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The front cover: *USS TEXAS* —courtesy USN

# FROM THE EDITOR

I am pleased that we have been able to procure another coloured front cover and I would like to think that the habit will become well-established, but it all depends on our advertisers: if we have a coloured ad, then at very little extra cost we can run colour on the cover. May I take this opportunity to thank all our advertisers, regardless of their colour, and our advertising sub-editors, Ian Noble and Frank Allica.

This edition contains a mixed, but interesting collection. Without running through all the contributions, I would like to draw your attention to a couple of pieces on little known subjects. Ken Mathews has responded to the earlier call for articles about the smaller establishments and has brought *HMAS PORT WAKEFIELD* to our attention, whilst Frank Allica has delivered a very illuminating article on an RAN 'first' — the bridge simulator project. The RAN Staff College ANI Silver Medal was won by Lt Cdr Farrell and his essay follows along the lines of the earlier piece by Frank Allica on the way ahead (there is also some interesting correspondence on that subject). Another Staff College paper has been given a new lease of life by Peter Clark: though written a few years ago, he still felt that his views on Defence decision making were apposite today. To round off this summary of the contributions, there are some Washington Notes that echo the views expounded by Sir VAT Smith (by the way, Tom Friedmann is looking for a copy of Vol 1 of the Official History of the RAN in WWII — any help?); the Assistant Editor, Haydn Daw, has a further article on training which is not as esoteric as it might seem; and Kim Bayly-Jones poses the question of when best to introduce young officers to the intricacies of Head Office.

My predecessor, Robyn Pennock, is keeping me well supplied with Ships and the Sea articles, with special reference to the shipping industry centred on Adelaide, but there is still plenty of scope for other budding historians. Another former editor, Dick Perryman, is to be congratulated on his gong in the last honours list, and one of our major contributors over the years (strangely silent at the moment!) has been awarded the Captain Guiness prize of £100 by the Naval Review — well done, James Goldrick.

Elsewhere in this edition, you will find notices about SEAPOWER 84, currently scheduled for April 1984, and for this year's AGM on the 28th October 1983. An unpopular issue is annual subscriptions which are now due for renewal; despite my exhortations as Secretary last year, there were far too many late payers, so please send your cheques off now.

Lastly, two more thoughts for the future. The next edition of the journal will definitely be on the related themes of oceanography, meteorology (with an article from our correspondent at the America's Cup), hydrography, law of the sea, and coastal surveillance. Intending authors, and those in positions where they can persuade intending authors to put pen to paper, please note that the copy deadline will be the 24th October; the earlier the better. The Art sub-editor, John Mortimer, and the Distribution sub-editor, Charlie Lammers, are both keen photographers and collectors of pictures of ships. They have suggested, and I have passed to the Council for consideration, that as there is no central repository of historical photographs in the RAN, including those being taken today by Service and civilian phots, the ANI might like to consider organising such a service. I do not want to be deluged with negatives, prints and photo albums in the next few weeks as the project is no more than a fascinating thought at the moment, but I would like our readers to think about the implications and possibilities and perhaps send ideas to us.

**Geoff Cutts**

# SEAPOWER 84

Following the outstanding success of Seapower 79 and Seapower 81, the Council of the Australian Naval Institute is planning our Third International Seminar to be held in Canberra on 27th and 28th April, 1984.

Seapower 84 will explore the subject of Australia's maritime dependence. Speakers of national and international renown are being gathered together to address this subject from the viewpoint of strategy, politics, industry and diplomacy, commerce and media. The Chief of Naval Staff is amongst these distinguished speakers and it is hoped that the seminar will be opened by His Excellency the Governor-General.

The next issue of the Journal will contain further details; in the meantime, note your diary.

# ANNUAL SUBSCRIPTIONS

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# Correspondence

**CONSISTENT STANDARDS**

Dear Sir,

In the haunts where Ancient Mariners lurk, the conversation all too often, especially after a couple of gins, tends to bewailing the way it never blows like it used to, and how the modern Navy is not like of old.

How reassuring then to this AM to learn from the February 83 issue of the Journal, that the Nelsonic virtue and chivalry to the weaker sex is still present — vide John Whittaker's article. I am sure that he looked after the lady in distress in the same way that Nelson did Emma Hamilton.

Also it is clear from Don Fry's address that the same standards can be expected from the Naval Stores branch as applied 27 years ago.

So, at least in some respects, it does blow like it used to.

Yours faithfully,

**R.J. Bassett**

**COMMEMORATIVE PLAQUES**

Dear Sir,

On Sunday the 24th of April, we saw on the TV news, a report of the unveiling, with due ceremony, of a Naval plaque at the entrance to Man of War Steps, Farm Cove, Sydney. Readers may care to know that the inscription reads:

'This landing area was erected for the Royal Navy in 1913. For 150 years, Man of War Steps served as the landing and embarkation point for the men of the British and Australian Fleets in peace and war.

From these steps, 2,215 officers and sailors of the Royal Australian Navy left to serve their country in the Great War of 1914-1918, the Second World War 1939-1945, Korea, Malaya and Vietnam never to return to enjoy the fruits of their labours in their native land.

"Ye who tread their footsteps
Remember their glory."

Erected by the Naval Association on the 20th January 1983.'

A plaque on the eastern side of the Steps reads:

'In conjunction with the official opening of the Sydney Opera House in 1973, The Store Jetty, known as Man of War Steps, was restored jointly by the Dept of Public Works and the Maritime Services Board, when a ramp and berthing pontoon were added to the structure.

The Store Jetty is situated near the site of the private landing steps built during the administration of Major General Lachlan Macquarie, Gov of NSW (1810-1821) and for a period, formed one of the walls of a small boat harbour situated to the west.

In Admiralty charts dated 1857 the Store Jetty was named "Watering Place" and no doubt was used by vessels at anchor in Farm Cover to obtain water supplies. The use of the jetty for the movement of personnel and stores to and from naval vessels moored in the (Farm Cove) Man of War anchorage nearby, early last century, and the facilities continued to be used by the Royal Australian Navy until work on the present reconstruction.'

Another interesting plaque, unveiled by Admiral Sir Victor Smith in 1981 is in Parramatta and reads:

'This memorial was erected by the Council of the City of Parramatta in conjunction with the Naval Historical Society of Australia to commemorate the service of all ships who bear the name *PARRAMATTA* in the Royal Australian Navy: *HMAS PARRAMATTA* (Torpedo Boat Destroyer) 1910-1928, *HMAS PARRAMATTA* (Sloop) 1939-1941, *HMAS PARRAMATTA* (DE) 1959. The stern of the Torpedo Boat Destroyer, first ship built for the Royal Australian Navy, is embodied in this memorial. It was the last class of British warship designed with an outboard rudder.'

And finally, a couple of ideas for the Council and members to consider. How about the ANI Council issuing members with some form of membership card for use as a means of identification when visiting ships and depots (especially useful for Associate members)? How about the Institute insignia made up as a coat badge? And how about a special ANI birthday card to celebrate the RAN's 75th birthday?

Yours faithfully

**Eric Jehan**

## MARITIME OPERATIONS

Dear Sir,

In his letter 'Maritime Operations' in your May 1983 issue, Air Vice Marshal Candy waffles furiously in the finest traditions of blimpdom — the impertinence of that young puppy Allica to dare suggest there may be a case for the Navy running its own air! Obviously the youngster has never studied any history and is totally ignorant of the subject, a handicap he shares with the unfortunate Americans, Russians, French and other ignorant foreigners who at this very moment are expanding naval air as fast as they can lick.

Come to think of it, however, why do we need a separate Air Force at all? A very good case can be made for the RAAF being declared a redundant Service whose personnel and equipment would be better employed shared as requisite between the older Services, with any surplus funds thus released becoming available for the purchase of hardware relevant to defence, rather than to the acquisition of aerial hot rods orientated exclusively to the pathetic vision of a replay of the Battle of Britain forty years on.

Such an initiative would lead to the abandonment of various absurd 'combined' schools which exist only as a result of the present aberration of the existence of a surplus Service, and also to the elimination of the unedifying spectacle of Admirals and Generals in an operational situation grovelling for vital support, which the Air Force as presently constituted is perfectly entitled to be 'too busy' to provide.

Yours faithfully,
**WOC Roberts**
**LCDR RAN (Ret'd)**

*The following two letters were printed in 'The Canberra Times' following AVM Candy's letter in the last Journal.*

Sir,

Air Vice-Marshal C.D. Candy's letter (*The Canberra Times*, April 20) invites response.

I have not yet read Lieutenant-Commander Allica's article, allegedly proposing that the RAN should "... take control of the RAAF's maritime-patrol squadrons ..." However, I do not believe this suggestion should be dismissed lightly, as the Air Vice-Marshall suggests, on the basis that it has been discounted in the past. Circumstances have changed greatly in recent years, and we need to make the best use of our limited assets and resources.

I think Air Vice-Marshal Candy sums up the issues very well. To quote him: "They are crystal clear — let navies continue to control operations against forces on or below the surface of the sea, whilst air forces must continue the exercise of air power in all of its roles, including maritime reconnaissance and maritime strike".

But should we — using this logic — develop a fourth (and separate) arm of the Australian Defence Force: a Royal Australian Submarine Force, if you like, "to exercise submarine power in all of its roles, including maritime reconnaissance and maritime strike"?

Of course not! But what Air Vice-Marshal Candy, and so many others, overlook in this obviously ongoing argument is that the "issue" is not surface, or sub-surface — or air; clearly, it is *maritime*.

A definition may clarify the matter even further: maritime is defined in different dictionaries, variously as "connected with the sea"; "relating to navigation, shipping", etc; "pertaining to the sea"; "bordering the sea"; or "nautical". Air, surface and sub-surface are artificial divisions — designed, perhaps, to retain and protect the status quo.

And despite his assertion that RAAF maritime-reconnaissance crews have "... through exercises, inter alia, *with similar forces* of many other nations, built up international recognition of, and renown for their expertise and performance", the true measure of their expertise must be their experience and knowledge of *maritime* matters.

This includes the way naval officers think. (After all, they comprise the opposition — in fact, not just in the mind). It includes the effect which inclement weather, for example, has on ships and men who spend long periods at sea (without returning to the comfort of home, and without time off to recover from "fatigue" at the end of the sortie).

These may seem tenuous requirements — perhaps they are. But it proves, surely beyond doubt, that the maritime reconnaissance crews only have that knowledge of the maritime environment which can be gained from the air during each sortie. At best, this must be described as limited.

Therefore, perhaps Lieutenant-Commander Allica's suggestion is not as unsupportable as Air Vice-Marshal Candy makes out; perhaps the maritime patrol squadrons should be put into the hands of the experts who best know the maritime environment (and the opposition).

Might I add — noting Air Vice-Marshal Candy's heavy reliance on British precedent — that in the late 60s/early 70s the British Government (like our own in 1983) decided to pay off the Royal Navy's carriers on the assumption (like our own in 1983) that the Air Force could and would support the Fleet.

However, even with a larger air force which included tankers, a smaller coastline to protect, and many more airbases suitable for modern aircraft, the Royal Air Force was unable to provide the necessary support. As a result, the Invincible-class carrier and STOVL aircraft, which proved essential to the success of the Falklands campaign, were developed.

The lesson for Australia is clear — as time will tell.
**N.C. Hyland**

Sir,

With all due respect to Air Vice Marshall C.D. Candy RAAF (Retired) I wish to take issue with his letter of 20 April. I can find no evidence which would suggest that the RAN has made a serious attempt to take control of airforce's maritime squadrons and it would appear that Navy has had no aspirations to achieve these ends, certainly in the recent past.

An analysis of most major navies of the world shows that in almost every case operational command of maritime forces, including maritime patrol aircraft

(MPA), is exercised by naval command. Air Vice Marshal Candy's reference to the British example is in error as operational control of MPA in the UK Defence Force is permanently delegated to AOC 18 Group who is operationally responsible to CINCFLEET. Of particular interest is the US Navy who not only have operational control of their MPA but fly and maintain them highly successfully as an integral part of the USN. It is obvious that the Australian system of operational control is out of step with the rest of the world.

The present Australian maritime command structure is similar to structures overseas but is activated only for exercises and in time of war and/or tension. Joint Force exercises continually highlight flaws in this system which are difficult to correct because of the lack of continuity in command and control and the need for tri-service agreement to any change. Clearly the command structure in peace should be the same as in war and this requires the continuous appointment of one maritime commander in control of all maritime assets, air, surface and subsurface to conduct operations in all facets of maritime warfare. Only Navy has the maritime expertise to exercise this command.

This proposal is not inconsistent with the statement made in February 1983 by the Minister for Defence in outlining the present Government's policy on Defence. A commitment is implied in this statement to organize a single, multi-service maritime command which would include all sections of the Defence Force devoted to defence of trade, Australian maritime supply lines, protection of Australia's coast and resistance to an enemy force.

I agree with Air Vice Marshal Candy in his recognition of MPA personnel and I applaud the dedication and expertise of the RAAF air and ground crews of the maritime squadrons. I also agree in light of a no carrier decision by the Government, that navies should "continue to control operations against forces on or below the surface of the sea". My proposal for Navy to take control of the MPA squadrons would provide a maritime commander with control of aircraft which are tasked in operations against forces "on or below the surface of the sea".

**F.A. Allica**
**Lieutenant Commander RAN**

## TRAINING AND EDUCATION

Dear Sir,

I would like to comment on a number of points made by Father Michael Head in his letter to the ANI Journal of November 1982. I have three major concerns with his letter:

- I cannot accept that education and training are an ill matched pair, at least in the RAN. I do not see education and training as discrete entities and I believe there are examples in Navy where education and training sit fairly happily together.
- Secondly, I reject the implication that naval officers are trained and not educated.
- Thirdly, while the study of Latin, Greek and so on may lead a person to think systematically, there is no guarantee of this.

It is dangerous to get into a position of trying to define training and education and there is little useful purpose in doing so here. The difficulty is illustrated by reference to Father Head's letter where the problem of separating education and training is illustrated. For example 'An educated mind has such a training . . .'. The popular conception of education and training will do. That is, training is usually related to the learning of specific tasks for a job, and education is generally broader in nature, a preparation for life or a whole variety of tasks or performances. The important point is that both involve learning and can be reflected in human performance. I see education and training as being more on a continuum rather than discrete entities and much instruction, even in the RAN, contains elements of both. This certainly applies in the case of officers where the concentration is on education in early service.

With regard to my second concern, surely no person familiar with RAN officer development would want to argue that it was not balanced on the education — training continuum. Father Head appears to be suggesting that it is not. Many Servicemen may think the pendulum has moved too far towards education. Naval officers have been attending the University of NSW and completing degrees, or completing other educational courses at the Naval College for over a decade now. Yes, some of them are even completing arts degrees and arguing moral and political questions in tutorials.

Of course it does not end there as it does in many organizations. Besides developing officers in naval skills during their careers, the educational process is also continued. Officers attend a wide variety of educational institutions both Service and civilian, within Australia and overseas. My experience would suggest that naval personnel are at least as interesting and stimulating in social settings as most other occupational groups.

My third concern relates to Father Head's claim that 'an educated mind has such a training that a systematic way of thinking . . . is second nature to it'. If by 'an educated mind' Father Head is referring to someone who has been educated in the normal sense, then this claim is simply not true. It may be true, but there is no certainty about it. My personal experience in the field of training is that there is no guarantee that an educated person, such as an arts graduate, will approach course design in a systematic manner.

I am not sure how much contact Father Head has with naval officers today. If he has found the older brigade like me lacking in education then I can assure him it is not the same with the younger officers.

The RAN is most conscious of the need to develop its members through education and training. I believe the RAN, and the other Services, places a strong emphasis on education in the officer development program. No one would want to argue that the system is perfect, but it is designed to incorporate revisions based on changing needs and feedback received on the product.

**H.L. Daw**
**Commander RAN**

# DEFENCE DECISION MAKING AND A MILITARY STRATEGY

By Lieutenant Commander P.L. Clark RAN

*(This article was written early in 1979 whilst I was a member of RANSC 1/79. Aside from some minor editorial changes I have made, the thrust of the essay is unaltered and therefore presents itself as a statement relevant to that time. PLC)*

The Department of Defence decision making process has been the subject of quite intense political and public debate during recent months. The major thrust of the criticism has been fuelled by the new capital equipment requirements of the military. Accusations have ranged from wild inaccuracies (FFG costs) to some piercing truths. Happily, Government machinery has been activitated to deal with the latter.

It is quite apparent that particular emphasis has been attached to the capital equipment decisions made in the Department despite the fact that new capital equipment only accounts for a relatively small proportion (14 percent in 1978–79) of Defence expenditure. Accordingly, this essay will examine the context in which capital equipment projects have assumed such a priority, the decision making processes woven into their development, and the consequent impact on a military strategy.

## THE SIGNIFICANCE OF CAPITAL EQUIPMENT

Despite the fact that capital equipment projects account only for a small proportion of Defence outlays, their importance is readily apparent when one considers the long term effects of a decision to acquire a particular piece of equipment. For example, *HMAS MELBOURNE* has already been in service for over 20 years and her retirement is still some way off. Similarly other ships in service in the RAN have projected lives ranging from 20 to 35 years. Tanks, aircraft, in fact nearly all military fighting hardware, have predicted lives generally exceeding 15 years. Thus, today's capital equipment decisions have a long term effect on the force structure and capabilities of our armed forces.

Since Australian military strategy is largely derived from existing and predicted short-term capabilities, today's decisions on capital equipment will have a long-term influence on a military strategy. For example, a decision to replace *HMAS MELBOURNE* in the early 1980s would see the new ship contributing a capability and hence impact on strategy until about the year 2030. Yet the decision on whether to replace such a capability will be based on current strategic assessments whose validity declines exponentially with time. Although such assessments are notoriously deficient in their predictions of specific events, such as Iran and the North Vietnam/China confrontation, they are reasoned and therefore should contribute in part to the decision making process.

