her economy and all but eliminated starvation, and Australia's trade has increased with Indonesia, Singapore and Malaysia. Changes in our economic alignment were also brought about by the entry of Britain into the European Common Market when we were forced to develop new markets in Asia and the U.S.A.

Australian observers have gazed benevolently upon this scene from beneath the nuclear umbrella. The balance of fear has been effective for thirty years and a war between the maxi-powers still seems inconceivable. The prospect of conflict between midi-powers remains remote, and wars between the mini-powers such as in the Middle East are regrettable but not of vital concern if controlled. Civil wars and wars of liberation are likely to break out but are unlikely to affect Australia's security interests. These reassuring views have been reinforced by other favorable portents such as detente and strategic arms limitation agreements.

American withdrawal from Asia, followed by the announcement of the Nixon Doctrine, marked the end of the containment policy which sought to prevent the spread of Asian Communism. In 1972 the Vietnamese War, rightly or wrongly, was generally perceived to be no longer a Communist-Anticommunist struggle, was named a civil war, and temporarily ceased to be of importance. Detente was extended to China as it became apparent that the Chinese did not intend to pursue expansionist policies.

Australia therefore moved towards a more neutral, independent stance in world and regional affairs, reflected in recognition of the People's Republic of China, in reduction of forces overseas in Malaysia and Singapore, and in changes in the

\* Australian Facts & Figures 1974



SEATO organization to emphasize economic co-operation and reduce the military role. National security policies now emphasize regional stability and co-operation combined with military aid to neighbors. Defence policy has tended towards Fortress Australia combined with dependence on the ANZUS Treaty should its invocation become necessary.

The considerations have led the present government and its defence advisors to the view that the prospect for general war is remote and that local conflicts can be limited. The government believes that no regional power has the motive or capability to threaten Australia but that low-level situations such as disputes over maritime resources could develop. Sudden changes in our strategic situation are assessed as unlikely and a cadre defence force is regarded as adequate. The Minister for Defence summarized this view when he stated that "the defence force in being should be adequate to indicate our resolution and our ability to defend Australia and Australian interests and to support others should the need arise. In times of low threat probability, as at present, the basic concept is that of a viable Core Force, able to handle local situations that may arise and manifestly capable of timely expansion, ultimately for the defence of Australia itself. Our force structure should be developed at the modest rate now required by the assumption of larger national responsibility, by the current strategic assessment and by longer term uncertainties."\*

Thus the interactions of historical precedents, organizational processes, economic pressures, geopolitical concerns and favorable strategic assessments have led to the evolution of small balanced forces which are seen as providing an adequate solution for Australian security today.

## II

But what of tomorrow? Will the military posture of the present work for the future? There are good reasons to believe it will not, and to come to such belief it only is necessary to look at the changes taking place within Australia now and at imminent developments throughout the Pacific and the world—developments that will surely come within the next decade or two.

Consider the many changes taking place today that are affecting defence budgets. First and foremost is a severe, world-wide recession. The experience of several economic downturns since World War II indicates that in the absence of

definable threats, defence cuts are almost inevitable. It is not surprising therefore that Australia and many other noncommunist countries have recently reduced defence expenditure in terms of percentage of G.N.P. This trend is unlikely to reverse unless threat perceptions change. Moreover, the increasing sophistication of national and international economic systems tends to prevent nations with highly structured budgets from suddenly diverting expenditure into the defence category. Other considerations have also assumed importance in defence thinking: the skyrocketing cost of new fighting equipment, and the high manpower component of defense budgets. In the Australian defence budget for 1974 only a small percentage, about 7%, was allocated for new equipment. The balance was required to maintain manpower and force levels. This situation is likely to worsen. Our planners face a dilemma. Do they scrap the old to release funds for the new and thereby reduce current capabilities to some nominal level? The services are fighting a losing battle. So far they have survived by cutting support costs, spares and reserves but this process cannot continue indefinitely.

A new public attitude also seems to be developing in Australia towards national security issues which paradoxically, is both more sophisticated and more naive than attitudes of the past. Indeed, in all developed societies there is a new maturity in public comprehension of the requirements for international peace. National security needs are now seen as more than men and machines and treaties. Internationalism, the United Nations, international public and private diplomacy, world opinion, trade agreements, immigration, tourism, foreign aid, and regional co-operation are now rightly viewed as important new tools for building peace. But acceptance of them argues implicitly against the need for expensive, special-purpose, national defence forces. As the civilized nations struggle to master these current problems, the framework of the world environment is being remoulded by other evolving phenomena.

The energy crisis and its consequences has shaken the stability and confidence of the world community in a dramatic way. For the first time in history, denial of an essential resource was successfully used as an alternative to war to achieve political goals. This Pandora's box has not been opened completely but it is certain that redistribution of resources will be one of the world's great problems in the next 25 years. Australia must be prepared for increasing pressures to share resources and indeed we must co-operate with underprivileged nations to the maximum extent possible. The difficulty arises as to who will decide what is the maximum extent. The implication for Australia is that we must have suffi-

\* Australian Defence Report 1974



cient military strength to back whatever resource sharing and trading policy is adopted by the Government.

