DEFENCE FORCE JOURNAL

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© Commonwealth of Australia 1977
Landing the Cavalry. M112 Carrier landing at Balmoral Beach, NSW, from a landing craft of the Royal Australian Corps of Transport.
IT is very pleasing to see the first of, I hope, many original articles from the Royal Australian Navy. The flow of RAAF articles is already producing something of an embarrassment of riches, in that major articles are having to queue for inclusion in the Journal, a situation exacerbated by the two month gap between issues.

The constant struggle between balanced content and currency of material shows no sign of diminishing, but happy is the editor who has that sort of problem on his hands against one who has to scrape around to find copy to fill the pages.

I have reluctantly decided to stop publishing the “Current Defence Readings”. They have in the past been a useful service to readers, particularly those within reach of a large library. I have taken this step for two reasons: firstly, the competition for space and secondly, the way in which entries tend to become dated before there is a chance to get them published. If the Journal becomes a monthly publication, their re-introduction would be considered, particularly if there were enough support forthcoming.

The first letter on page 4, you will notice, is from an author replying to a critic of his article which appeared in issue No. 1. While not wishing to prolong a debate over many months in these pages, the Board of Management feels that an author is entitled to the right of reply. In future, any letters of a critical nature received by the Editor will be automatically copied to the author under attack, so that he or she has an opportunity of replying in the issue following. I am sure potential letter writers and authors will see the justice of this policy.

This issue contains a large number of smaller articles, some of which have been awaiting publication for many months. They cover a diverse range of topics which we hope will interest the reader. No disparagement of short articles is intended — indeed, they are always most welcome, as they often help to fill an awkward gap where larger articles would not fit — but there has been a rash of them lately. While excellent in themselves, they do have defects. Contributors are urged to submit articles of at least 3000 words, which is only six pages of the Journal. Anything worth saying could not be well said in much less.

I should say in fairness to the shorter articles that Flying Officer Stewart’s Aeromedical Evacuation within the RAAF (p. 33), was the first original Air Force article to arrive on my desk. We are indebted to him for his enterprise.

Some articles received have tried to cover too much ground in their theses, and have of necessity covered it superficially. It is better to concentrate on one or two aspects of a broad-based problem, following the first article up with others where necessary, than to spread the net too thinly.

It is hoped that in your eyes as readers, the stature of the Defence Force Journal is growing. According to one lady of the Press in asking to be put on the distribution list it is, she was told, required reading on matters of Defence. That is what we are aiming at.
TO

CAN AUSTRALIA SURVIVE?

Major Mench's comments (Defence Force Journal No. 3) on the article “The Second Time Around — Can Australia Survive?” (Defence Force Journal No. 1), themselves invite comment.

Mench writes with a breezy intellectual condescension that offers selected, but one suspects, subjective challenges to Major Black's original arguments.

His attack upon Black's alleged suggestion that "resource rich but militarily weak nations are invariably subject to invasion" is inconclusive. His cited example of nineteenth century North and South America is inappropriate to the argument. Certainly the Continent was beyond the effective strategic reach of those countries likely to be interested in resource grabs at the time, i.e. the European powers. At this time too, the European powers were largely preoccupied with each other and the acquisition of empire in more accessible and weaker parts of the world — notably Africa. Examples countering the American quotation would include the British conquest of India, the "Grab for Africa" and closer to home, the Japanese establishment of the Greater SE Asia Co-prosperity Sphere.

Mench acknowledges that "the combination of economic wealth and military weakness may often have been a cause of conflict" and then asks "is it universal law that one necessarily follows the other? Major Black did not suggest that it was! He said (in his preface) that history indicates that others will covet our resources and we lack the ability to defend them. The world is not yet far enough into the widely predicted shortages of critical resources for us to dismiss blithely continued international tension and perhaps even war as a credible long term prognosis. We have already experienced resources diplomacy by the OPEC group — what would or could the Western bloc countries do if the USSR for example were to occupy all the Middle Eastern oilfields?"

It would appear that Mench, in his statement, "An appeal to the 'lessons of history' by many with a Defence barrow to push seems to be an attempt simply to make a respectable argument for large, or larger forces to meet the inevitable threat", largely misses the point of Black's paper. This to me suggests that Australian Defence Force capabilities and structure ought to be based on a detailed long term strategic assessment. This analysis should lead to the establishment of "a core force carefully structured to maintain the essential skills and to provide the immediate expansion nucleus of commanders, instructors and administrators". This would seem as logical as it is prudent.

Department of Defence, E. F. Pfitzner
Canberra

CAN AUSTRALIA SURVIVE?

THE AUTHOR REPLIES

In his letter (Defence Force Journal, No. 3, March/April 1977) criticising my article 'The Second Time Around. Can Australia Survive' (Defence Force Journal, No. 1, November/December 1976), Major Paul Mench raises many of the issues which the article was designed to push into wider debate. At the time the article was sent for publication (March 1976), I would have preferred to have despatched a forward-looking article based on an analysis of the present and an assessment of the future, but for various reasons relating to job-sensitivity, this was not possible. The alternative which I chose as a vehicle which might launch debate on issues which I felt strongly about, was a researched historical article dubbed with a beginning and an end which I hoped would be sufficiently powerful and controversial to provoke continuing discussion on defence concepts. Obviously Paul Mench was not to know all this.

Despite this, both his analysis of my paper and his interpretation of my personal views are well wide of the mark. Let me correct
his impressions and interpretations on the more important issues. I do not assume historical inevitability, but I do plead that we avoid re-learning basic principles. I do not discount the alternative of economic annexation in some form. I do not think a 'resource-grab' is 'inevitable', but I do think we must very seriously consider international resource distribution trends and the implication for foreign and defence policy. I do not wish to see the 'lessons of history' used as the sole basis in evolving defence concepts, but I do think they have a part to play. His assessment of my view on 'Australian intervention in Vietnam' is illogical and incorrect.

I do not think that larger forces are necessarily the answer; careful analysis might show manpower reduction trade-offs are necessary to increase our technological status. I am sure that defence planners are looking beyond the map of Australia, but isn't it about time that they also looked at it? I do not think we should worry about the Pilbara and ignore Port Kembla, but we do have a whole continent to consider. I am well aware of the greatly increased cost of a more self-reliant defence policy, but is the general public?

My intention in this annoyingly lengthy response has been to free my views, not to disparage Paul Mench for raising the issues; let me hasten to thank him for that. We badly need an infusion of analytical, researched discussion on these very matters in such a forum as this Journal, although I would urge in conclusion that our employment of such scholarly skills should be free of academic arrogance, something which Paul Mench has not entirely avoided.

Regular Officer
Development Committee Adrian Black
Canberra, ACT

The Editorial Policy, as laid down by the Department of Defence and as strictly followed by the Board of Management, is stated quite clearly in DFJ No. 1. As for censorship, there is none. Authors are kept fully informed where articles have to be changed by reason of lack of clarity or because (it has not happened yet) they are downright libellous. Articles are rejected only because they do not measure up to the standards of scholarship we hope to maintain in the Journal—Editor.

STRATEGIC BOMBING AND VICTORY

In reviewing the Strategic Air Offensive Against Germany 1939-45, Vols I and II by Sir Charles Webster and Noble Frankland (Defence Force Journal, No. 1), Professor L. C. F. Turner wrote:

No aspect of the war has produced so much controversy as the contribution of strategic bombing to the Allied victory and the great scientist, Sir Henry Tizard, has declared unequivocally that the fearful sacrifices of the RAF Bomber Command injured Britain more than Germany. In his opinion, the investment in money and manpower expended in the bombing offensive exceeded by far the damage done to the enemy. Webster and Frankland confirm this view.