For those who may feel that the derivation of strategy from capabilities has got the horse and cart out of sequence, it is worthy to examine many of the Department's statements concerning Australia's independent capability to cope with 'low level contingencies within our region'.

This situation really describes a new Australian definition of strategy — something I would call 'tactical strategy'. In response to the question 'How well placed is the ADF to deal with this situation (scenario)?' the reply is based on tactical application of a particular range of

**The Author**

LCDR P.L. Clark, DFC joined the RAN as SL Aircrew entry in 1966 and undertook flight training with the USN at Pensacola, Florida. Having gained his wings, initial postings in the RAN were to 725 and 723 squadrons as a helicopter pilot. Following service with the RANHFV (69-70) he then joined VC 724 squadron for Macchi and Skyhawk conversions. Service in the jet community has included tours on VF 805 and VC 724 squadrons, specialisation as an Air Warfare Instructor and later as NAS Nowra's Station Air Warfare Instructor. Prior to commencing the first RAN staff course, LCDR Clark was serving in the Naval Materiel Division at Navy Office. He was Senior Pilot of VF 805 Squadron 1980-1982, and is currently Commanding Officer of VC 724 Squadron.

capabilities. Hence Australian strategy largely reflects a response to what is considered to be a plausible (and manageable) threat to the nation. The broader aspects concerning our regional and global responsibilities in both a political and military sense are given scant, if any, attention. Such weakness in grasping the true elements of strategy is clearly demonstrated by the fact that the Army and RAAF pursue a 'continental defence' strategy, whilst the RAN pursues a strategy firmly based on regional (and global) considerations.

Whoever is right is irrelevant to the view that capital equipment decisions reflect the need for a particular capability, yet the decision-making process is excessively based on 'tactical strategic' thinking. Once acquired, a particular capability forms another cornerstone for further 'tactical strategic' decision making processes. The consequence of this situation is that our 'grand strategy' is gradually altered as a result of capital equipment decisions — not the reverse.

Of course, many would disagree with this view. For those, the aircraft carrier is a classic example. A decision not to acquire a replacement for *HMAS MELBOURNE* would enforce a considerable reduction in terms of the RAN's blue water or open ocean capabilities. Having achieved consensus on this point (a relatively simple task) greater momentum would follow for the protagonists of a 'brown water', patrol boat and submarine navy. The consensus of such a prediction must be an irreversible trend towards a defensive continental strategy.

## GOVERNMENT POLICY AND GUIDANCE

The major contributing factors in the decision making process are Government policy and the guidance issued for the implementation of that policy. Although this is as it should be, there are other considerations that have an impact on this aspect which is so critical to the efficient development of the Armed Forces.

Firstly, the division of financial resources amongst competing government departments is of critical importance to the political survival of the Government. Hence allocations to the competitors are generally commensurate with their predicted cost effectiveness in political terms. With firmly established guidelines for the division of resources as a percentage of GDP, government departments such as Defence tend to receive a fixed share during peacetime. This has significant implications for Defence decision making and these will be discussed in more detail later.

A second and most important factor which contributes to the formulation of Government Defence policy is the attitudes of the public towards defence issues. It is suggested that there is a fundamental difference between the present Government's desire to exert a truly independent influence on international affairs which is not matched in all cases by the predominating attitudes of the public. One of the most basic differences between the two exists in the defence area.

Public attitudes towards defence have largely been moulded by the major military conflicts of this century. Australian participation in these events can be broadly described as a series of voluntary contributions to the call of major allies. Australia has yet to conduct a totally independent military operation guided only by Australian political and military considerations.

This transition towards our new political ideals begs the question as to what the Australian Government is willing to do in military terms to support these ideals, particularly those of a foreign policy nature.

Although both the Soviets and Americans continue to utilise their military forces effectively to support their foreign policy initiatives, the Australian Government appears to be undecided on this issue. The reason for this vacuum, and hence the absence of appropriate policy to guide the development of the Armed Forces, is the proposition that public attitudes still reflect our previous style of military involvement — a contribution to someone else's involvement. If the public can not keep abreast of our changing political situation and therefore not understand the new implications for the military, then the Government does not possess the requisite resolve of the people to pursue its political aims.

Predictably, the Government has hedged its bets on matters of defence policy by alluding to a real commitment to: regional stability (in military terms), ANZUS, and the Defence of Australia.[1, 2] With such a broad policy, the Government can be seen to be fulfilling both its international and national responsibilities. However, in terms of Defence decision making, this policy is so broad that it is by necessity subjected to much interpretation because inadequate financial resources are provided to meet such a wide range of Defence responsibilities.

### Problems With Defence Decision Making

The major problem associated with Defence decision making rests with the framework around which Government policy is established. This framework generates the following competing demands which arise from the inadequate provision of financial resources:

- A trade-off between requirements for the defence of Australia and those stated commitments to our region and to ANZUS.
- The relatively standard allocation of financial resources invariably leads to competing inter-Service requirements.

Given this imbalanced situation, it is understandable why some military and political leaders are moving towards far greater emphasis on a 'Defence of Australia' policy. In February 1978, the then Chief of Naval Staff, Vice Admiral A.M. Synnot made the following statement in the context of his assessment of the RAN:

> There has been a fundamental transformation of the strategic circumstances that governed Australia's security throughout most of its history. In particular it should be noted that it is no longer practicable to pursue the earlier policy often termed "Forward Defence". The first call upon our Defence Force must now be in respect of our own national security'.

Similarly, the then Minister for Defence, the Honourable D.J. Killen stated:

> 'We must sustain a defence force which supports our diplomacy so that both, in combination, effectively deter interference with Australia's sovereignty by the military forces of a foreign power. We must sustain a defence force containing men with the right skills, possessing the right weapons, that could train and develop an expanded force as and when a major threat to Australia begins to emerge'.[4]

Whether or not these attitudes reflect a trend towards a fundamental change in Australian Defence policy is irrelevant at this time since they are not formally acknowledged. However, it is quite possible that they do influence the decision making process.

## DEFENCE DECISION MAKING PROCESS

Having established the framework within which the decision making process must operate and the obvious constraints upon it, the process itself will now be examined.

### Five Year Defence Program

The basis for Defence planning is the Five Year Rolling Programme (FYRP) system which enables the projection of both existing and new financial commitments to be managed in accordance with the estimated Government allocation of funds. The Five Year Defence Plan (FYDP) is a specific five year element of the FYRP and will be the term used throughout this discussion. The FYDP for budget purposes, is broken down into two major components:

- *Process A* The projection of existing commitments, including all minor capital equipment projects.
- *Process B* The projection of new unnapproved major capital equipment proposals and facilities.[4]

This article examines only Process B which is a reflection of the Service bids for new major equipments. These bids have been the major source of debate and criticism directed at the decision making process.

### Policy and Planning

The 1976 Defence White Paper established Government policy for the development of the Armed Forces. Since this document is not specific and alludes to wide ranging military capabilities and commitments, it is understandable that the individual Services are concerned with its translation into more concrete statements as to actual capabilities.

Hence, Service bids for the FYDP process reflect their interpretation of the capabilities required to fulfil allocated functions. The important point to note here is that the Services are making the interpretation of Government policy. The validity of these bids will be critically examined at routine intervals by the Defence committee system. However, the fact remains that this examination can be nothing more than a refining process based on further interpretation of the capabilities required.

Two projects appear as excellent exampes of this process: the Tactical Fighter Force (TFF), and the Aircraft Carrier replacement. These projects have stimulated a great deal of debate and criticism both within the Department and in the public arena. Such debate has largely centred around either the fighting characteristics of the TFF (fighter/air-to-ground) or whether Australia needs an aircraft carrier at all. Both lines of argument are pure interpretation.

Much to the chagrin of many, a formal transition towards 'Defence of Australia' would not clarify the situation at all. The TFF could still be argued as a pure fighter or as an aircraft with some capabilities for maritime strike, whereas Navy could highlight our critical dependence on maritime trade and would be concerned with exerting a deterring influence in the 'focal' areas. These 'focal' areas can be interpreted to be as distant as the Persian Gulf, and hence necessitate the retention of various capabilities such as an aircraft carrier.

Thus whatever the actual working is of the

current style of Government policy, the battles will continue to be fought over interpretation. One of the fundamental problems here is the fact that the Services are basing their inerpretations on actual capabilities for war, Yet our political ideals are aligned towards the preservation of international peace and stability. Perhaps our Armed Forces should be more concerned with the maintenance of peace, rather than the prosecution of war — a subtle difference.

If this is a reasonable proposition, it begs several questions. What is the Government willing to do for the preservation of peace? Would public attitudes be in favour of any intervention in the affairs of another nation? Finally, why is there a movement in political and military thinking towards a 'Defence of Australia?'.

It is neither intended to argue the case here for this subtle change in policy, nor to promote the notion that the Government should dictate all military activities, but rather to highlight a view of the clouded atmosphere in which Defence decision making operates. Moreover, there is a fundamental divergence between the political and military strategies. The former is biased towards the maintenance of peace and the latter towards the prosecution of war.

In fact it could be said of the military that they are so entrenched in their study of scenarios to justify their fighting capabilities (or the deficiencies needed to acquire new capabilities) that they fail to perceive and comprehend their political functions which are fundamental to their existence. Similarly, it would be fair to say that their political masters have yet to understand the implications for the Armed Forces with respect to Australia's new political ideals.

### Financial Resources

The major factor which dictates the range of military capabilities which can be maintained or introduced is the annual budget allocation to Defence. As mentioned earlier, this tends to be a relatively fixed amount in the order of 2.6% of the GDP. The management of this allocation largely rests with the Department and there are a number of significant problems associated with this task.

Before examining this matter further, it is important to note the pressures placed on the Armed Forces as a result of the increasing bids for capital equipment. Firstly, since funds are not separately earmarked by the Government for the introduction of new equipment, the Department must manipulate the budget allocation to accommodate the Service bids. Any percentage increase in capital equipment spending would have to be matched by a compensating reduction in another area. The likely targets for such activities are the manpower and operating allocations, which together account for more than 80% of the Defence budget.

Since undermanning is already a serious problem, compensating financial reductions are invariably made against the everyday operating costs of the Services. Whilst the effects of cuts against steaming time, flying hours and ammunition are obvious, they are of a far more insidious nature when the logistics arteries are restrained.

As the Services enter an era where many major equipments require replacement, the present methods of manipulating the Defence Vote will place intolerable demands on the day to day operations of the Armed Forces.

These palliatives have been accompanied by a tendency within the Department to defer decisions on new capital equipment purchases. Such deferrals have heightened competition among the Services for the limited funds available for this purpose and have exacerbated the demand for capital equipment funding in the 1980s.

In order to retain only present capabilities, decisions will have to be made during this period to replace many of the major equipments now in service. Navy's case is particularly grave since the majority of its major combatants reach the end of their lives before the turn of the century. The long lead times associated with warships acquisition highlights the demand for timely decisions during the 1980s.

The following represents a short list of Service bids for which decisions on replacement will have to be made during this period, purely to retain existing capabilities:

- Aircraft Carrier (including aircraft)
- three DDGs and six River Class DEs
- fleet underway replenishment ship
- six Oberon class submarines
- Tactical Fighter Force
- artillery equipment
- utility helicopters.

At current rates of funding for capital equipment, these requirements represent at least 15 years' worth of expenditure. Add to this figure the remaining large number of demands also to be charged against capital equipment, then the problems for future Defence decision making are staggering.

Undoubtedly, the Department recognises this fact. However, nothing can be done to alleviate the situation until such time that a fundamental change is made in Government policy concerning budget allocations to Defence.

## CONCLUSION

The Department of Defence decision-making

process which has evolved to deal with the new capital equipment requirements of the military has attracted a good deal of debate and criticism. One of the major reasons for this is the fact that these new capital equipment requirements form the cornerstone of military capabilities for a considerable period, which in some cases span more than 30 years. Moreover, it is upon these capabilities that a military strategy is derived.

The major considerations that impact on this decision making process are the interpretations made by the individual Services and the Department concerning the translation of Government policy into military capabilities. The extent to which these new capabilities can be introduced is then dictated by the Government's allocation of financial resources.

Government policy and the funds allocated for its implementation form the backbone of the Defence decision-making process. Yet the Department has diverged from the Government over the interpretation of policy. The military is too concerned with its capabilities for war, whilst the Government pursues the preservation of peace. This subtle divergence is then clouded by a transition in military and political thinking towards a 'Defence of Australia' policy. Such a transition is in fundamental conflict with our new independent political ideals which strive for the preservation of international peace and stability. Such a policy on international affairs is without substance if a nation is only concerned with an introspective outlook on defence issues.

Therefore, the very basis of the present decision-making process is at worst in direct conflict with our long term political ideals and at best, clouded by the appropriate interpretation of Government policy. Even so, under existing guidelines, the present process will be inoperable during the 1980s because the significant demands for new capital equipments required to maintain only existing capabilities could not be funded under these arrangements.

Hence an Australian military strategy, which is largely derived from our military capabilities, is unlikely to be aligned with the political functions which are fundamental to its existence.

**Notes**

1. 1976 Defence White Paper.
2. Hon D.J. Killen M.P. Statement to the House of Representatives 29 March 79.
3. Op cit p. 5.
4. Minor capital equipment is defined as that which has no significant force structure or joint Service implications and a total cost of less than $5.0m with no individual piece of equipment costing more than $0.250m. An equipment proposal which exceeds any of the above criteria is defined as major capital equipment.

*HMS RAMILLIES*

A. & J. Pavia

Supplied by J. Mortimer

*The author was awarded the ANI Silver Medal for this essay submitted during his attendance at the RAN Staff College*

# THE EXPLOITATION OF TECHNOLOGY BY THE RAN DURING THE NEXT TEN YEARS

by Lieutenant Commander D.J. Farrell, RAN

Much has been spoken and written in recent times about the impact of technological change on our society. Many of these words have been emotive; few show a real understanding of the change. Many words have been about the computer revolution, but this is only the most obvious aspect of the technological change. It is a symptom of a larger revolution not the cause. The real technological revolution is the result of devices and ideas. They are the result of research and development. The discovery of two devices, the transistor and the integrated circuit, led to the development of another device, the microprocessor, which allowed an idea to become the stepping stone for the computer revolution. We read in our newspapers and journals that Australia has fallen behind in this technological revolution. We all use its by-products. Many of us are employed as a result of it. Yet few of us earn our living from it.

For the Royal Australian Navy (RAN), the technological revolution is apparent. Much of its equipment is becoming obsolescent. The cost of replacement equipment is high and rising more rapidly than the inflation rate. The availability of manpower to operate the equipment is low and its cost is high. The RAN's ability to operate, repair and replace its equipment is decreasing as a result of economic pressures on the Defence budget. The RAN must soon determine what ships, systems and equipments will be necessary for its continued operation into the twenty-first century and how to obtain them. This essay does not attempt to define what the RAN needs. It proposes that there is an alternative method to those practised in recent years for the RAN to get what it needs. Much of our Navy's needs can be designed and built in Australia with ensuing benefit to the nation.

Much of the technological advantage enjoyed by the USA is a result of defence-centred research and development; their space programme can be considered as an advanced arm of the Defence Department. However, the USA does not hold an industrial advantage commensurate with its technological advantage. The reasons are complex, but one may be a result of poorly directed investment. There appears to be a management emphasis on short-term profitability rather than long-term dominance.

A long-term, defence-related plan for Australian industry, which is beset with similar problems to those in the US, can provide us with at least a regional technological and industrial advantage. Defence can provide the stimulus for such a plan and will directly benefit from it. The RAN can be in the vanguard of this plan by supporting the exploitation of technology by Australian industry over the next 10 years. The Navy's aim should be to sponsor a planned research and development effort over 10 years which would allow the production of equipments, systems and platforms in and for the future.

## EXISTING POLICIES

The Australian Defence Department and Defence Force have a predilection for self study and internal review. A significant number of investigations have been made and reports written in recent years. Yet the benefits of changes arising from these studies have often seemed lost in the bureaucratic jungle. Perhaps it is time to

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forget the investigation and get on with the job of defending Australia and Australia's interests.

### RAN — Past and Present

For the past 30 years, the RAN has been a carrier-based Navy. Equipment purchases, tactics, training and manpower have been selected with the underlying assumption of always having a carrier. Now there is a void that may be difficult to fill. The RAN must ignore the void — it can only be filled by another carrier, and a replacement is not in sight. The RAN is at a crossroads; a significant milestone has been reached, albeit (outwardly) unexpectedly. The milestone was achieved with the assistance of years of study which now must be forgotten. The Navy must advance, not reflect nor argue. There is room for a host of new ideas; a lot of old thinking must die. The future is now important, the past largely irrelevant.

The RAN has been buying overseas for much of its life. Early years saw, for traditional reasons, a dependence on the United Kingdom; later years show a dependence on the USA; scattered through the years have been some local developments and local building of overseas designs. The reliance by the RAN on overseas expertise will continue in future years unless a major change of ideas is chosen by or forced on the Navy. Two, major RAN projects — the new submarine and follow-on destroyer — will be to overseas design and most likely built in Australia. These may be the only major RAN ship acquisitions in the next 10 years.

There is some cause for concern if the next destroyer purchases are FFG 7 Class ships as presently planned. They will represent 20-year old technology when completed, for they were designed in the early 1970s. The RAN is likely, in order to achieve commonality of equipment in service, to install equipments which will have been out of production for several years in its 'new' FFGs.