Developed countries are striving for zero population growth whilst the underdeveloped countries who can least afford to increase, are swelling their populations at an alarming rate. By the year 2000, China will have increased her population to over 1000 million people, and India will have about 700 million. Australia is expected to have only about 20 million people by the turn of the century.

The communications revolution is already affecting every society. Wider use of communication satellites will revolutionize national and international TV broadcasting and provide instant global coverage of any event. Education of millions of underprivileged is now a certainty, not merely a possibility. With education and a broader view of the world brought into the villages and towns by transistor radio and TV, clamour for the better things of life as well as food, clothing, shelter and a sense of security, will echo around the world. No developed nation will be able to isolate itself, but the affluent societies have not even begun to grasp the magnitude of this problem.

Then there is the possibility of internal revolution following economic collapse in the developed countries. Hitler and Mussolini achieved power this way. If Italy collapses again, the European economic community may fall with her in a chain reaction. In the ensuing chaos the better-organized communist parties of some European countries may succeed in gaining power. Changes in the political alignment of important Free World countries would alter the delicate balance of power that now exists and is accepted by both sides. The ultimate effect on world stability can only be guessed at, but it is possible that a new version of the cold war or a new form of confrontation could be generated.

We have yet to comprehend the consequences of many other developments: possession of nuclear weapons by many small powers, use of the United Nations for political pressure, potential disagreements over ownership of the ocean's resources. All contain the potential for new misunderstandings and confrontations.

Finally and most important, we need to reassess possible developments in the strategic situation. With the fall of Vietnam and Cambodia, the domino theory has reemerged in Australia. There is a sense of foreboding, a fear that we have witnessed a cataclysm in Indochina which will spread across the region. North Korea, Vietnam, Laos and Cambodia have gone, and Burma is neutralized. How long can Thailand, Malaysia and Singapore with-

stand the pressures of communist insurrection? Communist fires smoulder in the Philippines, and South Korea is troubled with increasing unrest. The spectre of communism may not be real but the chill persists. These perceptions distort reality but there is the underlying truth that no border is sacrosanct. On balance, it appears that Australia has little to fear from communism in the short term because the national liberation element is missing. Asian revolutionaries have to rely on popular support as well as external aid, and the former seems to be lacking in Australia. Unfortunately, one cannot be certain that this will be the case by the end of the century. Any number of developments could generate the necessary cadre forces to set a terrorist liberation movement in motion. Volunteers could land in Australia to overthrow the ruling capitalist clique and free their Australian brothers from oppression. No, the possibility of long-term communist intervention in Australia cannot be rationalized away.

We just cannot see far enough into the future to discern the regional situation in the year 2000 with any clarity. The dominant feature of life in 1975 is uncertainty, and since there is no way to guarantee peace in a Southeast Asia which is moving rapidly towards great power dissociation, Australia must look to her own capabilities.

China is the key to the destiny of Southeast Asia and any strategic assessment must be heavily weighted by our understandings of her motives, attitudes, and goals, and her potential military capabilities. China's concerns now are internal development and conflict with Russia, but these preoccupations have not limited her involvement in Indochina. World revolution and the establishment of communism are still declared objectives. Once again, uncertainty intrudes into any discussion of China's future actions. So far as military capability is concerned, China will shortly join the USA, Russia and the European community as a maxi-power. She is already a nuclear power and soon will have an ICBM capability. Her fleet, small by great power standards, is the largest in Asia and consists of 22 destroyers and frigates, 34 corvettes, 55 submarines, 30 supply ships and 605 patrol boats (some with missiles), together with a large amphibious force comprising 50 landing ships (LST, LSM and LSL's) and 465 landing craft (mainly LCT's). This fleet is manned by 170,000 officers and sailors. In addition she has 20,000 personnel operating a large fleet air arm of about 450 fighters and bombers. The fleet air arm is currently land-based but China has the capability to build and operate carriers. If she does take this step, her naval forces in the region will be second only to America and Russia. She has the largest air force in Asia and the capability of her multi-million man army needs no discussion.



Recent events have profoundly affected the disposition of power in the region. Australians feel increasingly isolated as the United States withdraws from Southeast Asia and China's sphere of influence expands. Free world countries in the Western Pacific are concerned that America will enter a new era of isolationism and wonder if the experience of Vietnam will weaken her resolve to come to the aid of her friends.