However in their introduction to Vol I (p.4) Webster and Frankland wrote:

"Nevertheless, Bomber Command initially so weak and ineffective was eventually to grow into a weapon which with the US Strategic Air Forces in Europe was of decisive importance in the ultimate and total defeat of Nazi Germany."

Also in Volume III of the same series (p.310) they reiterated this view:

"Both cumulatively in largely indirect ways and eventually in a more immediate and direct manner, strategic bombing and also in other roles, strategic bombers made a contribution to victory which was decisive. Those who claim that the Bomber Command contribution to the war was less than this are factually in error."

Naturally I find Professor Turner's reference to the view of Webster and Frankland puzzling. Clearly there is conflict between the professor's reference and the two direct quotations from the authors. It is difficult to find...
in war anything more damaging than a decisive contribution to your defeat.

**SOUND ARCHIVE OF HISTORICAL RECORDINGS OPENS TO THE PUBLIC**

In July 1977, the Imperial War Museum’s collection of oral history and other historical sound archive recordings will be opened to public access. The recordings are administered by the Museum’s Department of Sound Records which, since it was created in 1972, has built up a collection amounting to 3,500 recorded hours of material.

The Department of Sound Records has been collecting archive material from two main sources. First, by arrangement with various agencies, recordings made by radio and television broadcasting organisations. Secondly, through its own oral history programme, the recorded reminiscences of various civilian and service groups.

Two major groups of recordings have been fully processed and organised for public use from July. Namely, broadcast recordings obtained from the BBC Sound Archive covering the years 1939 to 1945 and including war reports, commentaries, actualities, interviews and personal narrations. Most of these are contemporary recordings made during or immediately after the events they cover.

The second major groups of material which will be made available consist of the interviews which the Department has recorded in several projects broadly covering the First World War period. This group deals with the experiences of men and women who were personally involved in the following areas of activity:

- Military and Naval Aviation 1914-1918
- Life and Operations on the Western Front 1914-1918
- Life on the Lower Deck of the Royal Navy 1910-1922
- The Anti-War Movement (pacifists and conscientious objectors) 1914-1918
- War Work (non-combatant and mainly civilian) 1914-1918

Most of the interviews recorded in these projects have been fully transcribed, so that their content is in many cases available in typescript as well as in audio format.

In addition to the recordings described above there are several other groups of material in the collection, some of which can be made available in a somewhat more primitive state of organisation. From broadcasting sources, there are the interviews which were recorded by the BBC during the production of The Great War; by Rediffusion during the production of the Life and Times of Lord Mountbatten; and by Thames Television during its production of The World at War. There are contemporary recordings of, for example, the wartime speeches of Nazi leaders and the proceedings of the International Military Tribunal at Nuremburg. The Department’s own recording programme has progressed to the inter-war period and further projects have been carried out relating to the Spanish Civil War, the British Army in India and the Mechanisation of the Army (eg the cavalry’s transition from horse to tank). Finally, there are recordings of and interviews with war artists and war poets; sound effects; recorded lectures and speeches; and ENSA and other service broadcasts.

From July, listening and reading facilities will be provided in the Museum for personal visitors. Copies of these recordings and transcripts in which the Museum holds the copyright can be purchased by the public and other material will be available for circulation outside the Museum under the conditions laid down by the appropriate copyright holders. Applications to use the collection will be welcome after the 1 July, when lists of catalogues, conditions of access and terms of sale will also be available on request.

Enquiries should be addressed to the Department of Sound Records, Imperial War Museum, Lambeth Road, LONDON SE1 6HZ, England. Telephone 01-735 8922.

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**MONTHLY AWARD**

The Board of Management has awarded the prize of $30 for the best original article in the May/June issue of the Defence Force Journal to Lieutenant A. H. Longhurst for his article The Navy of the People’s Republic of China 1976-77.
What Australia Needs is a Good Revolution

The PGM Revolution

Wing Commander R. W. Howe
Royal Australian Air Force

'We owe it to ourselves to be able to mount a national defence effort that would maximise the risks and costs of any aggression'.

White Paper on Australian Defence, November 1976

Introduction

The Royal Australian Air Force is not averse to a revolution, a technological revolution, that is, which will enhance its contribution to Australia's national defence. Witness a recent example, our acquisition of a weapons platform par excellence, the General Dynamics F111C, capable of flying tree-skimming terrain following profiles at supersonic speeds in all weather conditions around the clock. Upon the introduction of the F111C into RAAF service, Australia in effect bypassed one stratum of aviation technology in the transition from a first generation jet bomber, the Canberra, to a third generation computer-age jet strike aircraft.

While the RAAF has undergone a revolutionary boost into modern technology by acquiring advanced skills and expertise in operating modern aircraft and avionics systems, the corresponding plunge into modern weapons technology has yet to occur. Although not the naked truth, the statement that the RAAF's F111 strike force 'carts around World War II vintage iron bombs', is a fair synopsis of the current potency of the RAAF's air-to-surface force.

In this article I propose to focus on RAAF weapon requirements in the air-to-surface spectrum, and the need for change. This change is not purely for the sake of change, but rather to match platforms, personnel and weapons. If the RAAF is to accept seriously its increased responsibilities arising from the shift towards defence self-sufficiency, it is incumbent on the Service to update its operational weapons inventory.

Operational Scenarios

Australia's re-orientation of defence priorities since our participation in the Vietnamese conflict has been well documented and subject to public scrutiny. Although the emphasis has shifted from a forward defence posture to one of increased self-reliance, traditional RAAF roles of counter air (or overland) strike/interdiction, maritime strike/interdiction and close air support remain virtually unaltered. No doubt debate will continue on the precise priorities to be allocated to each role, especially as traditional doctrines are challenged by changes in technology.

Within these air-to-surface roles, the spectrum of surface targets anticipated in forward planning and simulated in operational exercises has also remained constant. Expected counter air targets, for instance, include airfields, parked aircraft and airfield facilities such as SAM/AAA defences and maintenance hangars, many of which are amenable to attack by area cover weapons such as cluster bombs. Interdiction targets range from supply routes, road and river traffic to petrol, oil and logistics (POL) installations, supply and storage depots, base
camps and bridges. Maritime targets are expected to vary from large destroyer-type naval vessels to patrol boats and submarines, while typical close air support targets may comprise enemy troops, bunker systems, light artillery and mortar positions.

**CURRENT CAPABILITY**

For several decades, the prevailing air-to-surface weapons in the RAAF inventory have been the conventional bomb (ranging in nominal weights from 500 lb to 1,000 lb), guns (20mm and 30mm) and rockets (2.75" and 5" diameter). Undoubtedly, each of these basic weapons will continue to play a significant role in maintaining operational effectiveness, particularly in lower level contingency situations, where minor applications of force may be required.

However, more than platforms, avionics and conventional weapons are necessary if Australia is to maximise, for potential adversaries, the risks and costs of initiating any aggression, or conversely, if we are to minimise our risks and costs in establishing and maintaining a credible defence capability. Fully integrated weapons systems are imperative if we are to close off sufficient options to make the task of launching a major attack on this country appear to be prohibitive.