### A Basis for the Future

During the next 10 years, the RAN is likely to select, and eventually buy and build, technologically old ships for its surface force. With the carrier now gone, there is time to rethink the concept for future purchases. More modern equipments are available and can be selected and installed, new systems can and will be produced. There must be a break point from existing systems and equipments to new ones. If the RAN is forced to change its concepts of operations as a result of the carrier loss, the time for that break may be now. The types of ships and systems for a new role are likely to be different. The new concepts of operations can form the basis for a change in technology and a change of source.

Recent experiences in the British Falklands campaign may have demonstrated that some concepts of ship design should be reviewed. The many dollars spent in making destoyers such as the *SHEFFIELD* Class less vulnerable through ship design may be wasteful. Survivability is a matter of detection and destruction of the enemy, away from the naval platform. A simpler ship design can be contemplated if sufficient defences are provided. Australia has the ability to design and produce ships, ship systems and equipment. What is lacking is the commitment to a research, development and industrial effort to do so. The Defence Force and Department policies may be the reason that this state exists. A policy change can convert the ability to a reality.

## A CONCEPT FOR THE FUTURE

An ideal goal for Australia would be to seek future domestic production of Defence Force equipment, though the basically conservative nature of Australian society may make such a goal seem to be an impossible dream. Considerable Government investment would be needed and the present political and economic climate may make the dream possible. A positive commitment is required.

A realistic goal may be to seek an increasing share of defence procurement from domestic sources. To achieve this goal will require sacrifices by the Defence Force, Government and population. Considerable initial investment in research and development will be needed; first production may be several years away.

To achieve domestic defence production will require close co-operation between the Defence Force and Department, Defence laboratories, Australian industry, universities and other Government departments and instrumentalities. A Defence research, development and production council comprising representatives of these bodies could be the vehicle by which such co-operation is achieved. Its aim would be to co-ordinate the research and production aspects and to ensure optimum use of resources.

### A Navy Policy

A proposed policy for the RAN is to aim for an increasingly Australian designed and built Naval force. The achievement of this aim may not be complete for many years as there are aspects of naval ship design for which this country has no early capacity. There are many aspects for which there is no capacity, but all that is lacking is a commitment and the investment. The initial com-

mitment should be Navy's, and the investment must be part of the national aim.

The RAN can, almost immediately, plan for the production over the next 10 years of a series of detail designs for naval platforms. Concurrently, a set of system and equipment specifications and designs for those platforms should be produced. A parallel review of existing and planned naval systems and equipments suitable for the platforms would assist in an eventual selection of ship fits. A review of Australian research and industrial capacity would ascertain the capability for local production and determine what additional capacity would need to be provided.

The Navy policy should be to establish a set or series of common designs. A basic system could be installed in a simple or small ship, and enhanced or expanded systems in more complex or larger ships. A key element of such a policy is to use a top-down design approach, similar to that used by the US Navy in designing the FFG 7 Class. This approach means specifying the size, cost and manning limits for a platform which must then be produced within those constraints.

Such a plan will necessitate a substantial Navy investment in an initially non-productive research and development function. However, investment by Navy alone probably will be insufficient to achieve anything more than a minimal capability. Therefore, the Navy must sell its plan both to Government and industry who must also provide the necessary levels of investment. Navy must add a firm commitment to the end products of this investment and therefore must provide detailed requirements to ensure that its needs are met.

The Navy should specify a minimum set of performance and technical requirements which must be simple and attainable goals. Incentives for exceeding specifications, within an established set of constraints, could be provided. Above all, performance requirements must be realistic and aimed at producing innovative but not complex technical solutions.

Early benefits could be attainable. Local manufacture of some equipments may be possible in early stages. Early production may be specifically for test and evaluation purposes, installation on existing platforms or enhancement of existing equipments.

## SOME SPECIFIC CONCEPTS

The concept behind any local design and production of naval systems is to exploit technology, to obtain at least a regional technological advantage. The time lapse between conceptual design and final use must be as short as possible. Systems must be flexible and capable of enhancement and modification as easily and quickly as possible. The concept leads to a modular design approach and a (small) set of standards both for inter- and intra-unit interfaces.

A series of concepts for naval vessels — surface combatants, amphibious vessels and support ships — could be established. For example, the surface combatants might comprise a patrol boat similar in size to the *FREMANTLE* Class, a larger patrol vessel of 500 tonnes, a corvette of 1 000–1 500 tonnes, a frigate of 2 500–3 000 tonnes and a destroyer of 4 000–4 500 tonnes. The amphibious ships could comprise a light, medium and heavy landing ship. Support ships might comprise supply, command, repair and training versions.

The series of ship designs could be produced in the next 10 years. Initially a set of outline specifications could be produced by Navy in three to four years. These would be passed to a detail design bureau for production of final designs. The design bureau, set up in the initial period, would be a joint Government/industry body. Decisions on production could be made at the 10 year point. Earlier production of specific types could be a Navy priority and should be possible.

Perhaps the greatest factor in naval equipments is imposed by the need to meet military standards and specifications. These lead to unique design and test requirements which generally result in the production of special components for which the Navy must bear the cost. The necessity for these requirements should be questioned. Many who have been to sea in modern warships may never have stopped to consider the humble television set installed in most living spaces. It is always a commercial product, often subject to the worst of abuses by its users, usually hard-mounted to a bulkhead, subject to the same environment as many naval systems and is usually reliable. Many have been designed and built in Australia. Consideration to waiving a number of military specifications should be given. A series of trials of available commercial products with direct naval applications should be considered. The equipments should be operated for a period long enough to properly evaluate reliability and performance in typical ship environments. Failures should be examined in detail. Results may well prove that modern commercial products are suitable for naval use.

As for ships, a series of conceptual designs for ship systems and equipments should be made. All possible ship systems should be examined for local production. Following the conceptual design process, a decision to proceed could be made and detail design proceeded. Again some systems could proceed to production early. The basis of local equipment production

should be the establishment of standard cabinet and module design. There is no pressing reason why naval equipments must have unique cabinet designs. A standard set of cabinet sizes designed to take a standard set of module sizes can help to reduce costs. Of course, this approach is aimed at electronic systems but a similar approach to machinery systems can be taken.

In fact, the design approach should be to simplify and standardise whenever and wherever possible. For electronic systems, the establishment and use of standard interfaces should be implemented as early as possible. Within a ship, there is no constraint on interfaces; external interfaces must be compatible with those of our allies. Optical fibre data communication should be used. This offers substantial savings in weight and interference, and reduces ship vulnerability.

## IMPLEMENTATION

The RAN should plan to sponsor the design and production of ships and shipboard systems in Australia. This must be a long-term plan simply because, with minor exceptions, none is done today. Yet those exceptions are often notable and could be saleable.

Over the next 10 years, the RAN should sponsor the research and development effort aimed at implementing the plan. There are some starting points — the universities, Defence laboratories and some industrial bodies. The initial aim should be to work towards an early concentration of efforts. The creation of a Service, Department, Government and industry infrastructure for the exploitation of technological capability should be the first step and be cemented in the first year.

In the second to fifth years, the RAN should concentrate efforts in establishing design concepts. A 'task force' of available technical and operational manpower should be dedicated to producing the concepts. Regular dialogue with research and industrial activities can establish local capabilities, either available or readily gained, to which later efforts can be concentrated.

The sixth through tenth years should see design concepts passed to research and industrial bodies for detail design. Perhaps some simpler system can be produced by the end of this period. There must be close co-operation between the Navy and other bodies to ensure that concepts are properly brought to realisation. The Navy must dedicate manpower to this task.

Obviously, the Navy and Government must provide funding and facilities to enable the fruition of the plan. Navy should be prepared to commit part of its manpower and funds to the task. It must convince Government to agree to the plan and to provide additional funds. Industry must be prepared to support the plan with more research effort than has been the case in recent years.

It is suggested that the Defence Department provide space and facilities, say at the Defence laboratories, to assist with the early industrial effort. The Defence Research Centre Salisbury, has the space, facilities and manpower to provide the necessary support.

## CONCLUSION

Both the RAN and the nation can be considered to be at a crossroads — the Navy due to the loss of its carrier, and the nation for economic reasons. We have a new Government which has stated a commitment to technological and economic recovery. Yet Australian industry is in many respects dying. The road to recovery is with a change of emphasis, a change of technology.

A significant basis for the technological advantage of the USA lies with its defence industry and associated research and development. At least regionally, Australia should be able to emulate this advantage. The economic advantage should follow as the defence-related industrial capability flows on to non-defence industry. The exploitation of technology for defence purposes can lead to growth of related, non-defence industrial capacity. Production of attractive defence systems can lead to a new export commodity.

These ideas may seem idealistic, but they are within the capability of Australia and Australians. They represent a change of thinking for the RAN and for Australian industry. They represent the commitment of Government funds to research and development. But in the end they are worth more than a passing thought. With some effort and a little courage they could be the way of the future.

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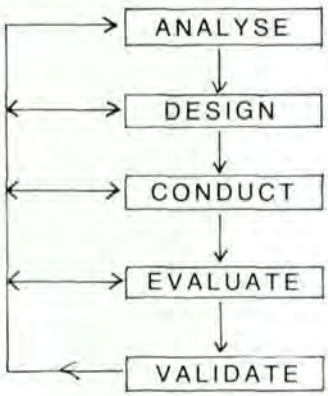
# THE DUTY/TASK INVENTORY

by Commander H.L. Daw RAN and Lieutenant Commander G.P. Robson RAN

Professional trainers in the RAN hold the view that for most people the concept of the Duty/Task Inventory (DTI) is a murky one. Many people confronted with a DTI are not sure what it is, how it was developed or what they are expected to do with it. As the DTI is the base document for the design of training, it is of fundamental importance. In addition, many members of the RAN, outside those directly involved with training, may be called upon to assist in the construction of a DTI or to evaluate a draft. The aim of this short article is to develop the concept of the DTI, to clarify the development of the document and to state its method of approval. Additionally, the authors hope that those reading this article will gain an additional understanding of the first step in the application of the RAN Training System.

The Training System subscribed to by the RAN can be summarized by the following model:




The RAN Training System starts and ends at the job. The phase ANALYSE, commences with an analysis of the job. In the final phase, VALIDATE, the performance of the trained man is measured on the job. It is this starting and finishing with the job that gives the training its validity. In this article, we will only examine the first section of the Analysis phase.

In the RAN, the person involved in conducting the analysis of the job is called a training developer. He will sometimes be part of the School staff but this is not always the case. For example, in *HMAS NIRIMBA*, the training development staff are in a separate, central cell working directly for the Training Commander.

A job consists of a series of duties and tasks which are completed by the incumbent. In the RAN, the job can often be equated to category or specialization, for example, Cook and Clearance Diver. Officers with the specialization 'P' have the job of Pilot but a Supply Officer could have any one of a number of jobs, such as Secretary, Pay Officer or Naval Stores Officer. 'Supply Officer' can be thought of more as an occupation which will be punctuated by employment in a number of areas.

A duty is one of the major work areas performed by an individual. A job consists of one or more duties. A duty can be further expressed as a number of closely related tasks. Duties often determine the qualifications to perform in the job. For example, one duty for a Petty Officer Seaman is 'Boatwork' and for an Engineer Officer 'Refits and Maintenance Co-ordination'. Both are broad work areas which would involve the performance of a number of tasks.

The task is the lowest level of behaviour in a job that describes the performance of a meaningful function. It is the examination of the job at this level and below that enables a relevant training package to be developed. Tasks and task statements have certain important characteristics:

**The Authors**

Both officers joined the RAN in the sixties and are in the Instructor Branch. At the time of writing, Commander Daw was Officer-in-Charge RAN School of Training Technology and Lieutenant Commander Robson a member of staff employed as a training consultant. Commander Daw holds the degrees of Bachelor of Arts and Master of Science (Instructional Systems). Lieutenant Commander Robson, an Arts graduate, is currently studying for his Master of Science at Florida State University and on completion will occupy the billet of Training Development Officer in *HMAS NIRIMBA*.

- A task statement describes a highly specific action. It has a *verb* and an object and is precise. For example, 'operates Mulloka Recording Replay Training Equipment (MURRTE)', looks promising but it is not a good task statement. It is not specific. It means different things to different people. MURRTE is operated for a reason and it is this reason that should form the basis of the task statement. 'Raise and lower hull outfit', however, is a specific action.
- Tasks are performed in a relatively short period of time: seconds, minutes or hours but rarely days, weeks, months or years. To 'prepare a well trained Navy' is a goal rather than a task.
- Tasks are observable. The performance of the job holder or the results of his efforts, can be seen. 'Understand the Rule of the Road' is not a task statement because neither the process nor results can be observed. However, certain actions which require an understanding of Rule of the Road can be observed.
- Tasks are measurable. That is, there is in the performance of the task, or the product produced by it, a method of judging that the task has been properly performed.
- Each task is independent of other actions. A task is performed for its own sake, for the job being considered.

The training developer employs a tool, called a 'scalar diagram' in organizing the many tasks which make up a job. He does this to allow a pictorial representation to be made which clearly shows the relationship between tasks and duties. An example of a scalar diagram is at Figure 1.

To gain a clear definition of a job, all the duties and tasks which make up the job need to be accurately determined. Initially the training developer will generate a draft list of duties and tasks. This process involves collecting information from one or more of the following sources:

- from current and former job holders
- current and former job supervisors
- books of reference
- manufacturers' handbooks
- observing people doing the job and
- defect returns etc.

In collecting information from job holders through personal interview, the training developer could step the incumbent through the tasks performed in a typical day's work and then add to that list any unusual or less frequently performed

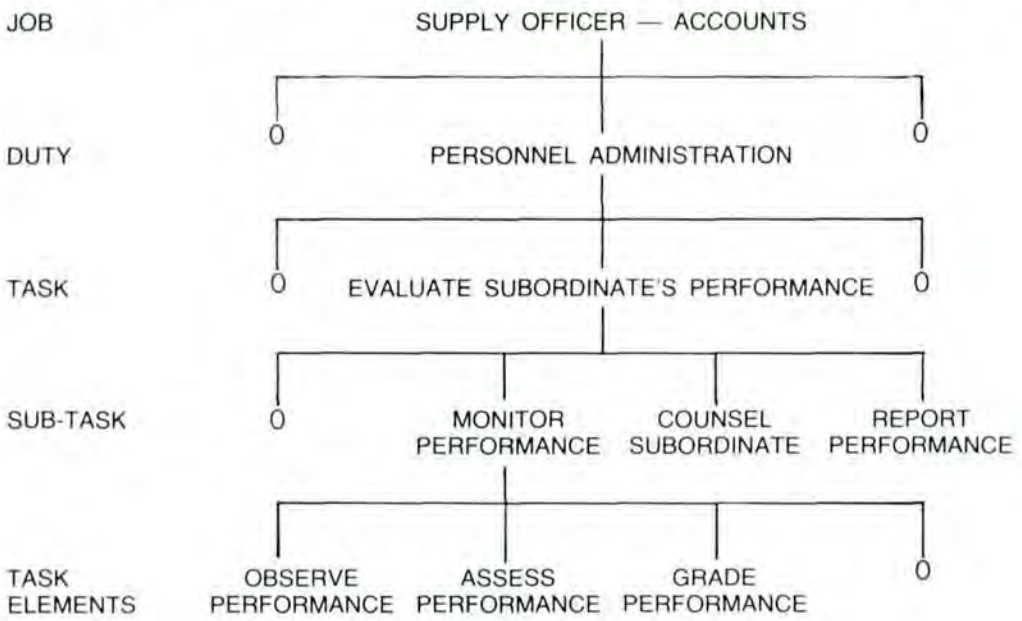



**Figure 1 — Part Scalar Diagram for Job Supply Officer — Accounts**

*(Here only one task of one duty area has been partly analysed. In practice, this is a substantial job which can occupy a large display area. The scalar is normally developed on a large roll of graph paper and displayed on a bulkhead.)*

tasks. In this interview, he would aim to obtain a precise statement describing the action involving in the task and, in addition, record information about task conditions and standards. From this information comes the draft list of tasks which must be authenticated before being accepted as a job description. There are two methods advocated for authenticating this draft list. The first is called the Questionnaire technique, which involves compiling a questionnaire which includes the draft list of tasks. This can then be administered to the total population (or a sample) of people performing, or who have recently performed, the job. The aim of this survey is to gain a large body of information about task performance, primarily to determine whether the tasks listed are actually representative of the job.

Collation of the responses can be done either manually, or by having the questionnaire initially constructed in such a way as to have the responses analysed and collated by a computer. The latter approach would normally be carried out by the Occupational Analysis Cell in Navy Office.

The second method, called the 'expert panel' approach, involves the selection of a small sample (say 6-12) of 'experts' in the job concerned. The draft list of tasks is examined by the panel independently, for agreement or disagreement on whether the tasks are representative of the job. The comments from these experts can then be analysed with any disagreements among the panel clarified or settled by the training developer.

Whichever method is used, there will now be evidence which will enable a representative list of job tasks to be constructed. It is very important at this stage that the scalar diagram, exemplified in Figure 1, now be developed down to task element level for all tasks. This process will inevitably result in amendment to the representative task list.

Once the scalar is complete, the list of tasks can then be transcribed on the DTI form. Before dispatching the DTI to Navy Office for approval, an explanatory statement should be attached which includes information on the contact officer, assumptions made, procedure followed, future intentions with target dates and so on.

Extracts of an example of a DTI for the job of 'Bridge Watchkeeper' are shown at Figure 2. Duties are shown in upper case and tasks in lower case.