Russia has moved steadily to take advantage of the changing strategic situation, and fill the maritime power vacuum in the Indian Ocean. After the Cuban missile crisis, the Soviets began to deploy warships around the world and sent substantial forces to the Mediterranean and Indian Ocean. As the Russian head of navy, Admiral S. G. Gorshkov put it, "Owing to the high mobility and endurance of its combatants, the [Soviet] navy possesses the capability to vividly demonstrate the economic and military power of the country beyond its borders in peacetime."\*

The Indian Ocean is important to the Soviets for many reasons. It is the access to the belly of Russia, and with the Suez Canal reopening it will be the highway between their Atlantic, Mediterranean, and Pacific fleets. The Russians have long desired a warm water port in this region with road and rail access to the homeland and are thought to have a long-range plan to achieve this goal by splitting off Baluchistan from Pakistan as a Russian puppet state. They already have the use of port facilities in Aden, Bangladesh, and Somalia, and they use these bases to support their "presence" operations and promote political influence. The Soviets are currently supporting allies or revolutionaries in Yemen, Oman, Iraq, Syria, Baluchistan, Eritrea, Somalia, Egypt, Malagasy and Bangladesh. These regional ambitions must also be viewed in light of the huge Russian investment in maritime assets operating in the Indian Ocean including merchant shipping, fishing fleets and whaling fleets. This ocean also provides their shortest and most natural access to the untapped resources of the Antarctic.

It seems inevitable that Russia will one day exert pressure on Australia, by external and internal political agitation, and by naval presence, to remove strategically vital U.S. installations from N.W. Cape and Pine Gap. At the same time they will attempt to weaken the ANZUS Alliance.

What of the other important noncommunist nations in the region? Japan, Indonesia, India, Pakistan and Iran all have a common interest in regional stability. Japan's future well-being is closely connected with ours. She has the human

resources and technical know-how but possesses limited natural resources. Australia is her natural trading partner because we have plenty of natural resources and few human resources. Both countries have signed the nuclear weapons non-proliferation treaty and rely upon American protection in the event of nuclear blackmail. Japan currently has a moderately sized self-defence force but in view of recent developments nearby, it is very likely that the Japanese will be forced to reassess their position and opt for more capable "self-defence" forces than they presently possess. They are dependent upon secure sea lines of communication for their existence. Shut off the supply of resources and Japan perishes.

Indonesia is also becoming an important resource supplier for Japan, and Australia is concerned with the well-being and welfare of our nearest neighbor. Strategically, Indonesia controls the three deep-water passages between the Indian Ocean and the Western Pacific. Southeast Asian regional security will be heavily influenced by cooperative policies and programs between Indonesia, Australia and Japan.

In the western Indian Ocean, India and Pakistan are preoccupied with internal problems and with establishing new relations after the agony of Bangladesh. Iran is proceeding rapidly with a military expansion program to fill the vacuum left by the departure of Britain from the Persian Gulf, to protect the flow of her Middle East oil, and to back other national policies of the Shah.

What ought Australians to conclude from these developments? The first conclusion should be that the military posture of today will not be adequate for tomorrow. The assumption that radical change in Australia's strategic situation is unlikely to occur suddenly cannot be justified. The world scene does not change in an orderly, progressive fashion and there are a great many reasons why we may witness dramatic changes. Deterioration of the world economic situation, shortages of resources, the Asian population explosion, the communications revolution, mass demand for better living, disagreements and friction over maritime resources, proliferation of nuclear weapons, ideological revolution: any or all of these factors could initiate dramatic shifts in our situation, and there may not be time to develop the necessary military forces.

We face uncertainty in the long-term future—economic, ideological, political, military and strategic uncertainty. We should heed the advice of the U.S. Secretary of Defense, James R. Schlesinger who said recently that "I do not consider it wise to bank on all the uncertainties

\* *Navies in Wars and in Peacetime* (Russian Naval Digest).



turning out in our favor."† Australia must provide defence forces that will ensure that we will not have to yield to unreasonable demands, threats, or intervention from any quarter.

### III

The grand question then becomes what should be the proper defence strategy for Australia? My solution to that question is, use the natural geographic barrier of water that separates the Australian continent from its neighbors, take advantage of appropriate technological developments, and develop a strong maritime defence force. These objectives are best achieved within realistic financial limits by the establishment of a maritime force consisting of attack submarines, aircraft, and coastal batteries which are all equipped with stand-off, anti-ship missiles.

Since any potential aggressor in our region must use the sea, force levels and composition should be selected to provide a high degree of assurance that any hostile amphibious force could be destroyed. Given this level of capability, the proposed maritime defence force would provide a powerful deterrent against seaborne attack.

As for technological developments, we have already had a preview of the influence of new technology on conventional warfare. In the last Middle East conflict, aircraft were unable to provide close support for army units until the battle outran the protective anti-aircraft missile umbrella. Tanks were knocked out in astounding numbers by man-portable anti-tank weapons. Missile engagements dominated the sea battle.

New surveillance systems used in conjunction with long-range maritime aircraft will provide a capability to detect and maintain surveillance on any force or large unit, anywhere on the earth's surface. It will be very difficult for ships or fleets to remain "in hiding" at sea for any length of time if an opposing nation has access to data provided by surveillance satellites, over-the-horizon-radar (O.T.H.R.), underwater listening arrays, computers and data links for exchange of information.

Changes in warfare techniques will also emerge from developments in weapon platforms such as remotely piloted vehicles (R.P.V.) or drones, V.S.T.O.L. attack aircraft, high-speed hydrofoil and hovercraft vessels, and quiet, high-speed, attack submarines.