Air Force parlance for gauging operational air-to-surface weapons effectiveness is called Over the Target Requirement (OTR), which defines the number of aircraft required to be positioned over a target, each releasing its full complement of weapons, to assure a requisite level of target damage or destruction. Table 1 illustrates the large quantity of resources, in terms of OTR, needed by conventionally armed air-to-surface forces to immobilise single targets such as a stationary tank or a small patrol boat. In this selected example, each aircraft platform is presumed to be carrying twenty 500 lb bombs while operational degradation factors, such as attrition, are ignored.

<table>
<thead>
<tr>
<th>Weapon Delivery Accuracy (CEP)</th>
<th>Number of Bombs Required</th>
<th>OTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 metres</td>
<td>400</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 1 — Variation of OTR with Weapon Delivery Accuracy**

Circular Error Probable (CEP), a measure of weapon delivery accuracy, is the radius of a circle centred on the target, into which 50% of all individually aimed weapons are expected to fall. Current conventional weapon delivery accuracies are in the order of tens of metres CEP.

Improvements in weapon delivery accuracy can be implemented by 'fine tuning' avionics sub-systems which collectively contribute to overall systematic errors, however random errors are more difficult to nullify by orthodox means. For instance, CEPs of conventionally aimed bombs are limited by ballistic dispersion: slight yet significant differences in bomb sizes, shapes and weights produce variations in individual bomb trajectories, resulting in a random spread of bombs about the target.

Two fundamental alternatives for resolving this problem are to increase weapon yield while accepting current weapon delivery inconsistencies, or to improve system CEP given fixed weapon yields. In the former option, the upper limit of high explosive technology is typified by the 2,000 lb (900 kg) bomb: beyond this nominal weight, aircraft structural limitations begin to impose restraints. The advent of nuclear weapons has overcome this constraint. However such a solution is inimical to current Australian government policy. In regard to improving weapon delivery accuracy, a series of coincidental events has enabled weapon designers to escape from the narrow confines of the past, resulting in remarkably improved CEPs.

**THE PGM REVOLUTION**

It is an interesting phenomenon of today's technological explosion that an ever increasing number of separate, yet (occasionally by chance) inter-related, disciplines continue to evolve. Moreover, a conjunction of events in separate disciplines might often supply the answer to seemingly insoluble problems in other areas.

Such is the case with the advent of the Precision Guided Munitions (PGM) revolution, the development of which has begun to alter previously immutable doctrine. As Dr Malcolm Currie, United States Director of Defence Research and Engineering (DDRAE), has stated: \(^2\)
WHAT AUSTRALIA NEEDS IS A GOOD REVOLUTION — THE PGM REVOLUTION

'PGMs will continue to transform the nature of warfare by making the precision application of force at a distance a reality.'

An amalgamation of the following technological developments, inter alia, has culminated in the PGM revolution as we know it today:

• microminiaturised electronics,
• digital computers,
• electro-optical sensors,
• advance in propulsion techniques,
• data link communications, and
• strap-on aerofoil surfaces.

Precision Guided Munitions have been defined as guided munitions with a probability of greater than a half of making a direct hit on their targets at full range (when unopposed). That weapons can achieve direct hits on at least 50% of all launch opportunities is indeed a quantum jump in delivery accuracy when compared with current conventional weapons performance.

In concert with many modern-day revolutions in a wide variety of fields of endeavour, the PGM revolution has begun to spread throughout the world. The revolution began operationally in Vietnam, when weapons such as the USAF’s 'PAVEWAY' guided bomb family were employed with surgical precision in degrading the ability of the North Vietnamese to continue to wage conventional warfare. A senior USAF officer observed in mid 1972, after the resumption of air strikes north of the DMZ, that more was accomplished in three months than 'Operation Rolling Thunder' (the air campaign against North Vietnam prior to the bombing halt) achieved in three years. The effectiveness of the 'smart' bomb was cited as a primary reason for this improvement in operational performance. The PGM revolution transferred to the 1973 Yom Kippur War with the use of 'smart' bombs, as well as Maverick 'launch and leave' air-to-surface missiles, by the Israeli Air Force.

THE WEAPONS

While Australia’s traditional wartime defence responsibilities were to be integrated into larger allied forces, a limited range of conventional weapons was sufficient to provide a respectable contribution to the effectiveness of the total force. Custody of the more advanced and specialized weapons remained in the hands of the major powers. Although this country cannot afford the luxury of acquiring the full diversity of weapons which could be used against all possible contingencies, the change in emphasis towards greater self-reliance significantly increases the burden on the Services to ensure that the best possible operational weapons capability is achieved by the most economical means.

The AGM-65A Maverick fitted to a USAF A7-D.
I referred previously to the requirement for fully integrated weapons systems capable of vesting the RAAF with a credible capability. Such a weapon system, in this context, comprises:

- aircraft platform
- aircrew
- avionics
- weapons

It is important, by the way, not to forget that adequate maintenance and logistic support are essential to ensuring successful employment of weapons systems.

The F111C, and no doubt the eventual replacement for the Mirage in the air-to-surface role, is a first class weapon-carrying platform. Our aircrew rank high on the world's professional ladder, although they lack the most recent wartime experience of, for example, the Israeli Air Force. The F111C, as presumably will the Mirage replacement, contains advanced avionic sub-systems such as electronic warfare (EW) equipments, terrain following radar (TFR), radar homing and warning systems (RHAWS) and inertial navigation systems (INS), which together provide the aircraft with a capability of penetrating hostile defences to arrive at a precise point relative to the target. Unless the loop is completed, i.e. the weapons hit the target, the composite weapon system cannot be regarded as truly effective.

What then are the weapons which can be regarded as reasonable options for the RAAF as a consequence of the PGM revolution? The possible shopping list will be examined under two broad classifications, guided bombs and guided missiles.

**Guided Bombs**

To avoid ambiguity, it is appropriate to delineate the specific types of bombs discussed in this article. Firstly, the RAAF currently possesses conventional bombs, sometimes called free fall bombs. Secondly, first generation guided bombs, colloquially known as 'smart bombs', are conventional bombs to which have been added terminal guidance sensors, a set of steerable fins or wings and a communications transmit/receive facility. Finally, there are second generation guided or 'smart' bombs which are fitted with similar sensors and data links as first generation guided bombs, but instead of steerable fins, specialised wings are attached to the basic bomb to provide an extended glide range capability.

The United States has a virtual monopoly on the production of these guided bombs, having pioneered the PGM revolution with this generic type of weapon in the late 1960s. Production of the first generation of 'smart bombs' (e.g. HOBOS) is almost completed, as top priority is being given to the development of Rockwell International's GBU-15 family of second generation guided bombs. Figure 1 illustrates the flexibility and modularity of this family.

The cruciform wing version of the GBU-15 is capable of extended ranges from low altitude release, while the planar wing GBU can glide from high altitudes at ranges comparable with current anti-ship missiles.

The Mk 84 2000 lb bomb is useful for attack against structures and point targets and the SUU-54 bomblet dispenser for attack against area targets such as troop concentrations. Sensor emphasis is changing from early TV technology to laser and imaging infra-red (IIR).

The modularity of guided bombs such as the GBU-15 family makes them particularly suitable for covering a wide range of operational air-to-surface contingencies. A potent combination of explosive power, delivery accuracy and stand-off range place the guided bomb in open competition with more expensive guided missiles in consideration for tomorrow's air-to-surface weapons inventories.