The DTI is then forwarded to the Director of Naval Training (DNT) for approval. On receipt, DNT will circulate the DTI to the relevant 'User Directorate' for comment. (For example a navigation DTI would go to Director of Tactics, Action Information and Navigation (DTAN)). It is the user directorate's responsibility to vet the DTI for accuracy and completeness and to inject the effects of future projects if not already included. The User Directorate is endorsing the DTI as a correct description of the job that has to be performed. The DTI then becomes the contractual agreement between the user and DNT. That is, the user directorate agrees that the DTI represents the job and DNT 'contracts' to develop training for that job. The DTI is then returned to the training developer with any amendments noted. If any of the amendments proposed are in conflict with the data collected during the job analysis, the training developer should inform DNT so that the matter can be resolved.

While the training developer is awaiting formal approval of the DTI, he should progress other steps in the Analysis Phase. The DTI will be the basis for performing the following actions:

- Task Analysis. Here the knowledge, attitudes mental and physical skills which must be learned for task performance are identified and listed.
- Training Analysis. The trainees are considered and steps taken to collect evidence on what they already have learned. Instructor capacity is also determined. In addition, facilities which exist in the RAN to conduct the training are listed.
- Feasibility Analysis. This activity results in a decision concerning the best method of closing the learning gap between what the trainee already knows and what the job requires. It need not be a decision which involves training. If it is training, then it need not necessarily be at a naval school.
- Training Objectives and Tests. These are constructed if the Navy is to design its own course and they become the basis of training design which will occur in the next phase.

The compilation of the DTI is the critical first step in what may be a long process leading up to the running of the first training course. The DTI is also the 'contract' between the trainer and the user Directorate on which course design is based. Like any other sequence of dependent events, if the first is incorrectly or inadequately performed, the final result is guaranteed to be less than perfect, no matter how careful the training developer might be from then on. For these reasons it is most important that the DTI should be properly constructed and staffed by all who are consulted during the development process. The authors hope this article will assist those readers who are involved to make a more informed and valuable input.

## DUTY/TASK INVENTORY

FOR JOB BRIDGE WATCHKEEPER

BRANCH SEAMAN

| UNIT NO. | DUTY/TASK DESCRIPTION |
|---|---|
| 1 | **NAVIGATION** |
| 1.1 | Plan and execute an ocean passage |
| 1.2 | Plan and execute a visual pilotage plan incorporating an anchorage |
| 1.3 | Plan and execute a blind pilotage plan incorporating an anchorage |
| 1.4 | Check compass accuracy by using a heavenly body |
| 1.5 | Check compass accuracy by transit |
| 1.6 | Check compass accuracy by Douglas Protractor/Station Pointer |
| 1.7 | Assess and report local weather conditions |
| 1.8 | Fix the ship by all means including: |
| | a. using radio navigation aids |
| | b. using gyro compass bearings |
| | c. using magnetic compass bearings |
| | d. using radar |
| | e. by observations of the sun |
| | f. by observations of the planets, stars and moon |
| | g. with SATNAV |
| | h. by horizontal sextant angles |
| | i. using OMEGA |
| | j. Douglas Protractor/Station Pointer |
| | k. Sounding contours |
| | l. Relative Bearings |
| | or combination of a-1 above |
| 1.9 | Pilot the ship using Sonar |
| | Duties 2 and 3 omitted |
| 4 | **COMMUNICATIONS** |
| 4.1 | Send/receive messages by: |
| | a. flashing lights, |
| | b. signal flags, etc. . . . |

**Figure 2 — Extracts from Bridge Watchkeeper DTI**

# RAN ACQUISITION OF A SHIP'S BRIDGE SIMULATOR

by Lieutenant Commander F.A. Allica RAN

*'It is of immense importance that the soldier, high or low, whatever rank he has, should not have to encounter in war those things which, when seen for the first time, set him in astonishment and perplexity; if he has only met with them one single time before, even by that he is half acquainted with them.'*

*— Carl Von Clausewitz*

With the acquisition of a ship's bridge simulator early in 1985, the RAN is entering an exciting new era in its methodology of training. For several years, it has been recognised that it is neither practical, nor cost effective to conduct live training in many training fields. Certainly, the aircraft industry recognised from its inception that simulator training was the most cost effective means to train aircrew and to put a pilot through the most extenuating of emergency procedures at minimal cost and at no risk to personnel.

Tactics and operations room procedures have for many years been exercised and practised in simulated operations rooms which are often a more cost effective and definitive means of training than practical training at sea. Of course, simulation cannot achieve all training objectives and there will always be a need for practical sea training. With the significant and rapid advances in technology in recent years, spiralling costs in weapons systems, associated armament and the sophisticated targets required to simulate today's threat, it is now more practical and certainly less costly to conduct most missile and gunfire engagements by simulated means. Consequently, there are now a wide range of simulator systems available in a competitive market to prospective users.

A different area of simulation which is breaking into this market is the ship's bridge simulator. Traditionally, the training of personnel in ship handling, navigation, officer of the watch procedures and ship safety, including rule of the road, has been by practical experience at sea. This system has many short comings, not in the least that the student is not permitted to make any mistakes (the most effective means in the learning process). Any Commanding Officer who aspires to greater things will exercise vigorous control over a trainee in a new and/or dangerous environment and often takes over when he considers the situation so merits or is beyond the expertise of the trainee. This of course, is not an unreasonable reaction, but it doesn't allow for an optimum system of training.

This lack of first hand exposure of a junior officer to ship handling incidents often militates against his gaining any significant experience in manoeuvring a ship in 'at risk' situations until he is in command of his own ship. In these days of few sea going commands and appointments, this occurrence is not uncommon and will lead, and perhaps has already led, to an overall lowering of standards. The acquisition of a bridge simulator will obviate intervention by the Commanding Officer and allow trainees to be responsible for their own actions without the risk of collision/grounding or the subsequent board of inquiry and/or courts martial.

The RAN is, to a degree, pioneering new ground in its acquisition of a simulator in that we are the first naval (non merchant service) to acquire a simulator of this nature, and some considerable international interest is following the RAN's development and utilisation of this

**The Author**

Lieutenant Commander F.A. Allica joined the RAN in 1965 and served in *HMAS HOBART* during her tour of duty in Vietnam in 1970. He qualified Destroyer Gunnery Officer in 1971, Principal Warfare Officer in 1975 and Advanced Warfare Officer (Above Water Weapons) in 1978. In 1972 he was Commanding Officer of *HMAS SAMARAI* in PNG waters, he has served as gunnery officer of *HMAS STUART* and *HMS LONDON* during which time he saw service in the Standing Nato Atlantic Squadron and under FOFI. Other appointments include Command Gunnery Officer WA and SO(G) Directorate of Naval User Requirements. In 1980–81 he was Executive Officer of *HMAS VAMPIRE* prior to taking up his current appointment as Bridge Simulator Project Director.

training resource. Several merchant marine academies have recently acquired or are in the process of acquiring marine simulators (including the Australian Maritime College at Launceston). There have been unsophisticated attempts to develop bridge procedural trainers in the past; however, it is only now, with the advent of modern computer-based technology, that it has been possible to design and produce simulators which realistically reproduce the 'at sea' environment.

A major impediment which had to be overcome in the development of a bridge simulator was in the area of visual simulation. The cues taken by a mariner in handling a ship are about 90 percent visual. He requires a good, near to all round vision and the ability to correlate the visual scene with his navigational instruments, radar and chart. These exciting visual requirements do not exist to the same degree in other forms of simulation, where more reliance may be made on instrumentation, and the visual scene need only be displayed on one or two channels through a periscope or onto a screen immediately in front of an aircraft's cockpit as appropriate. As visual presentation is not so important in these simulators, it has been possible to duplicate the required land or seascape on a model board which is photographed by a mobile video camera and projected onto the video screen. Naturally, the production of a model board is expensive and extremely limiting in providing a variety of gaming areas.

Whilst attempts have been made to conduct bridge simulation utilising model boards and video screen presentation, the changing and dynamic nature of the sea environment and the vessels which sail on it cannot be adequately simulated in this form. It was not until the development of the computer-generated imagery that it was possible to build a simulator which could simulate this changing environment on a wide wrap-around screen presentation.

The RAN's requirement is different to the merchant marine. Ship handling simulators are being acquired by maritime colleges for a multiplicity of reasons, but most of them stem from a desire to train pilots and captains in manoeuvring large tankers, container vessels and similar vessels in confined waters and also to be used as an evaluation and investigative tool in the study of environmental, ergonomic, ship dynamic and other effects on large hulled vessels in various conditions and situations. The RAN main requirement, however, is to train officers in manoeuvring ships at sea in company with other vessels.

The RAN requirement for a bridge simulator arose in 1978 when it became evident that with the trend towards the acquisition of new fleet units with limited accommodation, the paying off of older vessels such as *MELBOURNE* and the *DARINGS*, that there would be fewer training billets at sea to accommodate stage 4 seamen officers training for the award of a Full Bridge Watch Keeping Certificate (FBWC). At the same time, an unprecedented number of junior officers were forecast to be in the stream in the early to mid 1980s who would require billets at sea, and an exponential queue of officers awaiting sea billets would develop. A number of measures were taken to keep this queue to a minimum and to date it has failed to materialize to any significant degree. Nothwithstanding, the acquisition of a simulator will ease the training burden and ensure that young officers proceeding to sea for the award of their FBWC will be considerably more experienced than their present day counterparts. This should lead to the earlier award of the FBWC and an easing of the fleet training task.

**Description**

The building, which will be at *HMAS WATSON* on the former site of the Mortar MK 10, will house all the facilities necessary to support the system such as classrooms, student's preparation room, workshops and office accommodation.

The simulator wil consist of a bridge mock-up, around which will be placed at approximately 7 metres radius a circular screen of 250 degrees (125° either side of centre) onto which computer-generated images of sea scenes will be projected. The ship's bridge will be mounted on a motion platform. Its rear wall is equipped with a large window, which will give the instructor a view of the bridge interior and of the sea scenario from his position in the instructor's station which is directly adjacent to the bridge. To ensure an atmosphere of privacy for the trainees, the view between the bridge and the control room can be closed by means of a blind if an advanced exercise so permits.

At the rear of the control room, there will be an auditorium, separated by a soundproof concertina door which will allow instruction to take place prior to the door being opened to view a live exercise if desired. This concept will be useful both in the familiarisation of trainees and to accommodate the large number of visitors who are expected to want to view this unique equipment, especially during the first years of its operation.

The control of the simulator is at the

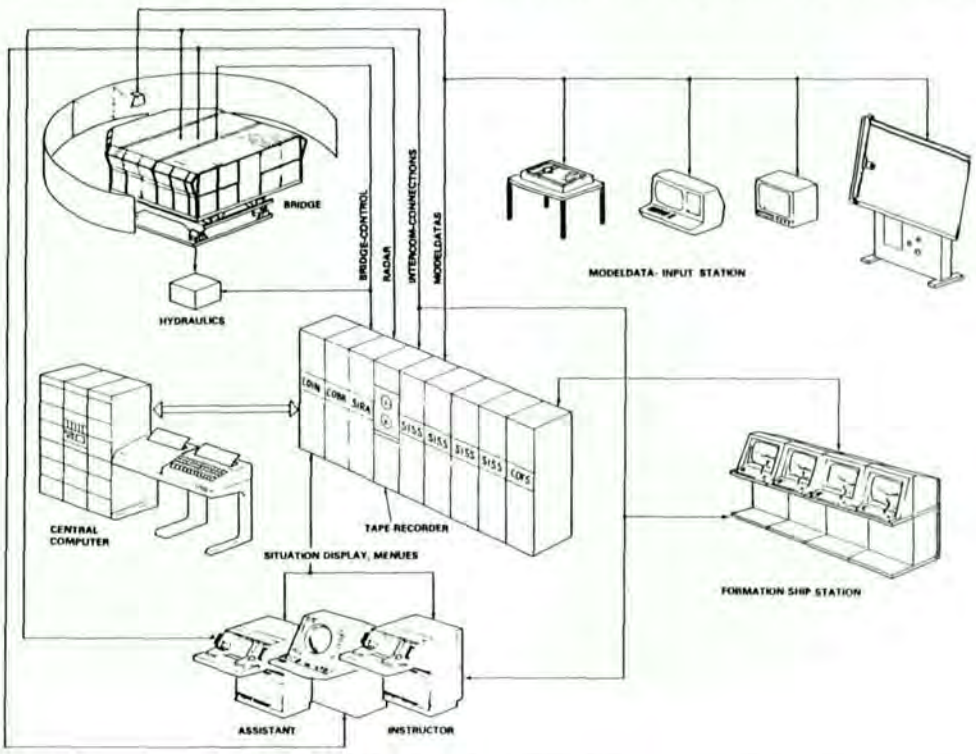
instructor's control station. Here, the instructor has complete control of its operation. The central processor (Gould 32/27) is at the centre of a network of ten other processors which control the functions of synthetic generation of the colour video, radar generation, bridge and other ship control and instruction functions. The entire scene is computed and displayed just as an observer would see it from the bridge of an actual moving ship. The synthetic scene is projected by 11 video projectors onto the surrounding screen.

The radar simulation provides up to 20 simulated targets and coastline as selected by the instructor, and the radar agrees with the visual scene. Various other controls for communications and audio are also interfaced with the system and form an integral part of the system, which may be recorded and played back in slow or quick time for debriefing or illustrative purposes.

The bridge is a generic bridge which will be representative of the *FFG/DDG* and *SWAN/TORRENS* Class of DE. Representative means that it will not resemble any one class; however, by altering the position of key navigation equipment such as the strip repeats or use of bridge or engine room controls it is possible to represent any of these three classes of ship. The bridge will be large enough to accommodate the OOW, a tactical operator, quartermaster and navigator or captain if so desired. The bridge equipment is based on that in actual use in RAN destroyers with all displays, instruments and intercoms. The bridge is mounted on a simple motion base which is capable of pitch and roll to ± 5 degrees and representative vibration.

Four formation ships can be controlled from the formation ship consoles. Each console consists of a graphic display which, centered on one formation ship, shows the geometrical situation of the other ships in company. These ships can be manned by students for manoeuvring and voice communication practice and appear in the visual scene, providing a realistic interaction in game play. Alternatively, if these stations are not manned, the instructor and his assistant can control the 'other ship' models to gain similar training value.

Own ship model and formation ship models behave and handle realistically with ship dynamics computed in the central processor with the aid of an extensive mathematical model based upon RAN ship trials data and practical ship handling information. The own and formation ship models handle realistically and include such




*Bridge simulator flowchart*

Courtesy Krupp Atlas Elektronik

*Hamburg Bridge Simulator — instructor console*
Courtesy Krupp Atlas Elektronik

dynamics as shallow water effect, windage, ship interaction effects during RAS and many others. In addition, the instructor can apply a variety of machinery breakdowns in order to fully test the student OOW.

The instructor/assistant console consists of two indentical consoles each equipped with a colour graphics display, a keyboard and rollball. A slave radar is provided between the two positions to monitor the bridge radar. The workload is split between the two positions so that it is possible for one person control for low level exercises, or two man control when in-company ships are introduced into the exercise. The graphic display shows the current exercise situation with important ship data. Communication with the processor takes place largely by responding to prepared questions — the 'menu technique' as it is called.

The instructor will monitor the exercise as it takes place. He uses the graphics display for this purpose which displays all navigational information including the coastline and navigation marks. Own ship, 4 formation ships and the 16 other ships move within this tactical display. Past tracks are shown and, in addition, all relevant data is displayed in alpha numeric characters. The instructor can also assess precisely the use that is made of the bridge radar unit by monitoring his radar display.

The simulator is able to simulate all forms of Naval activity including operations at sea, in coastal and pilotage waters. Computer-generated scenes of our harbours will be produced in time, and upon these may be superimposed the effects of wind, tidal steam current, fog, rain and all the other external factors which affect a ship at sea.

Each manoeuvre region is stored in its own set of magnetic disks. In this way, any desired number of manoeuvre regions can be created. The instructor may superimpose the desired environmental conditions, shipping and other factors.

At the end of an exercise, a record is printed out automatically showing the most important exercise data and corresponding times. This is useful for debriefing purposes. The exercise is recorded and reproduced in all detail which is an excellent aid in the criticism of ship manoeuvres. Visual, radar and audio run simultaneously and can be frozen or played in slow and quick

motion. This comprehensive recording facility is important and provides an excellent instructional aid in that the student is often unaware of an incorrect decision being made in the hectic situations which develop on the bridge. It is possible to pick up an exercise from when an incorrect decision was made and demonstrate the successful outcome when the right decision is injected.

In addition to recording for debriefing purposes, all exercises may be stored on magnetic disks and used again as a pre-set exercise which reproduces all the exact parameters and ship tracks which occurred in that exercise. This pre-set exercise capability is useful in the development of a library of exercises which highlight a particular training point or navigational incident. 'Other ship' tracks in this mode, remain on their pre-set heading unless altered by the instructor.

A feature of the simulator is the onsite programming facility which permits the modification and generation of ship models and harbour scenes by utilization of digitizer equipment. A drawing of whatever is required to be modelled, eg, ship or coastline, is placed on this drawing board and is electronically etched by this instrument and the results show up on a VDU. The model is etched from several aspects and when the results are satisfactory, colour is added and the model is then available for use in cassette form. A certain number of models will be provided at system acceptance; however, a large production task will be required in the initial stages to produce Australia scenarios. It is a simple task which can be undertaken by unskilled manpower but it is time consuming and takes one man 2 weeks to model a ship such as an FFG. It is possible that the RAN may be able to obtain several scenarios from the Hamburg Maritime College who have a similar simulator which will have been in operation for two years when the RAN system is accepted.