Noteworthy developments in weapon systems are also taking place. New offensive weapons all have one thing in common; they can be launched from a stand-off position, providing great advantages for the launching vehicle in terms of surprise, effect-

iveness, and survivability. Important developments include "smart" bombs, sea-skimming missiles of the Harpoon type and long range, homing torpedoes. New defensive systems will greatly improve the defensive capabilities of some units, but on balance the advantage will remain with the attacker unless the defending unit has sophisticated detection and control systems. Advanced systems will incorporate long-range air-to-air and surface-to-air missiles, automatic (hands off) reaction weapons, automatic decoys and jammers, and power lasers.

There have been some improvements in detection systems, mainly in development of infra-red and low-light-level devices. Unfortunately the advances in radar, sonar, and electronic detection systems have only been evolutionary and are unlikely to change warfare in any substantial way.

So far as Australia is concerned, the most important development is that the modern attack submarine, with either conventional or nuclear propulsion, will have marked advantages over surface vessels for at least 25 years and possibly longer. Small, diesel electric boats of about 1,200 tons manned by about 30 men will be able to remain at sea for about four weeks. Submarines are likely to dominate sea control missions of the future.

In the Pacific campaign of the Second World War, 333 Allied submarines sank 1,000 Japanese merchant ships, 1 battleship, 8 carriers, 14 cruisers, 45 destroyers and 25 submarines, for a loss of 50 boats. This result was achieved without the benefit of modern location devices and long-range weapons. Since then, there have been some advances in anti-submarine warfare capabilities brought about by the use of improved sonars, better weapons and delivery systems, helicopters, and improved aircraft systems such as sono buoys. But these marginal gains have not matched the development of submarine capabilities.

The submarine has much in its favor. With new surveillance systems providing continuous data on all surface contacts, the submarine can position itself quietly and at leisure, and then locate the surface contacts of interest at long range with low frequency passive sonar and E.S.M. gear. Stand-off missiles can be fired from any position within a 50-mile radius, possibly after the surface force has gone past the submarine. Moreover, modern conventional boats are much quieter and can achieve underwater speeds in excess of 20 knots. In practical terms, this means that future surface forces are likely to be decimated by unrelenting and repeated attacks from any reasonable number of opposing submarines, and that even a massive anti-submarine effort is unlikely to achieve results because there is no requirement for the attackers to close the sur-

†U.S. Defense Report 1975



face force. Surface forces will therefore be reluctant to conduct operations in submarine concentration areas and nations with a strong submarine force will be able to control vital sea areas.

In addition to these tactical advantages, these platforms are comparatively inexpensive to build and to operate. This operational and economic combination appears to be a matchwinner.

One comes finally to defence policy and force structure considerations. Deterrence is the first of the stated "functions" of the armed forces and I believe that deterrence should be central to our thinking. There is a need to develop criteria to measure the deterrent value of each element of the force structure. One might ask, "Will the presence and disposition of this element of our forces in realistic and achievable numbers dissuade a potential aggressor from attempting to land troops in Australia, assuming he is unable to neutralize the element?" If the answer is clearly yes or no, the value of the element is plain. If the answer is not clear-cut, one might ask the further question, "Will the lack of this element mean that Australia's integrity is unlikely to survive an attack by those forces which the element would have helped to counter?" A negative response would indicate that the element involved is not essential for strategic defence, though it may be useful for other reasons.

To be credible, a deterrent force must be immune from attack. Component elements must be capable of rapid deployment. They should also be able to disperse or concentrate quickly. These requirements are not presently given the attention they deserve and our future policy should at least indicate what measures are required to prevent surprise destruction. Those force elements which cannot meet the immunity criteria should be suspect.

Australia's current defence policy requires that the core force be capable of timely expansion but there is good reason to think that this objective may not be realistic. Core force expansion is limited by time, money, training, experience, overseas supply, and above all by the physical constraints of local building and maintenance facilities and skills. The only sensible alternative is to create the necessary forces as soon as possible. Our goal should be to build up our strength to the required level, concentrating on the deterrent elements.

We should build in Australia those cheaper, non-complex equipments, or those required in large numbers. Patrol boats, corvettes, training ships, submarines, helicopters, training aircraft, MRMP aircraft, and some weapons and missiles spring to mind as appropriate to this category. At the other end of the scale there would appear to be sound economic reasons why expensive or complex or small numbers of equip-

ments should be bought overseas. The vertical support ship, air-to-air missiles, LRMP, and heavy transport aircraft are representative of this group.

At present, the roles of the Australian armed forces are not allocated priorities. It is held that roles do not change but that capabilities to perform them can be developed against periodic reassessments of the strategic situation. The trouble with this approach is that the emphasis is on means rather than the end. Policy should state which roles are to be given priority, both at the joint and single-service level. In the absence of such role-oriented policy, each service is free to translate the strategic assessment to serve its own designs. The process generally involves a bureaucratic wrangle between the services and the central office of the department of defence, and the result is typically a compromise which may not be the best objective answer. This problem would be eliminated if national defence requirements were translated into a priority list of common and single service roles and issued as part of the defence policy statement.