**Guided Missiles**

A missile contains its own means of propulsion, either a rocket or a jet engine. Although missiles can travel much faster than bombs, they carry less explosive content because many more components have to be packaged into roughly the same dimensions.

The large variety of non-nuclear guided missiles in service or under development overseas can be grouped into the following categories:

- anti-ship missiles,
- overland 'tactical' missiles, and
- anti-radiation missiles (ARMS).
Specialised **anti-ship missiles**, such as the McDonnell Douglas AGM-84 Harpoon, Aérospatiale AM39 Exocet, Engins Matra/Oto Melara Otomat and MBB’s AS34 Kormoran contain terminal homing radars which are capable of detecting and locking-on to ship targets at sea. These radars, however, cannot in most cases distinguish land targets from surrounding terrain, thus severely limiting the missile’s effectiveness over land. Table 2 indicates the basic characteristics of this generic type of PGM.

**Table 2 — Anti-Ship Missile Characteristics**

An exception to this selective grouping is the Hawker Siddeley AJ168 TV-guided Martel
missile, which could be classified as an 'overland' tactical missile although it is used primarily by the Royal Air Force in an anti-shipping capacity. Weighing 500 kg, Martel contains a data link facility, whereby the parent aircraft monitors the missile's TV picture and transmits corrections to guide the missile to the target. Other examples of command TV-guided missiles under development are Sweden's Saab 05B and Germany's MBB Jumbo.

A further tactical missile capable of both overland and oversea operation is the unique 'launch and leave' TV-guided Hughes AGM-65 Maverick, which saw operational service in the October 1973 Yom Kippur War. Weighing 210 kg, with a 59 kg shaped-charge warhead optimised for killing tanks, Maverick missiles can be fired in rapid salvoes against a large target or a number of smaller ones. Command guided missiles such as Martel, however, require the undivided attention of the crew of the launch aircraft until the missile hits the target: only then can a further missile be fired.

The United States Air Force plans to acquire a family of Maverick missiles, the AGM-65A and B (based on TV-guidance), the AGM-65C (laser) and AGM-65D (imaging infra-red—IIR). Each of these weapons is seen as complementary, with emphasis being placed on the IIR Maverick, because of its day and night-time capability. TV and IIR versions of Maverick are more applicable to interdiction missions while the laser guided missile is being developed for close air support missions in conjunction with the Army.

Smaller tactical missiles, which can be launched from helicopters, include wire-guided TOW and HOT missiles and the laser-guided Hughes Hellfire, each of which has been designed to destroy tanks. BAC's CL384 Sea Skua is a helicopter-borne anti-ship missile capable of being launched from the RN's Sea Lynx.

**Anti-radiation Missiles (ARMs)**, such as Texas Instruments' AGM-45 Shrike, Engins Matra AS37 Martel and General Dynamics' AGM-78 Standard ARM, are passive homing
WHAT AUSTRALIA NEEDS IS A GOOD REVOLUTION — THE PGM REVOLUTION

Harpoon Missile

<table>
<thead>
<tr>
<th></th>
<th>Air Launched</th>
<th>Ship Launched</th>
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<tbody>
<tr>
<td>Length</td>
<td>384.8 cm.</td>
<td>458.5 cm.</td>
</tr>
<tr>
<td>Weight</td>
<td>526.0 kg.</td>
<td>662.0 kg.</td>
</tr>
</tbody>
</table>

missiles which detect hostile radar transmissions and home down the beam to destroy the emitter.

The operational viability of ARMs has been a topic much debated in military circles. In Vietnam it was found that early ARM variants could be 'spoofed' by enemy radars being switched off: memory devices were incorporated into the missiles to enable the ARM to continue to travel towards the offending radar. However, in the naval context, where ship-borne radars are mobile, ARM destructive power is virtually eliminated if radars switch off. On the other hand, a 'silent' ship, without radar to detect incoming aircraft, may leave itself vulnerable to attack by alternative PGMs. Both of the major powers, USSR and USA, are concentrating R & D efforts on improving their ARM capabilities. One solution is the High-speed ARM (HARM) yet to enter US operational service.

From a survey of current guided missile developments it can be concluded in general terms that:

- Specialised anti-shipping missiles have a reasonably good stand-off capability and delay detection until the last moment by using sea skimming profiles. However, missile radars, switched on at a short distance from ship targets, provide warning to potential victims so that countermeasures may be taken.
- Overland 'tactical' missiles are limited in effective stand-off range, although data links can extend stand-off ranges by up to a factor of two.
- TV has so far predominated as the major target detection and guidance sensor for overland missiles, although laser and IR are beginning to take over.
- Missile warheads are generally smaller than bomb warheads, but the former can be optimised against specific targets, e.g. tanks.
- ARMs are equally functional over land and sea. In addition they add a significant deterrent capability by their known presence in an operational scenario, causing radar operators to exercise restraint.
- ARMs may have a secondary utility against the 'soft' topsides of current warships, as well as destroying radars. The example of the destruction caused to HMAS Hobart by an accidental
firing of a Sparrow air-to-air missile in the Vietnam War is proof of this potential.

- Modularity has yet to impact on missiles as much as it has with guided bombs.

Other sophisticated PGMs, such as cruise missiles (costing from $ \frac{1}{2} $ to 1 million dollars each) being developed by the United States, have been excluded from the above discussion on the premise that these types of weapons constitute more than a marginal escalation in attaining a credible deterrent capability. As Dr O'Neill observes:

'While deterrence of attack is the greatest benefit to be achieved from a defence posture, it must be recognised that deterrent forces can be counter-productive unless they are well designed. For deterrence to be durable and stable it must rest on a foundation of approximate balance between potential opponents. If such a balance does not exist, then the side which is on the lighter arm of the scale may well feel to be menaced by the other or at least too vulnerable to its whims and fancies . . . Australia must therefore develop her defence posture with an eye to the apprehensions it might cause amongst her neighbours. In other words her defence posture must appear to be defensive rather than aggressive'.

Implicit in the foregoing discussion has been an indication of the type and nature of some of the problems facing the decision maker in selecting those PGMs most appropriate for Australian conditions. A basic conflict could exist with the trend of overseas developments, in that the prime mover of the PGM revolution, the United States, is steadily driving towards weapons optimised for the generally poor weather conditions which the US forces expect to meet in a NATO-Warsaw Pact conflict on European soil. Optimum solutions for the NATO environment may not necessarily be directly transferable to the Australian situation, characterised by either clear weather situations, smoke, or haze, or alternatively tropical environments typical of the far north.

However, whatever the differences between overseas developments and our unique requirements may be, in a rigidly constrained market, there may be no alternative to selecting those weapons which come closest to meeting both our operational and political needs. In this decision-making environment, trade-offs and compromises are inevitable, particularly if there appears to be no indication of alternative solutions being offered by local Australian industry.

THE SENSORS

In the previous discussion on air-to-surface PGM weapon types, several guidance sensors were mentioned briefly. As guidance and homing sensors are essential elements of the PGM picture, some amplification of their specific characteristics is warranted. In general, radar guidance is today best suited to operations over the sea, whereas electro-optical sensors (TV, Infra-red and laser) are useful over all types of surface.