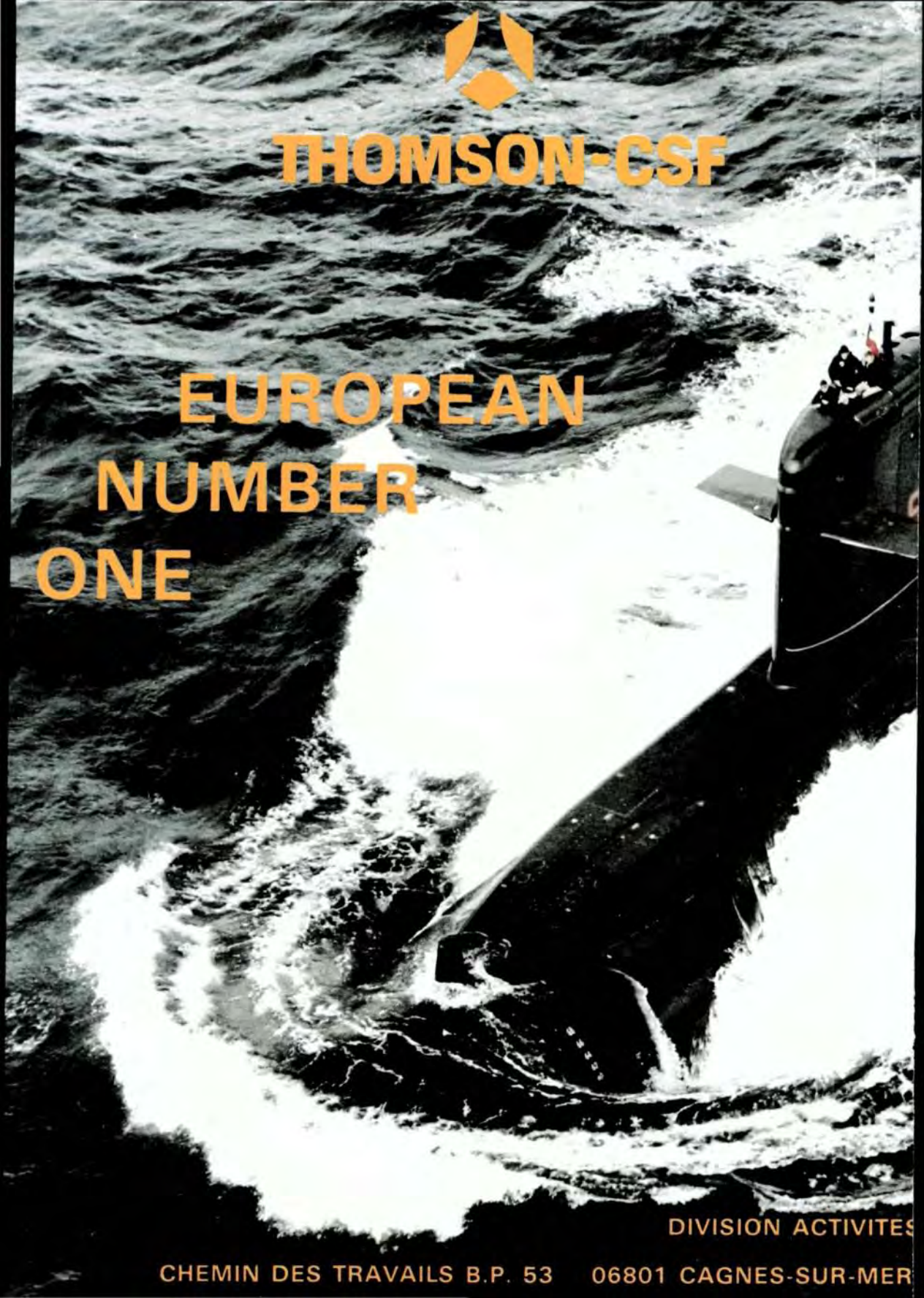
**Simulator Training**

Training priorities for use of the simulator have been agreed and it has been determined that the primary user of the simulator will be junior seaman officers, prior to joining their ships for practical sea training to gain their FBWC. This training is best co-ordinated and managed during their Stage III courses.

Second priority is given to commanding officers and executive officers designate so that

*Hamburg Bridge Simulator*

Courtesy Krupp Atlas Electronik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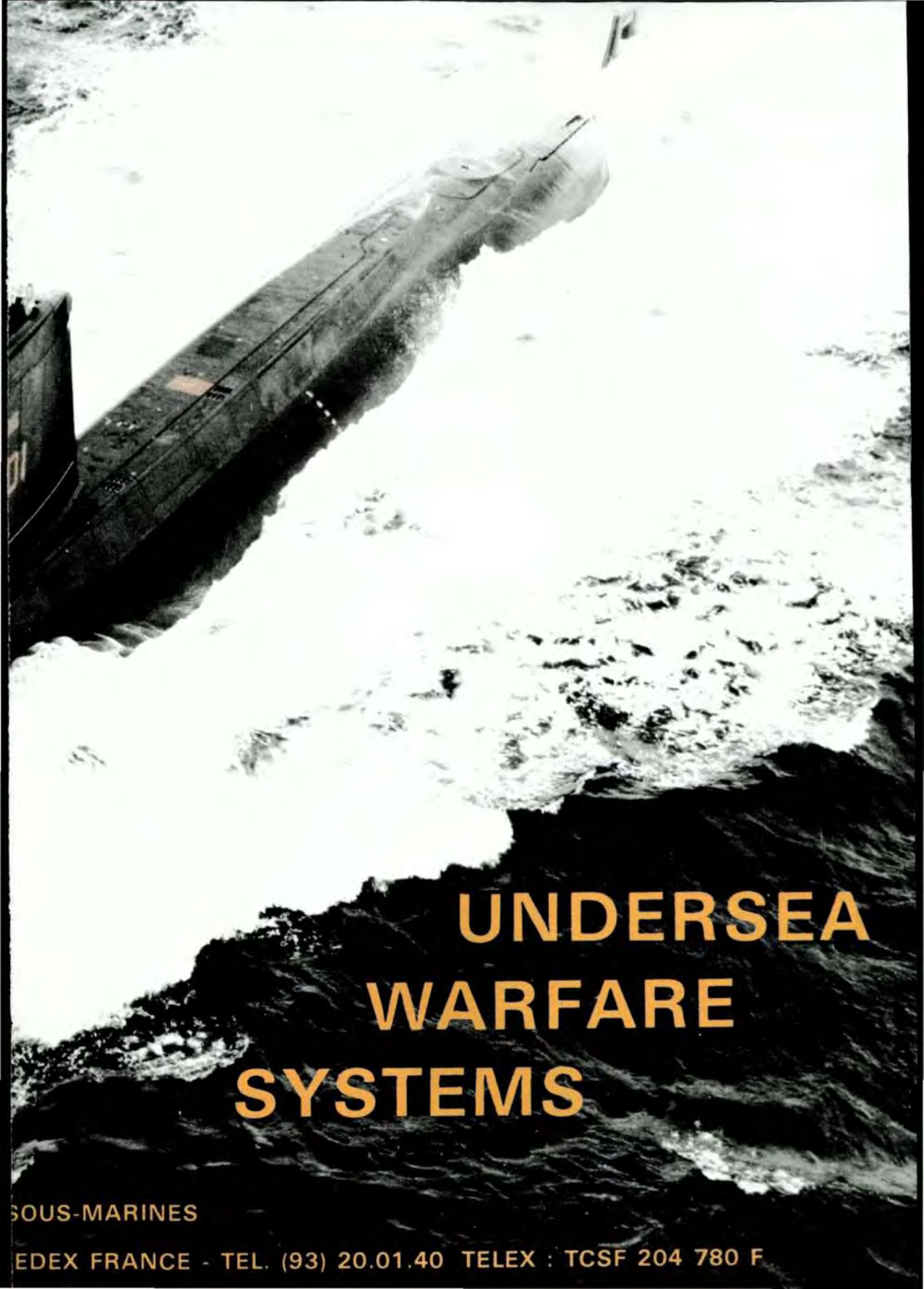
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they may practise handling their ships in the more advanced manoeuvres of replenishment approaches, harbour entry and alongside approach. It will also dust off a few cobwebs accumulated during sometimes long periods ashore at head office. Other users will be bridge teams from ships alongside in Sydney; Long and Short navigating officers courses; and naval reserve officers. It is apparent that there will be little free time.

**Research and Development**

Not stated as a requirement, but existing as a capability is the simulator's ability to be used as an investigative tool. The RAN's simulator will be capable of answering many questions about the maritime environment which until now have not been able to be researched in any depth. The simulator will allow experiments to gather data and to provide repeatability of trials to include additional data. It will be useful for analysis of the bridge instrumentation, information presentation, the ergonomics of bridge design, and evaluation of the man himself and his capacity to absorb the information as presented. It will be possible to go beyond the bridge to the ship itself and evaluate ship handling techniques, the advantages of different screw and rudder, external factors, aids to navigation, buoys, lights, beacons: are they really assisting the mariner or are they dreamed up by bureaucrats sitting at desks with a nice orderly plot on a plan? Certainly it is not a foolproof path to the answers we are seeking, but it is a far better option than we have had in the past.

**Project Management**

In comparison with many Defence projects, the Bridge Simulator has led somewhat of a charmed life. The project received considerable impetus in 1980 following the Afghanistan incursion and was brought forward for a year 0 decision. It has been developed in 2 Phases: Phase 1, the Project Definition to investigate the viability of the project, and Phase 2, Acquisition and Installation. Sperry Systems Management of USA and Krupp Atlas Electronik of Bremen Germany undertook Phase 1 and, as a result of evaluation of their responses, Krupp were awarded the Phase 2 contract at a firm price of $10.309m. Total project costs are $13.379m (at August 1982 prices) which include the facility and spares. A tender for construction of the building was accepted in January 1983. Work commenced in February and is expected to be completed by May 1984. Krupp will install and set the system to work on site late in 1984 prior to final system acceptance trials programmed for March 1985. It is planned that Krupp (Australia) will be awarded the first maintenance support contract for a period of three years from acceptance. Two Australian firms, FP Sanney Pty Ltd and Computer Sciences of Australia, have been awarded sub-contracts for the design and manufacture of components of the simulator system which will have Australian Industrial Participation (AIP) in excess of 30 percent.

**Conclusion**

Visitors to the Hamburg Facility have been thoroughly enthralled by the total realism of the system and convinced that the bridge simulator will be a very valuable training aid. This opinion is confirmed by the increasing number of maritime colleges who are acquiring simulators for training purposes. By mid 1985, all RAN navigation courses will employ the simulator as a major training aid. Its introduction into service is expected to contribute significantly to the reduction in overall training time in the award of a FBWC, and will ultimately result in the production of a more polished, confident and safe bridge watchkeeping officer.

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# THE GLADIATOR AND THE BUREAUCRAT

by Lieutenant K.C. Bayly-Jones RAN

At a lecture to the Joint Services Staff College recently, the subject of junior officers' training and postings was raised as part of an address on the RAN. The Chief of Naval Personnel, Rear Admiral Martin, had this to say:

> 'We share with the Army and the Air Force the problem of producing an officer who is brave, aggressive and decisive in combat, used to being a man of action, and a leader of men. We then drop him at an office desk in Canberra, miles from the sea, expet him to understand and be successful in the intricacies of the bureaucratic jungle where the qualities for which he was selected and with which the Service has armed him are not of the same use to him. If he is posted to Canberra too early to sit at a desk, there is the danger that he will become too good at being a bureaucrat and that his sword will be blunted as a result.'

This article will discuss the 'Gladiator and the Bureaucrat' issue as put forward by Admiral Martin but based on the following assumptions:

- that the officers referred to are of the executive branch, and
- that they are at the junior lieutenant level when posted ashore.

I have no doubt that Admiral Martin's remarks apply to all branches, though perhaps to a lesser degree.

**SL 75**

To illustrate the present situation with regard to junior seaman lieutenants, Table 1 outlines the posting history of the class of seaman supplementary list officers who joined the RAN in March 1975. SL officers are used because in broad terms they are expected to spend more time at sea during their short service than their GL counterparts. That, at least was the impression given to us upon entry!

SL 75 seaman training was completed with the award of Bridge Watchkeeping Certificates in 1978, when general career progression, and in some cases, specialisation started. At the moment, eight from an initial entry of fourteen remain; four have transferred to the General List, two have sub-specialised (submarines and MCD), and five have received APWO training.

**The Concept**

The Gladiator and the Bureaucrat concept, as it applies to junior seaman lieutenants will be looked at briefly as an ideal, and free from the constraints of short term realities. Two questions immediately arising from Admiral Martin's remarks might be:

- How late can we leave learning the Bureaucrat's art if we are to practise it for the benefit of the Navy?
- Does the sword in fact become blunted as a result of learning the Bureaucrat's art?

I leave these questions deliberately open as food for futher thought.

Navy Office, Malfunction Junction, Port Fumble or whatever description one likes to apply, is a fact of life, as is bureaucracy and the associated red tape. The Navy, as an instrument of Government and having to compete for public money will never be rid of the Navy Office system in one form or another. We have to learn to use the 'system' to our advantage, and I believe that if we are to be successful, the learning process must start at a relatively early age. The theoretical problem seems to be one of maintaining an adequate balance. We need officers well versed in both arts and with the ability to develop rapidly the skills learnt in each area should the situation demand it.

**The Author**

Lieutenant Kim Bayly Jones joined the RN in 1974 as a Supplementary List Midshipman. He transferred to the RAN in 1976 after completing initial training at BRNC Dartmouth and onboard HM Ships *FEARLESS* and *DEVONSHIRE*. After Stage IV BWC training, he joined *HMAS BOMBARD* in 1978, completed an A PWO Course (1979) and then served in *HMAS TORRENS* and *DERWENT* as APWO ASW through to 1981. He joined Navy Office in 1981 on the staff of DTXC-N and is currently Flag Lieutenant to CNS.

command of *FREMANTLES* indicate that sea billet shortages will be maintained at present levels. The effects of the demise of the APWO course have yet to be felt.

**Realities**

The present situation is well known. Put simply there are too few sea billets to go round. Contributing factors are the scrapping of *HMAS MELBOURNE*, the changeover from *Attack* to *Fremantle* Class patrol boats, and the ongoing DE modernisation. The situation is poor and it is unlikely to be relieved in the foreseeable future. Present trends in the minimum manning concept (FFG and FOD) and the postings of senior lieutenants/junior lieutenant commanders to

While we seek to find suitable slots for the Executive lieutenant in our ships, it would be fair to say that there are a number of vacant desks ashore waiting to be filled. Whether these desks are appropriate or not is the subject of some debate. The range of shore jobs available appears to be endless, and they cover the whole spectrum of naval tasks. For instance, junior APWO trained Seamen lieutenants have in recent years been posted ashore to the following areas:

- Recruit School — *CERBERUS*
- Parade Training Officer — *ALBATROSS*
- Barrackmaster — *KUTTABUL*
- Directorate of Naval User Requirements — Navy Office
- Directorate of Trade and Exercise Co-ordination — Navy Office
- Directorate of Surface and Air Weapons — Navy Office
- Fleet Operations Centre — FHQ.

Those examples are indicative only, but they do give some idea of how we are using our assets. Some postings are generated for reasons known only to the poster and the individual concerned, besides which it is not the object of this article to question *individual* posting policy. In light of the above example, the pattern of shore postings appears to retain, insofar as possible, the edge of the young Gladiator's sword when posted to Navy Office: the three directorates above are all close to the Navy Office 'coal face' for a warfare streamed seaman.

**'Six of One, and Half a Dozen of the Other'**

There are many pros and cons associated with what is essentially a discussion on sea versus Navy Office postings for junior Seaman lieutenants. I would categorise them as follows:

*Pros*

Navy Office provides a broader understanding of the Service, and an insight into the way Government, and the bureaucracy work. I suggest that anyone exposed to the Canberra environment comes away with a more balanced view of the factors that govern the Navy. A subsidiary benefit would hopefully be in the attitude of the young officer coming from the Fleet, and knowing that he will soon be returning. It is in his own interest to provide fresh input to the bureaucratic machine with an aim to improving its efficiency.

A job in Navy Office introduces young lieutenants to the awesome amount of paper work required to keep the Navy afloat. The ability to express oneself in Service writing is

**TABLE 1**

**SL 75 OUTLINE POSTING PATTERN**

| *YEAR* | *1978* | *1979* | *1980* | *1981* | *1982* | *1983* | *LEGEND* |
|---|---|---|---|---|---|---|---|
| RANK | SBLT | SBLT | SBLT/ LEUT | LEUT | LEUT | LEUT | MWV — Minor War Vessel NO/XO |
| A | MWV | MWV | MWV | APWO* | APWO | NO | APWO — Assistant Principal Warfare Officer |
| B | MWV | MWV | APWO | APWO* | NO | NO | |
| C | MWV | APWO | ESTAB | MWV | MWV* | DE(N) | NO — Navy Office Job |
| D | SM | SM | SM | SM | NO* | SM | ESTAB — Establishment Job |
| E | MWV | ESTAB | ESTAB | NO | NO | MWV | DE(N) — Destroyer Navigator |
| F | OOW | MWV | APWO | APWO | ESTAB | DE | SM — Submariner |
| G | OOW | MCD | MCD | MCD | OOW | MCD | OOW — Major Unit Watchkeeper |
| H | OOW | OOW | APWO | APWO | APWO | FHQ | MCD — Mine Clearance Diving Officer |
| | | | | | | | FHQ — Fleet Headquarters Job |
| | | | | | | | * Transferred to GL |

The table shows that of the eight, seven had either had, or are presently in desk jobs, and of those seven, four have been in Canberra at Navy Office.

a skill that all officers have to develop for jobs ashore and at sea. Staff Colleges teach these skills, but for those posted ashore prematurely, the Navy Office job will provide an opportunity to develop them ahead of time. Another factor in the early development of communication skills is inherent in the work environment, where a lieutenant finds himself working directly for, or in some cases with, lieutenant commanders, commanders and captains. The necessary hierarchy and functions of a ship restrict the opportunity for a junior lieutenant to converse (in the true sense of the word) with his Captain. Navy Office requires a junior officer to consult daily, and often argue his point of view, with officers considerably senior to himself. I am not implying that discipline is weak at Navy Office, just that the different nature of the work requires the junior officer to communicate with his seniors in a way that might previously have been unthinkable to him.