The primary common role of the three services should be to provide deterrent forces capable of preventing an invasion of Australia by any aggressor. The forces thus generated should be augmented as necessary by special purpose equipments, to provide the means of carrying out secondary roles: intelligence gathering, maritime surveillance, anti-infiltration, counterinsurgency, and general purpose missions. Maritime resource protection and national disaster assistance also need to be included.

As mentioned, the armed forces should be reconstructed to create a strong, mobile, maritime force which will provide a credible deterrent. A detailed analysis would be required to establish the optimum numbers, but as a starting point, the forces described below could be provided within present financial and manpower limits over a 25 year period. The major elements of the proposed reconstruction plan are, for the navy, initiation of a long-term submarine building program to create a force of about 50 submarines and construction of about 10 coast guard corvettes. These additions should be offset by a reduction in escorts from 13 to 6 to be achieved by not replacing destroyers as they reach end of life. Sufficient escorts would remain in service to create a general purpose task force centered on a carrier or sea control ship. Lower-level tasks can be undertaken by the coast guard corvettes.

As far as a submarine construction program is concerned, there are several designs from which a selection could be made with the object of building under license in Australia. Candidate submarines appear to be the German 209 class, the Swedish type 43, the Italian Sauro, and the French Agosta



class. A building program of about 2 boats per year would provide a force of 50 by the end of the century. Given a three-month warning, about 40 of these boats could be sent to sea to provide the submarine element of the deterrent force.

For the army it is proposed that the task forces be re-equipped and trained to specialize in anti-infiltration missions. Twelve mobile surface-to-surface missile batteries, each with 8 launchers, should be created for coastal defence. Mobile radar and E. S.M. stations should be procured and a seaward-surveillance system established.

The air force should initiate a building program to provide about 72 VSTOL strike aircraft and 24 STOL patrol aircraft designed for surface surveillance and strike. R.P.V.'s may be relevant for these tasks in the future. All of these aircraft should be armed with Harpoon type missiles, and in times of tension they should be dispersed to forward bases together with mobile support units. All three types could be built in Australia and it may even be possible to develop a maritime version of the STOL "Nomad" aircraft which is being purchased for the army. The rationale for this programme is that the present strike force of F-111's and the LRMP maritime squadrons can only operate from a handful of bases throughout Australia, particularly in Western Australia, and are thereby liable to be destroyed by surprise attack or sabotage. Proposed additions should be offset by reducing the fighter inventory from about 120 to 48 aircraft based on the value criteria mentioned earlier.

In addition to these changes, select commercial ships and aircraft should be provided with a missile firing capability. This reserve force could be armed at short notice by embarking the missiles and operators.

A joint maritime reporting and control center should be constructed underground near Canberra close to senior military commanders and political leaders. It should receive data transmitted from satellites and other tracking centers covering the Pacific and Indian Oceans. Other sources of information should be ships, submarines, and aircraft, and in due course the center would be linked to coastal surveillance systems operated by the army. It would need to be linked to communication facilities so as to rebroadcast information (and in some cases directions) to deployed forces. In peacetime this center could be used by the national disaster and maritime search and rescue agencies.

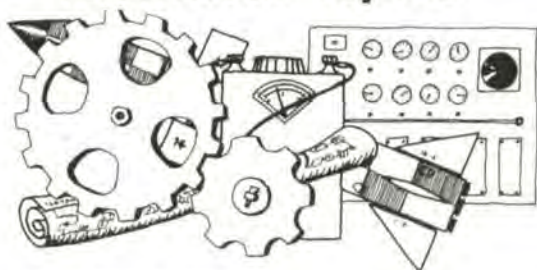
Current planning for other elements of the general purpose forces should not be affected by the abovementioned changes, as there will be a

continuing need for replacements of conventional force hardware.

The deterrent potential of the restructured force would be impressive. Approximately 40 submarines, 12 shore missile batteries, 150 aircraft and 45 ships, including the reserve forces, could deploy with their anti-ship missiles in times of tension.

To sum up, one must say that Australia's present defence posture seems unrealistic in light of the forces and factors operating upon world and regional politics now, and that are likely to be operating during the remaining years of the present century. Any careful analysis shows that our present forces, even if expanded, would not deter or be able to prevent an aggressor from landing in Australia. The world turns to new problems and seeks new solutions, and the remedies of the last decades are passing or have passed into history. Australia must look to the challenges to come, and respond with as much realism and foresight as the nation can manage. Only by this means can we be sure that Australia will survive into the next century.

## Technical Topics



### PLUMBERS' PROBLEMS

The scenario was Malacca Strait with four destroyers in single column steaming at standard distance (2½ cables) at 15 knots with one of the older and better known RAN two-stack destroyers as last of the line. Two black balls, hoots from sirens and clouds of black smoke announced the fact that the ship ahead, an RN destroyer of the CA class, had come to an involuntary halt. "Stop both engines starboard 35" but D123 continued to forge ahead as the E.O., who was on the bridge at the time, beat a hasty and tactical retreat to his personal domain.