**Television**

TV sensors are limited by visibility and, except for certain low light level TV (LLTV) sensors, are confined to daylight operation. Both bombs and missiles have been fitted with miniature TV cameras: parent aircraft launching these PGMs require a TV screen in the cockpit as well as relevant communications between launch platform and the weapon. Stand-off TV terminally guided weapons (e.g. Martel) require a continuous data link so that when the missile's TV picture is relayed to the aircraft, the aircrew can send correction signals back to the missile to ensure accurate terminal homing.

In hostile environments, the obvious advantages provided by a data link TV stand-off capability could be degraded by communications jamming. On the other hand, totally TV-guided missiles (e.g. Maverick) launched within line of sight of the target do not require command after launch.

**Infra-Red**

Infra-red sensors are used to passively detect and identify targets by measuring thermal signatures which are converted to resemble TV pictures. IR detectors can sense temperature differences of less than half a degree. Designed to operate in two major thermal ‘windows’ within the atmospheric absorption spectrum, IR Sensors vary in performance
WHAT AUSTRALIA NEEDS IS A GOOD REVOLUTION — THE PGM REVOLUTION

depending on the window for which they are optimised. The higher frequency IR equipments (3 to 5 micron wavelength) are less susceptible to water vapour absorption and are thus of greater utility in humid tropical air masses. The lower frequency spectrum (8 to 14 microns) is less sensitive to absorption by carbon dioxide and is therefore more useful in conditions of smoke and haze.

Forward looking infra red (FLIR) sensors have been developed for use as airborne target detecting systems, while the Imaging Infra Red (IIR) seeker is under development for fitment to both bombs and missiles.

Lasers

Unlike covert TV and IR sensors, laser illuminators actively transmit electro-optical energy (in some, but not all, cases visible to the naked eye), which is bounced off the target to be received by passive detectors, fitted either to aircraft or guided weapons. Although any form of active transmission is open to counter measures, the narrow beamwidth of the laser (typically $\frac{1}{2}$ milliradian), and the capacity for coding pulsed laser transmissions, provide laser operations with some immunity from jamming.

Lasers, however, suffer considerably from atmospheric attenuation as well as the non-return of a high proportion of reflected energy to a laser receiver, thus limiting effective ranges considerably. Enhancements under development to overcome these deficiencies include higher powered laser designators and the use of data links to enable stand-off launches into a laser ‘basket’ provided by a second source illuminator closer to the target.

Operational applications of laser systems include self-contained target designation by attack aircraft as well as collaborative missions utilising ground or separate airborne (e.g. Forward Air Control aircraft) laser designators. The inherent flexibility of lasers enhances their potential for close air support operations.

Because laser beamwidths are so narrow, accurate pointing is required if effective target illuminations is to be achieved. Consequently, a variety of airborne designators have been produced, in which the laser is ‘boresighted’ to other larger beamwidth sensors which serve to cue the laser beam onto the target. Table 3 shows the options thus far available or under development.

Radar

Radar suffers from clutter (unwanted reflections from non-target objects or terrain) which reduces its usefulness in accurately detecting and locating many land targets, which blend in with the surrounding terrain. In maritime operations, however, sea clutter can be rejected sufficiently to enable ready detection of ship targets. Anti-ship missiles such as Exocet and Harpoon carry small radars which are activated at pre-determined distances out from the target.

Because active radar transmissions provide forewarning to potential targets, counter-measures can be developed to nullify missile effectiveness. Although high speed and low level sea skimming capabilities can overcome this problem to a certain degree, in this dynamic ‘cat-and-mouse’ area the future effectiveness of active radar homing anti-ship missiles is difficult to predict with certainty.

<table>
<thead>
<tr>
<th>Cueing Sensor</th>
<th>Aircraft Types</th>
<th>Utility</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual or optical (e.g. telescopic sight)</td>
<td>Slower speed types such as FAC and maritime surveillance aircraft (e.g. OV10,P3)</td>
<td>Daytime only</td>
<td>Pave Nail (USAF) Castfire (USMC)</td>
</tr>
<tr>
<td>Television</td>
<td>Tactical fighter aircraft (e.g. F4 Phantom)</td>
<td>Daytime mainly</td>
<td>Pave Spike (USAF)</td>
</tr>
<tr>
<td>Infra-red</td>
<td>Strike aircraft (e.g. F111)</td>
<td>Day and night time</td>
<td>Pave Tack (USAF) TRAM (USN)</td>
</tr>
</tbody>
</table>

Table 3 — Airborne Augmented Laser Designators
On the other hand, passive radar homing does not suffer from these disadvantages. Anti-radar missiles (ARMs) were used effectively in North Vietnam and constitute an essential element of current and future United States PGM inventories. The passive nature of ARMs creates difficulties in early detection of incoming missiles.

**Implications of the PGM Revolution for Australia**

There are a number of major implications of the PGM revolution for Australia and the RAAF. Certainly a judicious selection of such weapons for the air-to-surface force would be advantageous. Even *The Economist* noted that:

‘Australia could be one of the first beneficiaries of the coming great change in the military world, the ‘precision revolution’... the development of new weapons which combine a powerful explosive punch with the near certainty of hitting their targets.’

**Operational**

Without a balanced force of complete weapons systems, Australia is wasting valuable resources. There is little value in having an excellent platform, capable of penetrating hostile defensive environments and arriving at an accurate position in space, if the weapon is so inaccurate that the target is unlikely to be damaged or destroyed. From an operational point of view, the inherent flexibility afforded by accurately guided stand-off PGMs simultaneously reduces the all-important OTR as well as increasing survivability chances in hostile environments. Furthermore, the inherent flexibility of modular PGM components will enable the field commander to rapidly change the weapon characteristics of his force to combat different targets as they are detected.

Despite the trend towards more complex all-weather PGMs designed to overcome the severe restraints imposed by the European environment, there remain sufficient options open to meet some of Australia’s unique requirements. However selective acquisition of a modest range of guided bombs and/or missiles for the air-to-surface forces will require clarification of several other major issues, not the least being the requisite level of technology involved and the extent of local Australian industry’s participation in the PGM revolution.

**Technology**

The White Paper on Australian Defence (November 1976) sets the ground rules on technology by stating:

‘Australian forces should use suitably high technology in Australia’s weapons systems, equipment, training and support... Our military technology should be compatible with, but not necessarily equal in technical advancement with, relevant weapons systems of larger allies. To acquire high-level technology in weapons and equipment now throughout our forces may give us advantages in effectiveness, but it would be very expensive. Advanced technology should be favoured where it offers compensating advantages, for example, in simplicity of operations and support, or avoidance of early obsolescence, or sufficient savings in additional equipment, manpower and life-cycle costings or is otherwise assessed particularly suited to Australia’s assessed strategic situation. Australia should aim to maintain its present relatively favourable position, and be prepared to increase selectively the technological level of its forces if this should be called for.’

It is readily apparent that part of the PGM spectrum is within the capability of Australian

<table>
<thead>
<tr>
<th>Description</th>
<th>Indicative Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional (‘dumb’) bombs</td>
<td>$1,000-$2,000</td>
</tr>
<tr>
<td>First generation guided bombs</td>
<td>$3,000-$6,000</td>
</tr>
<tr>
<td>Second generation guided bombs</td>
<td>$40,000-$150,000</td>
</tr>
<tr>
<td>TV guided air-to-surface missiles</td>
<td>$30,000-$350,000</td>
</tr>
<tr>
<td>Laser/IR guided air-to-surface missiles</td>
<td>$50,000-$150,000</td>
</tr>
<tr>
<td>Anti-ship missiles</td>
<td>$400,000-$500,000</td>
</tr>
</tbody>
</table>

Table 4—Indicative PGM Costs
industry to develop and, hopefully, to produce economically. Australia currently possesses the necessary skills and expertise to develop lower technology PGM options, such as first generation guided bombs, suited to our unique environment. High R&D costs, however, associated with the development of complex PGMs such as anti-ship and anti-radar missiles, appear to be beyond our means.