Family life for the married man is a crucial factor in the efforts to keep personnel happy. Of the earlier example citing the SL 75 course, seven are now married, four with children. While a move to Canberra may initially be upsetting to some wives (as any move can be) most find the area pleasant and many settle here. The lower cost of housing compared to Sydney, and improved roads between the two cities are further benefits to be taken into account.

*Cons*

The timing of the posting ashore, coming when the junior lieutenant is perhaps just beginning to play an effective part in the operation of his ship is critical. These officers are, for the most part, competent watchkeepers and effective Divisional Officers; the next time they go to sea will, in a lot of cases, be on completion of PWO course which will have followed the shore posting. It is therefore possible to spend up to 4 years away from 'the front line' and the time taken to get up to speed again in both the operational and administrative aspects of ship routine is considerable.

No job in Navy Office provides a real Divisional challenge. The loss of contact with sailors, and the responsibilities involved in their day to day personal management is a prime factor mitigating against the posting to Canberra. It might be suggested that the officer returning to sea on completion of his Navy Office job would be better equipped to manage his sailors as a result, although that again is a debatable point.

The view in the 'Pro' section on the benefits of a shore posting for the married man hide the reverse side of the coin for the single man. The prospect of a 9 to 5 job in Canberra should be, and generally is, anathema to the bachelor. To one used to the atmosphere of a ship, and a seagoing wardroom, that first view of Russell Hill must be a frightening experience.

**Conclusion**

To sum up, let me first emphasise that a secondary aim of this article is to seek views on the problems as presented. The efficient management of Naval manpower is an area that affects us all.

The concept of the Gladiator and the Bureaucrat has been looked at very briefly with and without the realities — those being our current force structure and the availability of billets. The pros and cons including family/single man considerations, communication skills, Divisional responsibilities and experience levels were also discussed. An example of a group of seaman lieutenants was used to illustrate the points made and I believe that example accurately reflects the situation as it is across the board.

I close with the final thought that in order to provide the Gladiator with his sword, we must first win the battle for funds — and that can arguably be done best by those who understand the roles of both the Gladiator *and* the Bureaucrat.

# THE PROOF AND EXPERIMENTAL ESTABLISHMENT PORT WAKEFIELD

by Lieutenant K.C. Mathews, RANEM

At the beginning of 1982, the RAN created a new billet for an RAN officer to be stationed at the Army's Proof and Experimental Establishment, Port Wakefield, South Australia. Although the Navy has had a close asseciation with the Range since its inception, this was the first time a naval officer was to serve as an Assistant Proof Officer. The Army argued, not unreasonably, that as almost 50% of firings and trials conducted on the Range are carried out on behalf of Navy, a permanent naval presence is justified.

The P&EE (PW) had its origin in 1926 when a committee of two, Lieutenant Colonel H.B.G. Gibbs, of the Munitions Supply Board, and Captain W. Spooner, RAN, selected 240 hectares of land near the head of St Vincent Gulf for the purpose of conducting proof firings of QF 18 pdr. ammunition for the munitions factory at Maribyrnong, Victoria. In selecting Port Wakefield, the committee was influenced by the large stretch of sand which is exposed at low water, thereby facilitating the recovery of fired projectiles.

The first rounds were fired at P&EE (PW) on 5 December 1929. For the first 10 years, firings were conducted at three monthly intervals, but the tempo naturally increased from 1939 onwards and Port Wakefield became the principal range for the proof of munitions manufactured in Australia.

An interesting development occurred in 1943, when it was decided to proof several 8 inch naval guns which had been re-lined at the Bendigo Ordnance Factory. As proof at sea was out of the question, it was decided to use a 28 cm German railway gun as the mounting for these barrels. The gun, known as the 'Amiens Gun', or more familiarly as 'Bruno', had been captured by the AIF in France in August 1918 and was on display at Canberra railway station. On 12 February 1944, the first 8 inch barrel was successfully proofed. Subsequent firings for proof of propellant continued until 1947 when the 8 inch programme was completed.

Unfortunately, despite the historic value of the mounting and accessories, it was disposed of as scrap in 1963, although the barrel used for the propellant proof remains on display at the Range. This barrel is believed to have come from X Turret in *HMAS AUSTRALIA*.

Today, the Range covers an area of Commonwealth-owned land of about 2000 hectares. In addition, the Range controls a sea area of 19,200 hectares. The land area is flat and clear of timber, consisting mainly of salt marsh. The only exception is a small area of high ground at the northern end of the Range where administrative, technical and domestic buildings are concentrated.

### Role and Tasks

The role of P&EE (PW) is threefold:

- proof of ammunition, propellants, fuzes, gun barrels, weapons and components as directed by HQ, Log Comd
- conduct of trials for the Services, Department of Defence and other departments associated with research and development, defect investigation and production of ballistic data
- development of techniques and instrumentation to provide performance data for users and others.

**The Author**

Joined the RN in March 1949 and was commissioned in February 1962. He served in the RAN on exchange between 1965-1966 and eventually joined the RAN in 1971. Whilst in the RN, he served in battleships, cruisers, frigates, aircraft carriers and minesweepers; in the RAN, he has served in *HMAS DUCHESS*, *HMAS PARRAMATTA* and *HMAS SYDNEY*. In addition, he has been Weapons Systems Officer at West Head, *HMAS CERBERUS*; Quality Control Officer at the Gunnery School (introducing the RAN Training System to the School); Staff Officer DSAW, and currently Naval Tradition and Reputation Upholder at PW.

### Tasks

P&EE (PW) is tasked to carry out various types of proof and trials. Proof is almost exclusively dynamic proof, on ammunition of 40mm calibre and above. Firings may be carried out:

- into shallow water for recovery at low tide,
- into deep water,
- on to sand, or
- against various types of targets.

Trials are usually more complex and may be broadly categorized as:

- trials in aid of research and development,
- ballistic trials,
- pattern acceptance trials, and
- provision of technical support for trials by other agencies requiring facilities unique to P&EE (PW).

Additional tasks may include:

- internal technique and instrumentation development,
- assistance to agencies in departments other than Defence, and
- support for Service courses and training.

### Manning

The unit authorized establishment provides 71 staff; 6 officers, 37 OR and 28 civilians. One of the six officers is an RAN Lieutenant. Eight different corps are represented on the range; RAA, RAE, RASvy, RAAMC, RAAOC, RAEME, RACT and AACC.

## WHAT IS PROOF?

### Equipment Proof

The need for trials for the development of equipment is clear. What is not so clear is the need for proof. Proof is the final acceptance inspection of ammunition or a piece of equipment. The proof of guns, mountings and barrels is straight forward and is carried out using specific proof charges which subject the equipment to pressures up to 20% in excess of those produced by normal Service charges.

### Ammunition Proof

The proof of ammunition is rather more involved and has two important aspects: safety and performance.

To begin with, the Fleet must obviously have absolute confidence that its ammunition will not explode prematurely onboard ship and that fuzes will not operate or shells detonate until after they have left the barrel. Proof is designed to prevent such accidents occurring. Of course, proof firings are carried out under strict precautions to ensure that no harm comes to those involved.

The second proof requirement is to prove that the ammunition will produce the desired terminal effects. An item of ammunition, say a round for a 5 inch gun, has a high material cost and an incalculable potential value. The purpose of the gun is to deliver a projectile onto a target in war. The cost of the projectile which is fired at an enemy is enormous, since, indirectly, it includes the cost of the DDG, its deployment to the battle area, the training of the crew, and a host of other things. That projectile, when it is fired, might destroy a ship or aircraft worth many millions of dollars. It must therefore perform perfectly, or all is wasted.

The quality of an individual round can only be judged by the performance of a similar round taken from the same batch and fired. For economic reasons the number of similar rounds taken from a batch must be small. In order that the results obtained from firing a relatively very small quantity can be applied to the whole batch with the necessary degree of confidence, various measures have to be taken. Firstly, the whole process must be governed by the most strict statistical sampling methods and the sample must be truly random. Secondly, the sample must be fired under strictly consistent, uniform and unvarying conditions; in fact, under laboratory conditions. These principles apply to all forms of proof and all types of projectiles and ammunition.

### Over Water Recovery

It is often necessary for rounds to be examined after they have been fired to determine whether any undue distortion of the projectile has occurred or to ensure that driving bands remain intact. Port Wakefield is an ideal venue, perhaps the best in the world, for Over Water Recovery Firings. The projectiles are fired so as to ricochet or skip across the Range at high water, thus minimising terminal effects. Later the tide recedes for a distance of up to 4 kilometres, leaving the rounds high and dry on the sand from where they can easily be recovered.

A variety of vehicles are used for recovery including landrovers, a motor tri-cycle with balloon tyres and a Skima 6 Hovercraft. The tri-cycle can be fun! On one occasion it was left unattended on the beach for a short time as the tide came in. The tide at Port Wakefield runs at a smart walking pace, and when the rider next looked round, the tri-cycle was seen floating upright on its balloon tyres, heading merrily out into the Gulf.

Although the hovercraft is used to assist with recovery, its primary purpose is for use as a patrol craft removing fishing boats when they encroach onto the Range. I cannot recommend this particular hovercraft for naval service as it becomes

*Beach Recovery*

*VT Towers*

*Ammunition Proof*

unmanageable in wind speeds over 20 knots or when wave heights exceed one foot.

## TECHNICAL FACILITIES AND EQUIPMENT

### Batteries

There are four batteries currently in use at the Range:

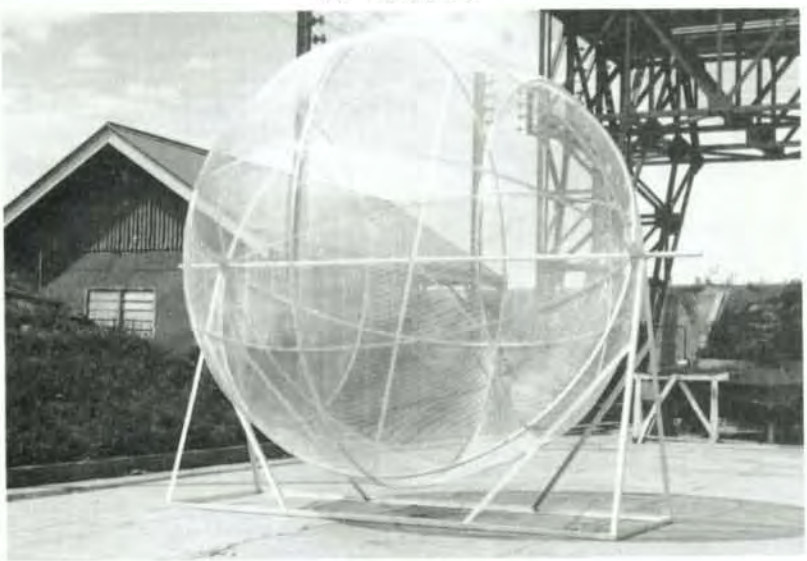
- *Forward Battery*. Forward Battery is suitable for most proof firings, including HE. The battery has facilities for propellant charge adjustment and instrumentation of all types.
- *Victor Battery*. Victor Battery is used for proof and trials of VT fuzes. The major projects being conducted on the Range in 1983/84 are the trials of the AN2 Mod 2 and AN3 fuzes for the Navy. More than 900 rounds of 4.5 inch and 5 inch ammunition are to be fired in support of these trials. VT fuzed rounds are fired to pass over an 11 foot diameter radar reflective aluminium mesh ball slung between two 90 metre high towers.
- *Cannister Battery*. Cannister Battery is used for firings from field carriages. It is not used for HE firings.
- *Plate Battery*. Plate Battery was originally constructed as an armour plate range but this facility has now been dismantled. The battery is primarily used nowadays for firings of RAN 5in/54 ordnance.

The range has ample area for the establishment of ad hoc batteries to carry out specific tasks.

**Table 1 — Instrumentation**

| *Serial* | *Observation/ Data required* | *Instrumentation/ Equipment* | *Operation* |
|---|---|---|---|
| *(a)* | *(b)* | *(c)* | *(d)* |
| 1 | Projectile Velocity and Muzzle Velocity | Photocell chronometer (PCC) | Skyscreens are positioned under the trajectory at a measured distance apart and connected through amplifiers to counters. Projectile interruption of the field of view provides a start/stop signal to the counters giving an elapsed time over the measured distance. |
| | | Ferranti Type 900C | A doppler radar system including a transmitter/ receiver unit, data flow accessories and a data processor. |
| 2 | VT Fuze Frequency | Panoramic receiver<br>Tape recorder<br>Multi-channel antenna | Receiver detects frequency transmission of fuze. Doppler effect is recorded on tape. |
| 3 | Projectile Spin | Magnetiser | A magnetised projectile is fired closely parallel to a long straight wire which is part of a closed electric circuit. Resulting signals are photographed against a time scale. |
| 4 | Fuze delay | Aluminium foil<br>Battery<br>Infrared (IR) detector<br>Cathode ray oscilloscope (CRO) | Aluminium sheets are placed against the face of a target and connected to a battery to form an open circuit. Projectile striking foil 'shorts' the circuit and starts a counter. This counter is stopped by IR detection of detonation of shell on target. |
| 5 | Projectile Yaw | Cards frame | Projectile is fired through a card or set of cards at pre-determined distances. Subsequent measurement of the perforation shapes will define the inclination of the projectile relative to its longitudinal axis. |
| 6 | Projectile Retardation | PCC | Four successive observed velocities are measured at 100ft intervals. |
| 7 | Maximum pressure | Copper crusher gauges<br>Micrometer | Calibration copper gauges are crushed by pressure of the propellant gases. Measurement of the deformation gives maximum chamber pressure. |
| 8 | Pressure/Time History | Strain transducers<br>Piezo transducers | The transducers are inserted into the chamber by the most technical feasible means and the output signals passed to a suitable recorder. |
| 9 | Detonation/Fragmentation/Trajectories/Fuze Function | High speed cameras<br>Still cameras<br>Polaroid cameras | |


*The Skima Six*



*The Ball*

*Mobile 4.5in*

**Weapons**

Between 40% and 50% of the tasks given to the Proof Range are undertaken on behalf of the RAN. Because of the peculiar nature of naval guns (from the Army's point of view) we have had to devise some interesting hybrids, apart from the marriage between 'Bruno' and the 8 inch naval gun referred to earlier. Some of the hybrid and unusual equipments currently in use are:

- an OQF 4.5in Mk2 mounted on an Army 155mm M1A1 carriage
- a 5in/54 Naval gun mounted on a specifically designed 'Britstand' trailer which is affectionately named *HMAS PORT WAKEFIELD*
- an OQF 40mm Mk1 mounted on a 25 pdr gun carriage.

Eventually, it is expected that the range will acquire a 76mm OTO Melara which will need to be modified to suit proof requirements and the trials which will be associated with Australian production of 76mm ammunition.

**Observation, Meteorology and Instrumentation**

Thirty one accurately surveyed observation posts are sited along the coast. These permit accurate fall of shot, height of burst and fuze function observations to be made.

P&EE (PW) is equipped with the resources to produce detailed meteorological data.

Different proofs and trials have different observation requirements. Some of the observations and instrumentation used to gather the required information at P&EE (PW) are described at Table 1. A brief description of each procedure is included. There are many others not described. Most of the more complex computations are made simpler with the aid of a Techtronix computer.

**Range Safety**

Range safety is monitored by a Plessey surveillance radar, the aerial for which is mounted on top of an 80 metre high steel tower.

In summary, the Proof and Experimental Establishment, Port Wakefield, is a highly professional unit. It is a self-sufficient organisation, capable of undertaking a wide range of technically demanding tasks. It has a vital role in minimising the risk of defective weapons or ammunition endangering the lives of soldiers, sailors and airmen when they are sent into battle.

Propellants must be proved consistent, barrels and breeches must be able to withstand huge pressures and fuzes must be safe and reliable. The entire round or missile must perform in the manner intended, whether it was manufactured last year or 20 years ago.

In this short article, much has had to be left unsaid. Ships visiting Adelaide are encouraged to send officers and senior sailors to tour the Range to see for themselves the many exciting new developments taking place, and the efforts made to ensure that we follow St. Paul's injunction —

*Prove all things. Hold fast that which is good.*

*HMAS PORT WAKEFIELD*

— photos courtesy author

# WASHINGTON NOTES

*by Tom Friedmann*

Just over a year ago the world witnessed what might be the last dispatch of a British battle fleet to liberate part of Britain's once vast empire. It had been many years since a fleet of any nation had been sent to sea for such a purpose and there were high expectations about how many new lessons would be gleaned from the first use of high technology by an entire fleet. The use of the Harrier, nuclear submarines, and the massive use of guided weapons were, indeed, 'firsts'. But these technologies represented evolutions in concept and design more than totally novel ideas. The greatest lessons were not really 'new' but merely relearned and, as always, the re-education was paid for in blood and vast expenditures of national treasure.

Since the Second World War, the United Kingdom has been steadily reducing the size of its armed forces. However, the cuts went beyond rational reduction based on the shrinking size of the Empire. The two decades prior to April, 1982, became a precipitous retreat by Britain from her position as a world power. The strength of the British Armed Services were cut so deeply that the gashes went into their bone and marrow.