At the time one boiler was connected, cruising throttles in use and closed exhaust opened to the port L.P. turbine. The port throttle had seized in the all but full open position and despite a liberal application of astern steam to this engine, consistent with the boiler power available, the ship forged ahead to the complete chagrin of both the Captain (most irate) and the E.O. (most perturbed).



The ERA on watch did the right thing. Getting his priorities correct he left the manoeuvring platform E.O., the then Leading Engineering Mechanic beating the telegraph reply gong repeatedly and carefully getting as much astern power to the engines as possible. Of course, the bridge phone was wailing.

The ERA hastily shut the nozzle group control valve thus depriving the HP turbine of steam, but the exhaust steam on the L.P. was good for revs for eight knots. Next he shut the exhaust to main engines. With Captain D. now abeam the situation was under control if one ignored the fact that the Closed Exhaust relief valve had lifted with its attendant roar from the forward funnel. This all but matched the bull-like roar from the Captain!

Having completed his involuntary tour of the engine room the ERA answered the phone, partially appeased the Command and got the situation well under control.

HMAS *Warramunga* proceeded to S.N.B. in company without further ado.

The sequel

1. No more closed exhaust to main engines.
2. No further use was to be made of cruising throttles when in company.
3. The CO never did believe the E.O.'s explanation for the fracas — he'd never had a ship which could not stop — 'twas always the opposite!

Lessons:

1. The use of exhaust on main engines seriously inhibits the ability to obey telegraphs.
2. The cause of the throttle jamming led to a re-think on the method used to re-claim worn shafts.
3. All engine controls should be located centrally and not dispersed about the engine room.
4. Be prepared!

L.T.S.

\* \* \* \* \*

#### FACTS & FIGURES

Sources T. B. Millar and Defence Reports

Over the past 29 years the nation has spent on each arm of Defence:

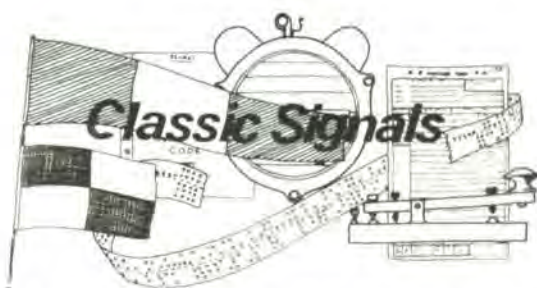
ARMY	\$M 6316.9
AIR FORCE	\$M 5123.0
NAVY	\$M 4144.4

Actual figures for 75-6 are not available because of the new method of expressing Defence expenditure and estimates.

\* \* \*

#### COMMENTS

Journal articles are intended to get you thinking. You may violently disagree with views expressed or you may wish to expand on arguments propounded. We look forward to hearing your views in letters to the editor. In other words write, don't fume.



Two destroyers engaged on blockade duty in the Mediterranean were alerted by higher authority to the likelihood of a gun-running attempt by a small craft. Details of the planned operation, said to have come from a reliable intelligence source, included the date and place of the expected landing.

Suitable patrols were instituted and sure enough, at the predicted time and position a small craft was detected. For some hours it was tracked in darkness as it steadily closed the coast, with the destroyers converging on it expectantly. Soon after dawn the intruder reached territorial waters and was quickly intercepted and ordered to heave to. A boarding party was sent to search her and received a very pleasant surprise. In place of the expected gun-runner they found a harmless luxury yacht skippered by an elderly male with an attractive and scantily clad female crew.

Destroyer A signalled destroyer B: "SO PERISH ALL OUR FOES".

(Reflecting on the incident one wonders just how genuine was that intelligence source, how innocent that glamorous crew and if any gun-runners slipped ashore undetected on other parts of the coast that night?!)

— . . . —

A destroyer working up some years ago was practising dummy torpedo attacks. The target vessel was a DE with the Squadron Commander in command. An earlier dummy attack had not come off very well as the attack had ended with what would have been a fairly long range shot, so the Captain of the destroyer decided to press the next one right home. As a result the ships got fairly close and the destroyer made a very tight hard turn to break away. It was not dangerous but the whole business had some excitement. As soon as the attack was over the target vessel started to make a signal:

Target vessel: "You gave me a nasty turn".

Destroyer: "ENOVID takes the worry out of being close".

Target vessel: (Disappearing over the horizon) "I prefer MUM".



# BOOK REVIEW



## "AUSTRALIA'S SHIPS OF WAR"

by John Bastock

"*Australia's Ships of War*" is a survey of the ships that have helped to shape Australia's naval history for a century or more. Compiled from a collection of facts, figures and photographs assembled by the author over a period of many years, it sets out to provide, between one pair of covers, a complete illustrated source of reference covering all the vessels that have served in the navies of the Australian Colonies, the Commonwealth Naval Forces and the R.A.N.

The work follows a broad chronological pattern, ranging from the establishment of the Australia Station in 1859, through the period of the Colonial and the Commonwealth Naval Forces to the birth of the Royal Australian Navy and its growth up to the present day.