Costs

Table 4 lists approximate unit costs of the range of PGMs discussed in this article.

Relating back to the illustration of destroying a single small target, such as a tank or patrol boat, the cost in terms of weapons alone indicates the economy of most PGMs. However, when attrition is added to the bill, i.e. if one 5 to 10 million dollar aircraft can be saved using PGMs compared with conventional bombs, the scales are tipped heavily in favour of PGMs. In terms of cost-effectiveness therefore, precision guided munitions are seen to offer considerable advantages over conventional bombs.

Australian Industry Participation (AIP)

AIP has featured prominently in recent public discussion of events of immediate significance to Australia, for instance, the impending TFF decisions and the RAAF's jet trainer requirement. However, there have been some notable gaps, including an apparent reluctance to grasp the implications for Australia of the PGM revolutions per se.

Whether this omission is a consequence of other demanding and complex short term issues or an indication of a lack of industry interest is uncertain. It has been observed that a sheltered, inefficient industry is one of the most serious weaknesses in our ability to defend ourselves. Although the context of this statement was hypothetical, the inference may not be entirely without substance.

It is incumbent on the Australian defence industry, whether government or private enterprise, to maintain an awareness of overseas developments in weapons technology. To date, conventional wisdom has placed the onus on operational planners to consider local industry early in the planning stages of future major equipment acquisitions, however, it is equally important for early industry initiatives to be incorporated into the overall decision-making process. There appears to be a dearth
of substantial analyses originating from Australian industry, exploring either the ramifications of the PGM revolution in toto or consequent applications to Australian industry. Procrastination in this area could well find local manufacturers left behind as the time approaches for essential decisions to be made. Industry inputs on this subject should constitute valuable contributions to resolving this complex issue, both in the Five Year Rolling Plan environment as well as in public forums such as this magazine, the Defence Force Journal.

SUMMARY

The F111C is a first class weapon-carrying platform, and there is little doubt that the aircraft selected to replace the Mirage in the air-to-surface role will be able to carry and release a variety of modern weapons. Together with the aircraft platform, avionics and weapons, the professional skills and expertise of RAAF air and ground crews, supported by efficient and effective maintenance and logistics organizations, determine the overall operational capability of the Air Force.

As Australia endeavours to attain a credible degree of self-sufficiency in the light of changed strategic circumstances, it is vital to achieve the requisite balance of arms and men to ensure that our forces are best equipped to carry out their assigned roles. If there is one weak link in the chain, overall force effectiveness is seriously degraded.

The Minister for Defence, The Honourable D. J. Killen, succinctly summarised RAAF weapons requirements when he said that:

'Accurate delivery of effective weapons is a major aim of any air force — it is the key to success and it also ensures economy in the force necessary to achieve a particular goal.'

Precision guided munitions are necessary to redress the current imbalance within the air-to-surface force, and to enable the RAAF, when required, to cover a wide range of possible threat contingencies. The economy of effort achieved through significantly improved weapon delivery accuracy, combined with enhanced survivability provided by a stand-off weapon launch capability, will indeed constitute a cost effective addition to Australia's defence effort.

Furthermore, there appears to be considerable potential for local Australian industry involvement in the development and/or production of selected PGMs appropriate to Australia's unique circumstances. The advantages of PGMs are all the more attractive when viewed in the present climate of limited financial resources, fixed defence manpower ceilings and ailing defence industries.

In summary, the PGM revolution is an event of major significance to the RAAF and the country as a whole. During the next few years, the right decisions can be made to ensure that Australia attains a credible defence capability to deny potential adversaries the opportunity of posing any threat to our sovereignty. One of these critical decisions must include PGMs — the PGM revolution is ready to be imported to Australia.

NOTES


Editor's Note: Although Wing Commander Howe's paper was initially submitted for publication in January 1977, he advises that, while his cost estimates may now be somewhat conservative, the thrust of his argument remains unaltered. Recent trends towards greater public discussion in this critical area of modern weapons technology are most encouraging.
Tom Besant where are you?

the mystery of HMA Submarine AE1

Commander J. D. Foster
Royal Australian Navy

On the 14th September 1914, only shortly after the outbreak of the Great War, Australia's first submarine, AE-1 was lost with all hands. For over sixty years the reason for her loss has never been determined and her disappearance remains one of the most baffling mysteries in the history of the RAN. It was not until May of 1976 that a short, but dedicated, underwater search was undertaken in an attempt to solve this mystery.

The loss of AE-1 was 'written off' by the then First Naval Member of the RAN, Rear Admiral W. A. Creswell, in a matter of weeks. The search conducted by Vice Admiral George Patey was practically useless and the investigation which followed produced vague conclusions.

For Australia's first submarine loss, and indeed the first casualty of the new British 'E' class submarines, naval authorities at the time showed remarkable disinterest in the cause of the loss, the apparent urgency of other wartime matters or just simply the inability to conduct a technical investigation being the more obvious reasons.

On a clear spring morning in August 1914, Vice Admiral George Patey's Australian Squadron sailed from Sydney for New Guinea waters. His orders were to support the AIF landings on the Gazelle Peninsula, East New Britain, in order to capture the German colonial capital of New Guinea — Herbertshohe — (now Kokopo). Admiral Patey had a mixed group of warships under his command, led by the battle cruiser Australia, in which he flew his flag; HMAS Encounter (Depot Ship); HMAS Sydney, the battle cruiser which was to shortly run SMS Emden aground off Cocos Island; HMAS Parramatta, a torpedo boat destroyer of 800 tons; HMAS Yarra; her sister ship, the destroyer Warrego, in which the Commander (Destroyers) Claude Cumberlege was embarked; and the two submarines AE1 and AE2.

The landings on the Gazelle Peninsula (Bitapaka) were successful, the Kaiser's troops defeated, and German New Guinea was taken for the Empire. Shortly after the Bitapaka skirmish, Patey's squadron lay at anchor in Rabaul Harbour with the exception of Parramatta who was on night patrol off Rabaul Point to the East and Encounter at anchor off Herbertshohe with AE1 in company. Parramatta, under the command of Lieutenant W. H. F. Warren, left her night patrol ground at 0700 on the 14th September and proceeded at slow speed in the direction of Cape Gazelle. Her orders were 'to search in St Georges Channel to the southward'. Presumably Commander (D) implied Warren was to search for enemy ships; Parramatta complied and when she was close by Herbertshohe, submarine AE1 joined.

AE1 was Australia's first submarine. She was one of two British 'E' class ordered by the Australian Government under Andrew Fisher in 1910 for the embryo RAN. These 'E' class were the latest type, of 740 tonnes displacement on the surface and 825 tonnes submerged. The two huge 8 cylinder diesel engines produced
1750 horsepower which gave them a surface speed of 15 knots and 10 knots submerged. Their armament consisted of 5 torpedo tubes (18 inch) — two bow, one stern and two beam. The two Australia submarines AE1 and AE2 commissioned in February 1914 and arrived in Sydney on Empire Day (24th May) 1914.