No Service suffered as greatly as the Royal Navy, the island nation's first line of defence. The new aircraft carrier *INVINCIBLE* was scheduled for transfer to Australia and the *FEARLESS* and *INTREPID* were scheduled for the breakers, thereby removing Great Britain's last amphibious assault capability. Many frigates were to be either sold or scrapped and replacements were never to reach even the old dangerously low levels again. Britain's politicians not only ignored the lessons of seapower taught during the two World Wars this century (including the first Battle of the Falklands in 1914), but they also ignored their *entire national history* as they stripped away Britain's naval power.

The Argentine dictatorship, a corrupt murderer of its own people, misread Britain's actions toward unilateral disarmament. Not without reason did Argentine generals (as had other dictators before them) come to believe that any nation that would not spend enough on its armed forces to keep the peace, would not then spend many more times any peacetime expenditure for weapons, as well as the lives of its young men, to fight for such abstract principles as the protection of its national territory and the freedom and independence of its own people. The actual attack took most people by surprise. Obviously, it was the desperate act of a failing regime, despite the deep feeling Argentines have that the Falklands are rightfully theirs.

At the time of the invasion, the United States was involved in negotiations with Argentina to provide troops in support of counter-insurgency actions taking place in Central America. In other words, Americans were dishonoring themselves by negotiating with an abhorrent regime to become their surrogates — their Cubans — in Central America. These negotiations in turn caused another tragic misreading by the Argentine generals that led them to the conclusion that the United States would support Argentina in an invasion of the Falklands to gain Argentine support in Central America.

But if the Argentine government had any questions about the sympathy of the American public in their cause, they were undoubtedly dispelled soon after the attack. Although most Americans supported their government's attempts to mediate between Argentine and the United Kingdom, American public opinion overcame what would otherwise have been a pro-Pan-American sympathy and was unquestionably pro-British. It was a matter of Britain defending basic principles in which Americans

believe, against Argentina that trampled upon those same principles.

And Britain was supported in a more than spiritual fashion. Munitions and other supplies came from US factories and stockpiles, and American air bases — on British islands — were used to support the fleet. Most importantly, Britain was supplied with intelligence so far superior to Argentina's that many feel it tipped the scales in Britain's favour. Much of the intelligence came from joint Anglo-American operations. However, many Americans were surprised to see how closely the United States was linked with the United Kingdom and how the actions of such a close ally could affect American security interests in circumstances over which the United States had no direct control.

There has been much comment about the superior training and leadership of the British forces. But what forces are we speaking of? The Royal Marines, the Special Air Service, the Special Boat Squadron, the Gurkhas, the Welsh Guards, and the Scots Guards to name several. These are some of the leading military units of the world. Would anyone question the training and professionalism of the Royal Air Force and the Royal Navy? Frankly, the only real surprise would have been if these superb forces had lost.

Secretary of the Navy John Lehman's emphasis on the fact that the British forces were superior to Argentine forces because 'like their US counterparts, they are entirely volunteer' is somewhat questionable. Who, after all, would question the combat capability of the Israeli armed forces, for one example, which are based on universal conscription. Secretary Lehman, by his comments, denies credit to the conscript armies that fought so valiantly for the United States in every war this nation has fought during this century.

The skill, stamina and resolution of the members of the British forces were probably as good if not better than any force Britain had ever sent into battle. The campaign took place in an extremely harsh climate and once again emphasized the crucial importance of both physical and mental toughness for the protection of the individual Serviceman and the success of any military campaign.

But no matter how competent they were, the British were still lucky. British commanders landed without achieving air superiority. Large luxury liners lay offshore and sent troops into battle in lifeboats. Such actions could have easily developed into another Gallipoli, as General Paul X. Kelly, Assistant Commander of the United States Marine Corps, testified before Congress. There were errors such as the loss of thirty-two members of the Welsh Guards on the RFA *SIR GALAHAD*, as they watched a film while their ship was at action stations. But no war was ever won without a large element of luck, as well as tragic mistakes.

The success of the Exocet missile used by Argentina to sink several British ships should not have come as a surprise because of the successful use of guided missiles against surface ships in the 1967 Israeli-Arab War and the 1971 Indo-Pakistan War. The *potential* use of guided weapons goes back to World War II when the Germans sank the Italian battleship *ROMA* and damaged several Allied warships with radio controlled bombs. The kamikaze, it can be argued, was the ultimate 'guided missile' and the navies that fought that menace should have volumes of records to study about the steps taken to protect their ships. Indeed, it was not the success of missiles that was the story of the Falklands but the fact that the Royal Navy sent ships lacking effective close-in air defense weapons and airborne early warning aircraft into an environment where guided weapons would be used. This technology has been available to Britain for years and her civilian leadership should be called to account for not having properly prepared the Royal Navy's remaining vessels.

However, the Royal Navy is not alone in facing armament problems. The United States navy is only now making progress in providing state-of-the-art weapons for its ships. Frankly, the United States was lucky that it did not have to fight a missile war during the last two decades as it has been consistently behind the Soviet Navy in the deployment of surface-to-surface missiles and close-in air defense weapons.

The loss of British warships has been greatly overplayed. It is a simple maxim that when warships seek the enemies of their country, they run the risk of being sunk, whether by gunfire, torpedo or missile. The small size of the ships lost has become an important issue in the defense debate in America. Secretary Lehman, a *large* ship advocate, has stated:

> 'The Exocet missile that sank *SHEFFIELD*, for instance, would have quite literally bounced off the seventeen-inch armor of the (US battleship) *NEW JERSEY*. . . Not one of the attacks sustained by British ships would have been able to penetrate any vital space on any US aircraft carrier. The smaller carriers deployed by the UK, by contrast, are far more vulnerable to complete loss from torpedo, missile, or bomb attacks because they lack multiple hulls, armor plate, and redundant damage control and protective launching systems of large US carriers.'

*USS NEW JERSEY*

Courtesy USN

The comparison is questionable for many reasons. First, the Secretary of the Navy cannot be absolutely certain that an American carrier would not be put out of action by a surface-to-surface missile. Second, the *INVINCIBLE* was not damaged by a missile so we are not sure how such damage would have affected her performance. Third, the Secretary underplays the difference in missions between British aircraft carriers and American aircraft carriers because he refuses to acknowledge there could be a place for a smaller aircraft carrier in the US Navy. Fourth, the statement passes over the fact that only the US Defence budget is capable of conand maintaining *NIMITZ*-class carriers and their deployment is beginning to strain even that budget. Fifth, not all US ships carry 17-inch armor like the *NEW JERSEY* but the Secretary neglected to comment on how American destroyers and frigates would stand up to a missile attack. Finally, even if all four *IOWA*-class battleships were recommissioned (and to date, Congress has refused to fund the conversions of the *MISSOURI* and *WISCONSIN*) there are only four such heavily armored ships in the entire American inventory. Is the Secretary proposing the United States build new ships as heavily armored, perhaps to match the new Soviet 'battlecruisers'? If so, no such plans have been released.

The Battle of the Falklands was a classic

battle of logistics. Argentina made great strides in sending adequate supplies to Port Stanley to withstand a considerable siege. However, once the supplies arrived, Argentina's commanders lacked the ability to have them properly distributed (shades of the Russian Front in World War I). But a key point is that Argentina kept supplies coming until the very eve of the surrender because interdiction raids against Port Stanley's airfield were ineffective. The RAF was never able to secure the same superiority in the air that the Royal Navy did at sea. Had other factors been different, this failure could have meant the defeat of the British forces.

The United Kingdom exhibited a dazzling display of logistics preparation. Britain mobilized 45 ships of her Merchant Navy in record time. The Defense Ministry's Directorate General of Ships did a superb job in organizing and preparing the vessels in many ports in the United Kingdom and abroad, including Charleston, South Carolina. But the rapid mobilization was aided by the slump in world shipping which made more ships readily available. Much of the work was done in navy yards scheduled for closing, most notably the *UGANDA's* conversion to a hospital ship at Gibraltar. But even with the large number of ships called into national service, there were problems. For example, the Royal Yacht *BRITANNIA* is scheduled for conversion to a hospital ship in wartime. However, the Royal Navy was unable to make use of the ship because it had been unwilling to risk the political flack it would have received in order to convert the ship from black oil to diesel oil fuel. The only other ship in the fleet that burned black oil was the aircraft carrier *HERMES* and she was to be supplied by *only one* tanker. Two black oil ships would have greatly complicated the fuel situation which could easily have become a catastrophy had this one tanker been sunk. Luxury liners and passenger ferries were forced to become assault ships. The fleet required the acquisition of five offshore oil rig support vessels because its only repair ship, *HMS TRIUMPH* had been towed to Spain three months previously for scrapping.

Despite Britain's massive effort, supplies were stretched to the limit by the end of the campaign. In particular, munitions were used at a much faster rate than expected. The rapid use of munitions in modern war should not have come as a surprise to the United States as they found it necessary to strip American forces in both Europe and at home to resupply Israel in 1973 after its massive expenditures during the Israeli-Arab War. Only now, in fact, has the United States really begun to fully makeup deficiencies caused by that emergency. Nonetheless, the Secretary of the Navy has admitted sending American ships to sea without full magazines while still pushing for the construction of multi-billion dollar ships. One can only question the priorities of any administration that would build new warships while existing warships lack the ability to fight.

In the event of a crisis, the United States can rely on only 29 ships in its Ready Reserve Force despite Secretary Lehman's projections that any American task force would be far greater than anything the Royal Navy mobilized for the Falklands. The Reagan administration has asked for an increase in size for the Ready Reserve Force to 77 merchant ships. Because of the narrow margin of safety in Britain's supply situation, 77 ships might not be enough. One factor in particular that did not figure into the Falklands fighting was the apparent lack of any concerted effort by Argentine submarines to sink supply vessels, a luxury no navy should rely on when planning a campaign.

In the Arapaho Project, the United States Navy leads the world in planning to use merchant ships as small aircraft carriers by placing a 'prepackaged' flight deck and necessary support equipment on board these ships. The concept has now been proven both on land and at sea but the Navy refuses to proceed any faster than at a snail's pace developing the concept, despite the great interest shown by several American allies, including Australia. Many are convinced the primary reason the Arapaho has such a low priority, as does the rebuilding of decrepit mine forces, the merchant marine, amphibious and support ships, and numerous other areas, is that they are not 'glamorous' enough for the Navy to 'push' when it seeks fuding from Congress. This glamour factor appears to be crucial in determining the shape of America's armed services. It is not 'glamorous' to seek money to purchase a weapon to place in reserve for use on merchant ships in case of an emergency. It is not 'glamorous' to request money to increase armaments and fill magazines of ships already built. It is not 'glamorous' to ask for money for more training and exercises to assure equipment works and men survive in the event they are called upon to do battle. Unfortunately, it is 'glamour' projects that attract members of Congress when they appropriate peacetime budgets.

The Falklands fighting gave the West yet another opportunity to relearn basic facts about warfare. The importance of adequate training, proper equipment and sufficient supplies reign with renewed lustre in military science courses all over the world. Hopefully, the military and political leaders of the democracies will heed these lessons. The price Britain paid was too high to be ignored.

# SHIPS AND THE SEA

## KANGAROO ISLAND TRAGEDIES

The Loch Line, a well known line of sailing vessels on the England/Australia run, lost two of its vessels within 16 miles of each other on the west coast of Kangaroo Island, albeit six years apart.

Messrs William Aitken and James Lilburn of Glasgow founded their line in 1867 by chartering three sailing vessels *LOCH AWE*, *LOCH RANNOCK* (ex *CLAN RONALD*) and *BEN NEVIS*. Business was so good that in 1869 they had six 1200 ton ships built especially for the trade. These were *LOCH LEVEN*, *EARN*, *NESS*, *LOMOND*, *KATRINE* and *TAY*. Other vessels followed in the years 1869–1885. The most famous of all their vessels was *LOCH ARD*, but much has been written on that particular vessel. According to Jack Loney in *Tall Ships and Sailormen*, the proof of the popularity of the Loch line was that in 1901 the residents of Melbourne witnessed the unusual spectacle of 7 Loch line vessels together in Port. For the record, these were *LOCH TORRIDON*, *LOCH TAY*, *LOCH CARRON*, *LOCH ETNE*, *LOCH BROOM*, *LOCH KATRINE* and *LOCH GARRY*.

The first vessel lost on Kangaroo Island was *LOCH SLOY*. Built by D&W Henderson of Glasgow in 1877 she was an iron barque of 1280 tons gross (length 225 ft, beam 35 ft 6 in, draft 21 ft). After loading a general cargo for Adelaide and Melbourne, she sailed from Glasgow on 5 January 1889. Under the command of Captain Nicol, *LOCH SLOY* had an easy passage towards Adelaide and 124 days out, passengers and crew were expecting to raise Cape Borda light on the western end of Kangaroo Island.

Landfall was made at about 5 a.m. on 24 April 1889, but it was land, not the lighthouse. Being so close inshore, all attempts to gain sea-room were of no avail. *LOCH SLOY* struck a reef some 200 yards offshore in Maurpentius Bay and became fast amongst the breakers of the Southern Ocean. Destruction was complete and of the 31 crew and 6 passengers onboard the barque when she struck, only 3 crewmen and 1 passenger survived.

The second Loch line vessel to be wrecked on Kangaroo Island was the 3 masted, full rigged ship *LOCH VENNACHER*. Built of iron by J&G Thompson of Glasgow she was launched in August 1875 (1485 tons, length 250 ft, beam 38 ft, draft 22 ft 6 in). A fairly fast vessel she was well known and well liked on the run, averaging 86 days London to Melbourne over 12 passages.

In her career, *LOCH VENNACHER* had her share of problems. In 1893 she was dismasted in a Southern Indian Ocean cyclone and was forced to make for Port Louis, Mauritius for repairs and re-rigging. The master, Captain Bennett, was awarded the Lloyd's Medal for saving his ship, crew and passengers. Later, in November 1901, *LOCH VENNACHER* whilst at anchor at Thameshaven, was rammed by the steamer *CATO* and sank in 40 ft of water. One month later she was raised and set sail for Australia.

All remained well until early 1905 when the Loch-liner left London for Adelaide and Melbourne with general cargo. Under the command of Captain W.S. Hawkins there were 26 crew onboard. Details of this last voyage are not clear, of course, but one may assume that all went well although the voyage took longer than normal. Nearing the end of the voyage to Adelaide, *LOCH VENNACHER* was sighted by, and spoke to the steamer *YONGALA* on 6 September 1905 when only 160 miles to the west of the Neptune Islands. Her course was ENE, that is, on course for Adelaide.

At this stage, she was considered overdue and the superintendent of the Lifesaving Department (Captain C.J. Clare) conferred with the ship's Agents (GR Wills & Co). The result was that at 5 p.m. on Monday 18 September 1905, the Marine Board steamer *GOVERNOR MUSGRAVE* departed Port Adelaide to search the Neptune Island group and the south coast of Kangaroo Island. The search over the following week proved fruitless.

However, evidence of the wreck of *LOCH VENNACHER* came to Port Adelaide on Friday 29 September when the master of the Ketch *ANNIE WATT* (Captain F. Peters) reported having recovered printing paper in St. Vincent's Gulf. The paper — according to shipping marks — had been carried by *LOCH VENNACHER*. More reports of wreckage came in from various parts of Kangaroo Island and although it was all from the Loch line vessel, the main problem was to locate

the actual wreck. All evidence now pointed to the fact that *LOCH VENNACHER* struck Young Rocks on the western end of Kangaroo Island.

In 1976, three divers from the Society for Underwater Historical Research located the wreck of *LOCH VENNACHER* approximately half a kilometre north of West Bay on Kangaroo Island. Relatively untouched by salvage operations, the remains include anchors and cables, frames, plating, scuttles and the brick and pig iron ballast. The remains of the bow section is tightly wedged against rocks at the base of the cliffs. The shipwreck is classified under the (Commonwealth) Historic Shipwrecks Act of 1976. One anchor has been recovered and after preservation was set up as a memorial to the vessel in 1982. Other items are being recovered and preserved by members of the Underwater Historical Research Society.

**Robin Pennock**

## MORE SUCCESS

There have been a number of vessels named *SUCCESS* associated with the maritime history of Australia. Four of the name are well worth a mention in this section of the Journal.

### SUCCESS — 1820

In company with the RN vessels *SATELLITE, RAINBOW* and *CHALLENGER* she was present on the Australia station in the 1820s. *SUCCESS*, a sixth rate vessel of 28 guns, was under the command of Captain James Stirling when she arrived at the Swan River on 6 March 1827. Although the rest of the Fremantle/Perth story is history, it could be construed that this settlement came about by accident. Captain Stirling, and *SUCCESS* had in fact been sent westabout to form a colony to the eastward of the ill-fated Port Essington. (Port Essington in the Northern Territory was originally settled by *HMS TAMAR*). Adverse prevailing weather forced Stirling to obtain approval to explore the west coast of the continent instead of carrying on to the north.

### SUCCESS — 1840

621 tons, teak hull, a fully rigged ship built at Moulmein (Burma). She first visited Australia in March 1843 (at Fremantle) in 1847 (at Adelaide) and 1850 (at Sydney). In 1852, she arrived in Hobsons Bay with 200 immigrants but once secured, the crew departed to join the gold rush.

Bought by the Victorian Government for use as a prison hulk whilst Pentridge Gaol was being built, *SUCCESS* was only one of 5 such hulks, the others being *PRESIDENT, SACRAMENTO, LYSANDER* and *DEBORAH*. Fitted with accommodation for 130 prisoners, *SUCCESS* was to become the most infamous. Normal cells were 7 ft. square, with the solitary confinement cells only 3ft. wide. In 1853, the complement was 3 servants, 3 cooks, 1 watchman, 1 labourer, 3 warders and 83 prisoners. The Superintendent of Convicts, a Mr. John Price, was not a popular man even in those days. He took up his duty in January 1854 but only survived until March that year when, on 26 March he was battered to death by irate convicts working on the Williamstown breakwater.