Class by class, and ship by ship, there is a well illustrated record, as complete as can be ascertained by diligent study and research, of every vessel known to have served the Australian Colonies and the Commonwealth at sea from the 1850s to the 1970s, including numerous auxiliary vessels and obscure craft, pictures of which have never before been published.

Each class of ship is described in basic technical detail, and generally accompanied by a plan, diagram or silhouette, after which an illustrated history of each vessel of the class is presented. Most of the photographs bear a date, and the more important vessels, where possible, are depicted in various stages of their careers covering, for example, launching, alterations in appearance, paying off or sinking, etc.

The comprehensive nature of the book is exemplified by the coverage of such types as the R.A.N. Corvettes of World War II, every one of which 56 vessels is presented by a photograph and accompanied by a history of its career from building to disposal or loss. Similar treatment is accorded the 12 frigates, the 36 auxiliary minesweepers, the boom-working vessels and the many other types of minor craft of that period. The illustrated account of the present-day R.A.N. ranges through the complete spectrum of major warships, down to Diving Tenders, TRVs and Dockyard Tugs.

Assembly of the material in this book represents a quarter of a century's research on the part of the author. The purpose behind the work is to fill what has been long recognised as a gap in the annals of Australia's naval history by providing both details and pictures of the ships, many of which have either been completely overlooked or, through sheer lack of space, have received but scant mention even in the several monumental histories and other excellent books already published.

Readers of *The Australian Naval Institute Journal* who use the coloured AUSTRALIA'S SHIPS OF WAR order form inserted within this issue to obtain their copy will be directly assisting the funds of the Institute.

Author John Bastock, a member of the Sydney Chapter of the Institute, has persuaded his publishers to contribute a "commission" to the Institute for every copy sold on this special order form. All orders should be sent direct to Angus & Robertson Publishers at the address shown.

This is an excellent way to acquire an outstanding historical reference book of Australian naval ships — one that's likely to increase in value because it's available only as a limited edition — and assist our fledgling Institute at the same time.

John Bastock trained as a boy seaman in HMAS *Tingira*. On leaving the Navy after 10 years service he was a Leading Seaman Torpedo Gunners Mate, one of 3 at that time to wear the right and left arm badges simultaneously. Since then he has been an active member of many naval, nautical and historical societies both in Australia and overseas.

## "THE CONTINENTAL COMMITMENT"

by Michael Howard

Pelican Books \$1.35

Michael Howard is the Professor of War Studies at Oxford and previously occupied a similar chair at the University of London. In this new Pelican, he sets out to show how it was that Britain became a land power on the continental model in World War One, and now, after World War Two, has accepted that her eastern border is not the North Sea but the Rhine, where, under her NATO obligations, she maintains a permanent garrison force, the British Army of the Rhine. The author argues that this was all inevitable from the beginning, and he suggests that military commentators, such as Sir Basil Liddell Hart, who, in the 20's and 30's, advocated that Britain should never again engage in a continental war and should rely in future on a maritime strategy, were, at best, unrealistic, emotionally driven by their memories of the four years of slaughter in France.

In developing his thesis Professor Howard gives revealing glimpses into the workings of the Committee of Imperial Defence, the British Defence Committee, various British Cabinets, and the interactions between a great many prominent men in British public life over the last 70 years. He quotes liberally from official records and cites many references. The thoroughness of his research is impressive and he generously acknowledges the part played by his students' work. The book is well written, and I found it as compulsively readable as a novel.

The author puts forward the proposition that, when Britain had finally decided before 1914 that her most likely enemy was Germany and that she would be allied with France, there really was no other choice but to send an Expeditionary Force to France to fight at the main front. The reasons, he claims, were both military and political. Militarily, how could an outnumbered France be expected to fight Germany alone on land? And, the hard facts of logistics dictated the shortest line of communications back



to Britain. Politically, how could France trust Britain as an ally if it would not make a commitment of men to help redress the imbalance on the continent? He also quotes Schlieffen as having considered the prospect of a British amphibious diversion and welcoming it, as it would make his plan even more effective. It is all very plausible but I believe there is a much more fundamental reason why Britain engaged in this "act of suicidal idiocy".<sup>1</sup>

From my reading of the evidence I believe that a strong case can be made that it was not so much the political and military necessities which drove Britain to "seize the glittering sword of continental manufacture"<sup>2</sup> but quite simply better staff work from the newly formed British General Staff and the glaring deficiencies of the Admiralty in this regard. Perhaps this assertion needs some amplification.