Not four months later, the skipper of AE1, Lieutenant Commander Thomas Besant, a Royal Navy Officer from London, found himself navigating his submarine off the remote Gazelle Peninsula of New Britain. Looking astern at 0800 on the still, hazy morning of the fourteenth, Besant saw the Parramatta steaming up behind him.

‘What speed are you going?’ Parramatta signalled.

‘10^1/2 knots’, replied AE1.

Parramatta then increased speed and passed ahead of AE1. As the two ships approached Cape Gazelle Parramatta signalled:

‘Propose steaming to southward ahead of you, keeping in touch. Do you concur? What speed do you wish to go?’

Parramatta proposed this course of action as Besant in AE1 was the senior officer. Besant took some time in replying to this; either he gave the matter some thought or his primitive radio set was giving trouble. Eventually AE1 replied:

‘What orders have you got?’

Parramatta replied ‘My only orders were to search to the southward with submarine and anchor off Herbertshohe at 1730.’

Parramatta then proceeded in a southerly direction at six knots; AE1 turned to the north, heading in a north easterly direction towards the eastern side of the Duke of York Islands. The weather, in Warren’s own words was ‘Hazy — increasing as the day advanced; the range of visibility being about nine or ten miles decreasing to five miles’.

Warren was apparently concerned about the decreasing visibility as he found the submarine obscured by the haze for some time. Parramatta lost sight of the land at about 1100, so Warren decided to search for the enemy to the South as far as possible but at the same time not losing touch with the submarine for too long. At 1230, Warren brought Parramatta towards the Northwest.

At about 1430, Parramatta was close to the submarine who was to the east of Berard Point on the Duke of York Island. Besant was also concerned about the haze, for he sent a wireless message to Parramatta.

‘What is the distance of visibility?’ he signalled.

‘About five miles’, was the reply.

Shortly after this brief radio exchange, Parramatta proceeded eastwards, but it was not long before the destroyer lost sight of the submarine again. Again Warren turned back towards the north-west and steamed in the direction of AE1’s last sighted position. Parramatta went close to the coast of the Duke of York Island, but did not see the submarine.

Warren thought at the time that AE1 must have returned to harbour without informing him as he records in his Report of Proceedings, written later in Rabaul; ‘She would have to leave at that time (about 1530) to arrive in harbour before dark’. In fact AE1 was then about 21 miles from her harbour berth.

When Parramatta could not find AE1 on the eastern side of the island, she steamed to the north-west, rounded the Duke of York Island and searched for AE1 on the direct homewards route to Herbertshohe where she arrived at 1900.

The AE1 was never seen again.

What happened to the submarine is still a matter of debate, but after examining the particular circumstances of that day, ships’ records and, more importantly, a careful study of the

(Courtesy AB S. Given) AE1 with the battle cruiser Australia and destroyer Yarra in the background.
local oceanographic and meteorological conditions, we may be a little closer to the truth.

If the reader imagines what was probably occurring in submarine \( AE1 \) at the time, the following sequence of events could have been taking place. On the conning tower, Lieutenant Commander Besant was talking to Officer of the Watch, Lieutenant The Honourable S. F. Scarlett RN.

‘I don’t care much for this visibility.’

‘No, Sir. There are also some strong currents around here. I propose we keep well clear of Duke of York on the way home, and by the way, Sir, we will need to leave now in order to make harbour by dark.’

Besant replied ‘Yes, I agree.’ He then returned to the Control room to determine the necessary navigational plan, issue instructions, and consider what he should report to the Admiral when he returned to harbour.

Besant called up the voicepipe:

‘Officer of the Watch, hold your present course and speed. Keep a good lookout, particularly for the Parramatta and let me know when we are approaching Credner Island.’


Scarlett thought how glad he was that the skipper was not conducting a practice dive on the way home.

What with an unserviceable starboard main motor, poor visibility, strong currents and no escorting destroyer around, a practice dive would not be very comfortable.

At this point, the reader must be made aware that \( AE1 \) had not dived for some days, she also had a defective starboard motor. The E class submarines had two diesel engines for surface running/battery charging, and two battery driven motors for running submerged. Because of the peculiar mechanical arrangement of this Class, the motors drove the boat astern on the surface, that is, she could not go astern on her diesels. It was also likely that she was running on one main engine surfaced using the other diesel to charge her batteries. Such a procedure would avoid charging batteries most of the evening, a procedure which kept everybody awake!

In the control room Besant was thinking that it was disappointing that he couldn’t take her under, but after all, one defective main motor doesn’t make for a very safe dive. He was looking forward to its repair back in harbour and was grateful that Encouter’s Engineer Officer had things in hand on his return. Just as well, he thought. He really wasn’t very impressed with the weather conditions. Further, the strong and variable currents in the ocean around the Duke of York’s leave a lot to be desired.

Meanwhile, back on the bridge, Scarlett was cursing the haze and the passing showers. Goodness knows what the tidal stream is doing to us now, he thought, as he tried to reconcile his position. Suddenly he looked up. Out of the haze he caught a glimpse of coconut palms and some light coloured water just ahead of the submarine. Christ! he thought, that must be Credner Island; it must have been obscured. As he tried to manoeuvre the submarine to clear the island to port, he realized he was much closer to the island’s reef than he thought. He cursed the lack of a starboard motor as he desperately tried to go astern when it was obvious the boat would not clear the reef.

All hands on \( AE1 \) felt a shudder and heard the dreaded crumbling noise that accompanies contact with a reef. Besant ordered full astern on the port main motor. As the submarine slowly responded, Petty Officer William Tribe, the \( AE1 \)’s Engineer Officer from Portsmouth, reported to his Captain that water was fast making its way into the port saddle (ballast) tank.

Besant was in a difficult situation. The submarine was now pulling clear of the reef, but being trimmed by the stern for the surface passage, the boat was going to go down by the stern as more water flooded into the torn port.
saddle tank. Quickly he ordered diving stations. The Officer of the Watch clambered down from the bridge shutting the conning tower hatch after him. Besant ordered all starboard Kingston valves open in a desperate attempt to trim the vessel as she slowly started to submerge by the stern and heel to port. But it was too late. The *AEI* had gathered speed astern and slid backwards off the reef. The heel to port became critical and the batteries toppled, spilling acid and creating deadly chlorine gas. *AEI* possibly caught herself upside down halfway down the slope of Credner Island reef. She was probably not crushed by pressure at this stage and it may not have been for some years that the constant subterranean activity so prevalent in East New Britain dislodged her, causing her to settle, most likely crushed, on the bottom of the reef in 240 metres of water.

When *AEI* failed to return to harbour, at 8 p.m., Admiral Patey ordered *Parramatta* and *Yarra* to search for her with *Encounter* assisting the two destroyers at daybreak. *Sydney* left harbour at 9 p.m. not knowing that before long she would be in combat with the German raider SMS *Emden*. She was ordered to look out for *AEI* en route.

On the morning of the 15th September, *Parramatta* and *Yarra* were ordered to make a sweep 30 miles to the NW of Duke of York Island. These ships were joined by *Warrego* returning from an ‘expedition to Kavieng’. Nothing was seen. Admiral Patey then recalled the ships to start a systematic search of Duke of York and Credner Island and arranged for motor boats to search the coast. Still nothing.