Later in 1854, *SUCCESS* ceased her duties as a prison ship and was moved into the River Yarra to become a stores ship. In 1890, the hulk was purchased by Mr. Alexander Phillips, refurbished and fitted out to resemble a convict ship of the early Australian days. After being exhibited in Melbourne, she was towed to Sydney in 1891 but almost ended her career when scuttled in Kerosene Bay. Refloated and with new owners, *SUCCESS* visited Brisbane, Hobart and Adelaide as a convict exhibition ship.

A voyage to England in 1894 brought further exhibitions as a convict ship and the exhibitions continued until 1912 when she was again sold, before voyaging to the United States of America. Proving to be very popular in the States, the exhibitions continued until *SUCCESS* was requisitioned for use as a cargo carrier in 1917.

After the cessation of hostilities it was back to the now familiar role as a convict exhibition ship and in 1923 she was part of the Chicago World Fair. At the ripe old age of 106, *SUCCESS* was destroyed by fire at a Lake Erie wharf on 4 July 1946.

### SUCCESS — 1920

Built by Doxfords for the RN, this *SUCCESS* was laid down in 1917, completed in April 1919 and commissioned into the RAN on 27 January 1920. A sister ship to the destroyers *STALWART, SWORDSMAN, TASMANIA* and *TATTOO*, she was transferred to the RAN in June 1919. Arriving in Australia in company with her sisters in April 1920 she remained operational until paid off into reserve on 21 May 1930. Once again in company with her 4 sisters, *SUCCESS* was sold to the Balmain (NSW) firm of Penguins Ltd. for £2,277 and broken-up in 1937.

### SUCCESS — 198?

Perhaps the least successful of the ships bearing the name is the RAN's new underway replenishment ship *HMAS SUCCESS*. Presently under construction at Vickers Codock, she was originally planned to be in service by 1980, but was not laid down until September of that year. A *DURANCE* class AOR, this vessel has been plagued by many and varied problems and the delivery date, although still not firm, will probably not be until sometime in 1987.

**Robin Pennock**

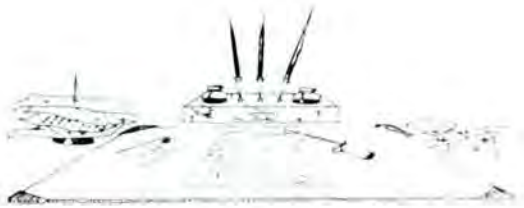

*HMAS SUCCESS 1920*

AWM Neg H17527

*HMAS SUCCESS —?*

Taken 14 May 83

Courtesy J. Mortimer



# CHAPTER NEWS

There has been no news from the Chapters for the last few journals, but here is a brief update on what seems to be happening — the Editor would be delighted to receive regular updates from convenors and secretaries.

**Canberra Chapter**

A meeting is planned for 28 September 1983 at Legacy House when Mr Paul Eccles will speak on 'Coastal Surveillance'. The speaker after the AGM on 28 October 1983 will be the Fleet Commander, Rear Admiral Hudson.

The long term plan for the chapter is to hold meetings in March, May, September, October (concurrent with the AGM) and November. The March 1984 meeting will not take place because of the impending Seapower Seminar in April 1984.

Commodore A. Cummins has taken over as convenor from Captain L. Fox and the secretary is Lieutenant Commander R. Jemesen.

**WA Chapter**

Indications are that the WA Chapter is flourishing and that four meetings have been held in the last year. Sub-Lieutenant Williams has taken over as secretary and a more detailed report will hopefully appear in the next journal.

**Other Chapters**

The NSW Chapter currently plans to hold two meetings a year at *HMAS PENGUIN* to coincide with RAN Staff College programmed events.

The Council has been informed that there is an interest in forming a chapter in the Nowra/Jervis Bay area, and that the Victorian chapter may soon be revitalised.

All convenors and secretaries, or those interested in forming chapters, are urged to contact the Council, via the Secretary, to let the Council know what is happening and/or to ask for assistance. Transcripts of meetings where a speaker is used should be forwarded to the Editor for inclusion in the journal.

# NOTICE OF ANNUAL GENERAL MEETING

The Annual General Meeting will be held at 2015 on Friday 28 October 1983 at Legacy House, Allara Street, Canberra, ACT.

**AGENDA**

1. Confirmation of Minutes of the Annual General Meeting held on 22 October 1982
2. Business arising from the Minutes.
3. President's Report.
4. Auditor's Report.
5. Election of the officers of the Institute and the Ordinary Councillors.
6. Appoint an Auditor and fix his remuneration.
7. Other Business.

**ELECTIONS**

**Office Bearers**

The Officer Bearers of the Institute are:

a. President
b. Senior Vice President
c. Junior Vice President
d. Treasurer
e. Secretary
f. Journal Editor

**Council**

The Council of the Institute consists of:

a. The Office Bearers
b. Ten regular members known as Ordinary Councillors

**Qualifications**

Only regular members may hold office.

**Nominations**

Nominations of candidates for election are to be signed by two members (regular or associate) of the Institute and forwarded to reach the Secretary no later than 14 October. Nomination forms are available from the Secretary.

**Voting**

Only regular members may vote and voting must be in person at the Annual General Meeting.

# NOTICE OF SPECIAL GENERAL MEETING

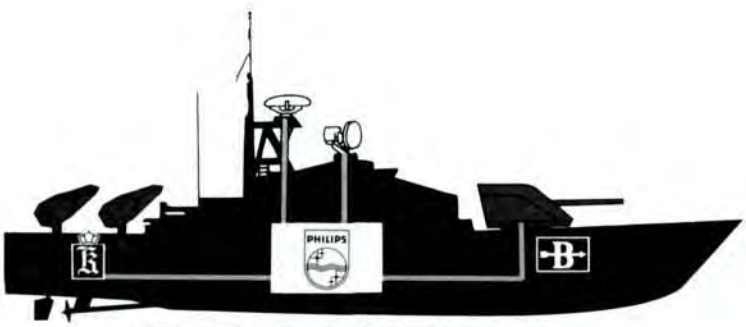
1. A Special General Meeting will be held at 2000 on Friday 28 October 1983 at Legacy House, Allara St., Canberra, ACT, to consider the following change to the Constitution.
2. Article 8(2) currently states:
   'The Treasurer of the Institute shall faithfully keep all general records, accounting books and records of receipts and expenditure connected with the operations and business of the Institute in such a form and manner as the committee may direct.'
3. **Proposal.** The proposal is made that 'committee' be amended to read 'Council'.
4. **Reason.** There is no committee as such. The Council is empowered under Article 22(2) of the constitution to 'control and manage the business and affairs of the Institute'. The use of the word committee was an original drafting error.

**Honorary Secretary**

# CANBERRA CHAPTER MEETING

Following the AGM, there will be a meeting of the Canberra chapter and an address by the Fleet-Commander, Rear Admiral M. Hudson RAN.

Royal Swedish Navy has taken delivery of Hugin-class patrol boat no. 14 in a series of 16.
Length: 36.4 m. Displacement: 150 tons. Speed: 30+ knots.
Complement: 18.




# SCANFIRE

- Bofors all purpose gun 57 mm/ L 70.
- Kongsberg SSM Penguin Mk 2.
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This powerful weapon package is proposed for the R.A.N. Freemantle class FPB.

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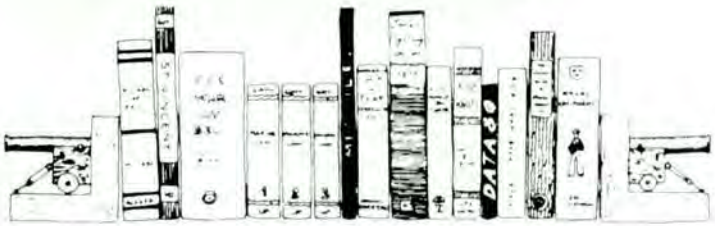
**PHILIPS**

# BOOK REVIEWS



**BATTLESHIPS OF THE GRAND FLEET. By R.A. Burt and W.P. Trotter, M.C., Arms & Armour Press. 96 pp, ill, $23.95.**

This book is a pictorial history of the Royal Navy at its peak during World War One — it is 96 pages of pure nostalgia.

*Battleships of the Grand Fleet* covers the era from the first Dreadnought, *HMS DREADNOUGHT* in 1906 to the mightly HM Ships *RESOLUTION, REVENGE, ROYAL OAK, RAMILLIES* and *VALIANT* of 1917. Although pre-Dreadnoughts are not covered, there are 32 battleships and 15 battlecruisers included.

Each class is well covered with illustrations and comprehensive data sheets. Wartime modifications are covered in a step by step photographic record. Some changes in appearance from commissioning to final appearance are quite startling.

The book is packed with 169 black and white photographs, including eight double page spreads and also one double page line drawing of *HMS BELLEROPHON* in detail.

Many of the superlative photos from glass negatives have never been seen before and include the Grand Fleet at sea in 1916, launchings, dry docking, and broadsides from *HMS BARHAM* and *HMS HERCULES*.

Many sets of photos are worthy of close scrutiny — eg, *HMS CENTURION* entering Valetta Harbour, Malta, in the early 1920s and then after her conversion to a target ship in 1930, and further alteration in 1936. Another is the famous *HMS WARSPITE* aground on the rocks at Prussia Cove, Cornwall, after parting tow on the way to the breakers in 1948 and her reduction to scrap in situ by June, 1950.

Australia's only battlecruiser, *HMS AUSTRALIA*, is well represented with three photographs: passing *HMS VICTORY* as it leaves Portsmouth Harbour in 1913, a superb double page shot of the old 'Aussie' in July, 1913 and finally an aerial pic of her listing to port after being scuttled with honours off Sydney in 1924.

The concluding pages of the book are devoted to shots of the last of these Dreadnoughts — HM Ships *RAMILLIES, VALIANT, REVENGE* and *RESOLUTION* being demolished in Scotland between 1947 and 1950.

*Battleships of the Grand Fleet* is a book one tends to pick-up and browse through from time to time and on each occasion find some new point of interest. Reasonably priced at $23.95, this limp covered book is available from Thomas C. Lothian of 4–12 Tattersall's Lane, Melbourne, Victoria. Highly recommended.

**Vic Jeffery**

*HMS BARHAM*

A. & J. Pavia

Supplied by J. Mortimer

**US DESTROYERS. By Norman Friedman. US Naval Institute Press, 1982. 487 pp, ill, diagrams and tables, $US46.95.**

Development of the Torpedo Boat Destroyer has been a continuing exercise for almost a century and in *US Destroyers* Norman Friedman presents the results of detailed research. It is without doubt the only full story of these craft as it applies to the US Navy. The first seven chapters trace destroyer development between 1886 and 1945, the next seven deal with the period 1945 to the 'nukes', and the remainder look to the future and ultimate developments.

Throughout the book, the author describes the Naval versus Civilian factors that determined the design and operation of destroyers. In his future predictions, the nuclear ships make their presence felt, especially in the arguments of nuclear/conventional power plants.

In presenting the history of the design and development of destroyers, Friedman has undertaken a mammoth task. With the assistance of A.D. Baker, who provided the line and profile drawings, the result has been well worth the effort. Each class and type of ship presented is accompanied by at least one profile drawing and many photographs. Even more interesting are the additional photographs which highlight any 'alterations and additions' that have appeared after major refits or rebuilds.

Development of the Destroyer ASW, or four-piper, and its derivatives shows what can be done when needs be. Funnels and boilers were deleted, guns and AS weapons added and, in at least three cases, the whole concept of the DDASW altered. They became transports, seaplane tenders and minesweepers. Others were modified to become escort ships and thus forerunners of the modern DE.

Between the two World Wars, the destroyers leaders kept a silhouette somewhat similar to their Royal Navy counterparts. This reviewer tried to find the point at which the two designs moved apart, but the changes were subtle. The flush deck became more to the USN way of thinking and, like the Chinese ideas of old, the funnels taller. Possibly the ultimate rift came with the change of name of various parts of the vessels. Calling a funnel a 'stack' is not too bad, but to dream up the term 'mack' (combined mast and stack) must be the ultimate degradation of the English language.

In the section on nuclear destroyers and frigates, Friedman deviates into the cruisers. I would question the need for this, but with the vast escalation in the size of the destroyer over the years — *USS Bainbridge* (DD1) 452 tons to *USS Knox* (DE1052) 4120 tons — the actual class/type names are purely academic.

*US Destroyers* concludes with three data tables and a very comprehensive index. All that is lacking is a table to allow the non-naval, and non-USN, reader to follow the conglomeration of initials used in describing the basic type of ship and its derivative.

**Robin Pennock**

*HMS RESOLUTION*

A. & J. Pavia

Supplied by J. Mortimer

## JOURNAL BACK ISSUES

Stocks of the following back issues of the Journal are available:

Vol 1 No 1 August, 1975
Vol 1 No 2 September, 1975
Vol 2 No 1 February, 1976
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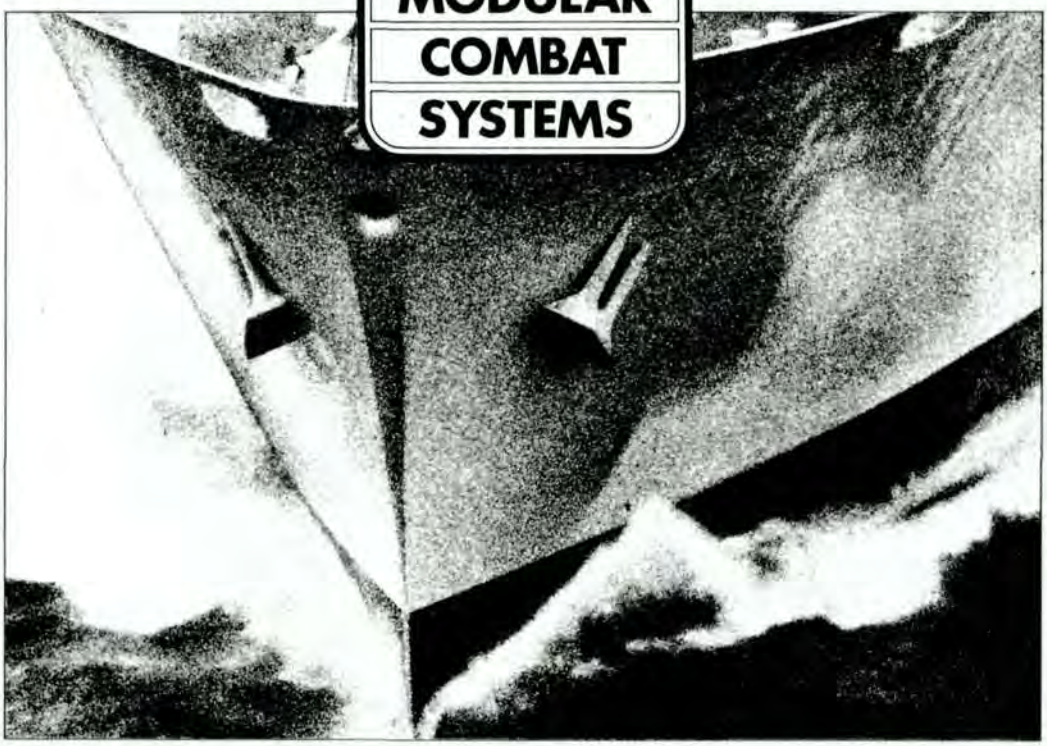
Vol 2 No 3 August, 1976
Vol 3 No 2 May, 1977
Vol 3 No 3 August, 1977
Vol 3 No 4 November, 1977
Vol 4 No 1 February, 1978
Vol 4 No 2 May, 1978
Vol 4 No 3 August, 1978
Vol 5 No 1 February, 1979
Vol 5 No 2 May, 1979
Vol 5 No 3 August, 1979
Vol 5 No 4 November, 1979
Vol 6 No 1 February 1980
Vol 6 No 2 May, 1980
Vol 6 No 3 August, 1980
Vol 6 No 4 November, 1980
Vol 7 No 1 February, 1981
Vol 7 No 2 May, 1981
Vol 7 No 3 August, 1981
Vol 7 No 4 November, 1981
Vol 8 No 1 February, 1982
Vol 8 No 2 May, 1982
Vol 8 No 3 August 1982
Vol 8 No 4 November 1982
Vol 9 No 1 February 1983
Vol 9 No 2 May 1982
Seapower 79
Seapower 81

Back copies may be purchased from the Institute at $2.50 each ($7.00 for Vol 1 No 1), which price includes postage. Write to the Treasurer, Australian Naval Institute, PO Box 18, Deakin, ACT, 2600.

## JOURNAL BINDERS


Journal binders are available (as illustrated) from the Treasurer, price $6.00 each including postage. Coloured blue, with gold lettering and ANI crest, each binder will hold 12 copies of the journal (3 years' supply) by means of a metal rod which is inserted simply through the middle page of the journal and held firmly at top and bottom of the binder. Plastic envelopes on the bottom of the spine enable volume numbers or years to be inserted.

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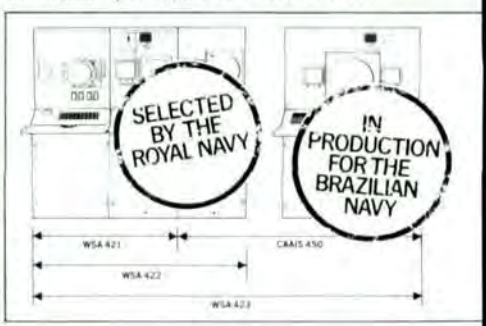


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