The remarkable Jackie Fisher had been only too glad (almost malevolently so) to accept a seat on the Escher Committee which had been charged with re-organizing the Army after its apparent failings in the Boer War. As a result of the Committee's recommendations, the old office of Commander in Chief of the Army was abolished and a post of Chief of the General Staff, and an Army Council (on the lines of the Board of Admiralty) were established. As well, the country was divided into military areas and an organisation was created for a reserve on a territorial basis, the Territorial Army, to allow expansion of the small corps of regulars. The new Army Council in turn quickly established the General Staff. The War Office then had the planning staff, it had a potentially sizeable army to plan for, and it developed a well thought out argument as to how it could best be used. Fisher, on the other hand, refused to have a Naval Staff at all, and kept all such functions to himself. Although he got a small group together at RNC Greenwich (including Hankey and Corbett) they had no official status. So, despite Fisher's messianic pronouncements "the army is a projectile to be fired by the Navy", and "there was a stretch of hard sand ninety miles from Berlin. Were the British Army to seize and entrench that strip a million Germans would find occupation", when the decisive moment came in 1911, the Navy and no concrete alternative to offer. A vague Admiralty plan for a landing on German soil was no match for the Army's proposals which could be explained in detailed practical terms to the politicians who had the responsibility for the decision. One naval historian describes the difference at the fateful meeting of the Committee of Imperial Defence in 1911 like this, "... when Sir Arthur Wilson (1st Sea Lord) was faced with explaining the Navy's strategic role ... he could only stutter out salty inanities, while Sir Henry Wilson, for the Army, ran verbal rings around him".<sup>3</sup> In this light British acquiescence to fighting World War One on German and French continental terms was inevitable, but not, I suggest, simply on the basis claimed by Professor Howard. If Fisher, and later Wilson, had backed up the publicly professed philosophy of maritime strategy with a demonstrably practical plan for an amphibious assault on Germany it might well have been possible to convince, first the Army, then the French, that this was the best course militarily.<sup>4</sup>

In turn this could have swayed the political argument. No doubt those who support Britain's strategic choice in 1914 would say that the later fiasco at Gallipoli is further evidence that an amphibious operation against Germany would have ended in disaster; it would be, and it has been argued that the Franco-British alliance would then have been defeated in detail.

My contention is that if Fisher, in the first instance, had tackled the problem with the vigour, ruthless determination and disregard of convention he showed in the "Dreadnought" project the Admiralty could well have produced a workable solution and there is little doubt in my mind that the lack of a Naval Staff to help define the issues played a big part in this disastrous omission.

Professor Howard does not dwell on this sort of hypothesis; he has an opinion that it would not have worked anyway, and gives some supporting reasons, but he does not find it necessary to build to his conclusion from a closely reasoned argument. In disagreeing with him I must admit that I am luxuriating in opinion just as much as I consider him to be, and I make no claim to being unbiased. The mindless stupidity of slogging it out for four years in France is more than I can accept with equanimity. If only Gallipoli had succeeded! Perhaps this subject should be given more detailed examination and, using war gaming techniques, we might all get closer to the truth.

After Germany's early successes in World War Two I brought about an undeniable need for Britain to revert to what was, effectively, a maritime strategy. (call it what you will), Professor Howard stretches my belief in his objectivity again when he suggests that it all came back to a continental strategy in the end anyway. Well, of course, who would argue with the self-evident fact that eventually Europe had to be fought over, the land won and held? But, surely, the comparatively swift war of movement following the June '44 amphibious landings was a totally different matter from "eating barbed wire" (in Churchill's phrase) in a grinding continental war of attrition. I cannot resist the observation, perhaps very unfairly, that Michael Howard served in the British Army in World War Two and won a Military Cross, which may go some way to explaining his apparent desire to justify Britain's choice of a continental strategy in World War One, and again, initially, in World War Two. Despite his eminence, it seems to me that he really does not understand maritime strategy. Either that, or he has allowed some of seapower's more euphoric public propagandists to rattle him "... seapower could not, of itself, produce a clear military decision", he writes elsewhere.<sup>5</sup> Who has ever suggested seriously that seapower, "of itself", could produce all the answers? What he seems unable to accept is that without it there was, and is, no foundation for any kind of victory at all. And his mask slips right off when he describes post-Mahan theories of seapower as "sinking into naval minds, there to ossify into impenetrable orthodoxy." Such peevishness!

The book covers a great many other matters of politico-military importance from World War One to the end of World War Two and it is surprising how the reverberations from so many of these matters still find echoes in Canberra to bedevil us to this day. In addition, as we have now entered a period of history which is so often reminiscent of the 20's and 30's, present day practitioners at Russell Hill might find some useful clues as to how they could avoid some of the booby traps which caught them in Whitehall in those days. There is precious little new under the sun. Without asserting a narrow parallelism at all, the book has a relevance to what we are doing today and is worth reading on that account alone, apart from its intrinsic interest as history.

Do not let my quarrel with the author put you off; on the contrary, I strongly urge you to buy the book and read it. You will learn a lot. Did you know, for instance that the three British arms between the wars were all preparing for different wars with different countries? We won't make that sort of mistake again, will we? But this sort of revelation makes one wonder how some of our agonizing over Australian Defence problems today will look to some historian in the future.

J. A. R.

1. Admiral Sir John Fisher.
2. Liddell Hart "The British Way of Warfare".
3. D. M. Schurman.
4. Theodore Ropp's "War in the Modern World" p 232 implies that such an alternative could have been acceptable to some Army opinion.
5. "Mediterranean Strategy in the Second World War". Michael Howard (Wiedenfeld and Nicolson, London)



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