*Australia* left Rabaul at noon on the 15th September. The Captain of *Encounter* was ordered to conduct an enquiry. There are no records to show that this enquiry in fact was conducted. Admiral Patey’s explanation to the Naval Board was that she was ‘lost whilst conducting a practice dive’. Such an explanation is illogical for several reasons:

- *AEI* would probably not have conducted a dive, particularly the first after several days in harbour effecting repairs, without an escort standing by.
- Besant would have been unlikely to have been forced to dive, there being no ships other than *Parramatta* in the area. (The German task group had left some time before).

- Why dive on the way home when 11\(\frac{1}{2}\) knots was the speed required to make harbour by sunset, i.e. a dive would unnecessarily delay her arrival time?
- Why dive when only one motor was serviceable?
- The visibility was not the best for surface operations, let alone a practice dive.

There was no trace of wreckage, oil or debris. She most likely went down intact as a result of a navigational incident which forced her into a ‘diving stations’ situation.

Admiral Creswell, First Naval Member, issued the following statement:

‘It is with the deepest regret that we have to report the loss at sea with all hands of the Australian Submarine *AEI*.

She was last seen on September 14th returning from patrol duty. The weather was fine, the sea smooth, and no enemy was in the vicinity. It was thought that she might have sighted an enemy and given chase, but the result of thorough search has now caused this hope to be abandoned.

The water in the vicinity of the place in which she was last seen is very deep and there is no hope of locating the wreck if she has sunk there. We may be thankful that the water is deep as the hull of the vessel would be unable to withstand the pressure and death would be mercifully sudden.

The *AEI* was in charge of the officers, and would for the most part by the crew, who brought her out from England. In that long voyage they showed their thorough efficiency.

The Navy has to mourn the loss of good comrades, many homes will mourn today, but although our men did not fall by the hands of the enemy they fell on active service and in defence of their Empire. Their names will be enshrined with those of heroes.’

The file on *AEI* was closed in December 1914 with an apology from the Naval Board to the next of kin of Lieutenant Moore, one of *AEI’s* officers, whose name had been omitted from the original official list of missing personnel.

After some 6 months’ research by the author in 1975 and 1976, a probability area around Mioko Reef and the Credner Island was determined and approval was given for the survey
ship HMAS Flinders to conduct a brief search though this probability area using her special­ised profiling Side Scan sonar. This probability area is shown as the shaded parts on the sketch map. Flinders was in PNG waters at the time, having been assigned surveying tasks in the Dampier Strait or site under the Defence Co-operation Programme with PNG.

At approximately 1330 on 17th May 1976, after several hours of scanning the eastern and southern sides of the Duke of York and Credner Islands, a contact was made 1000 metres north-east of Hast Point Credner Island in a depth of 240 metres. Whilst the side scan sonar in use at the time was unable to profile at a deeper and therefore more satisfactory

- the possible wreck is not even close to any of the known wreck positions provided by the Hydrographer; there is no report of any World War II sinking off Credner Island.
- the strong currents run north-west, south­east across the Credner Island area.
- there is no logical reason as to why LCDR Besant would have deviated from the most direct route to his sunset (1730) anchorage.

One day it is hoped that a side scan sonar with a greater depth capability can provide a positive profile of the possible wreck. Unfortunately 240 metres is way outside the scope of normal diving methods. If identification is

profiling depth, the contact displayed was not a natural feature. The area of contact is most reasonable for the submarine in which to have been, as it would fit in with her dead reckoning position working both ways from the last sight­ing of her and from her night anchorage position.

The author believes that there are no indica­tions of other causes of the loss. Research has shown that:
- there were no enemy ships in the area.
- there were no enemy shore batteries on the Duke of York and Credner Islands at the time.
- there were no sightings of AE1 in any other area.
- there have been no items salvaged by any diver; a lot of divers have been active these past years.

possible, there is no question of salvage. The wreck would be considered a war grave and thus AE1 would remain in her resting place. It would be most satisfactory, though, if the mystery of Australia’s, and the RAN’s, first war loss could be cleared up after all this time. The AE1 may not have been sunk by enemy action, but it took a lot of courage to serve in those old submarines, particularly in the area around Cape Gazelle in wartime conditions.

The subsequent press reports of the possible finding has generated much interest and contact has been made with the author by some descendants of the submarine’s crew. The men of the AE1 are honoured by two memorial plaques situated in the beautiful Bita Paka war cemetery near Rabaul.

One of these days, Tom Besant, we will find your resting place.
Major-General J. W. Norrie, AO, OBE

'We have been able to eliminate a net 14,947 trainee days per year of unnecessary training. The verdict was quite clear — we are to go ahead with the systems approach — it is here to stay, and the CGS is right behind it.'

Foreword

MOST people in the Army have by now heard of the Systems Approach to Training. Few understand what it means and what it does. The following article is a summary of the Systems Approach and is based upon a presentation I gave at the Australian Staff College in November 1976.

All officers and senior NCOs will be involved with training, one way or another, during their service careers. Therefore to update yourself and maintain your professionalism, you should know something about it. You will then be in a better position to answer queries about training that will certainly arise as the Systems Approach is fully implemented.

General Norrie joined the Army in December 1942. He served in the 2/12 Battalion in the New Guinea Campaign. After the War, he was Honorary ADC to the Governor of New South Wales. In 1948, he attended the Australian Staff College, and in 1952 served with 3 RAR in Korea. In the following year he became CO of 18 National Service Training Battalion. In 1959 he was CO of the Pacific Islands Regiment. In 1962, he attended the US Command and General Staff College, and in 1965 became Director, Military Arts at RMC Duntroon. He was Military and Naval Attaché in Saigon in 1968 and Commandant JTC in 1971. In 1972-73, he was Commander HQ PNG Command and later Commander PNG Defence Force. He was promoted Major General in 1976 and appointed GOC Training Command. He resigned in March this year.

Scenario

Soldiering is becoming a more complex business. With the introduction of new equipments, and the continuing development of tactical and logistic doctrine, the army's requirement for individual training is growing — not shrinking. The levels of skills, knowledge and efficiency must be higher than in the past.

Training is becoming more expensive as shown in the tables 1, 2 and 3:

<table>
<thead>
<tr>
<th>Item</th>
<th>Period</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>105mm HE</td>
<td>68-75</td>
<td>+40%</td>
</tr>
<tr>
<td>81mm WP</td>
<td>72-76</td>
<td>+70%</td>
</tr>
<tr>
<td>81mm ILLUM</td>
<td>72-76</td>
<td>+60%</td>
</tr>
<tr>
<td>66mm ROCKET</td>
<td>69-76</td>
<td>+58%</td>
</tr>
<tr>
<td>M18A1 AP MINE</td>
<td>69-76</td>
<td>+99%</td>
</tr>
<tr>
<td>PLASTIC EXPL</td>
<td>71-76</td>
<td>+42%</td>
</tr>
</tbody>
</table>

Table 1. Ammunition Costs

Our whole army training apparatus is caught in a squeeze between a legitimate growing requirement for training and static or shrinking resources to meet that requirement.

It is obvious we must get the most out of our training dollar — training must become more cost-effective. Taking this idea a little further, we must aim at producing a better quality product out of our training machine, using less resources. This means that we must become more efficient.

This is what the systems approach is all about. It ensures that we use what resources we have to the very best advantage and we don't waste time and effort on non-essentials.

Thus courses are made more relevant to the job. Also both the student and the instruc-
To summarise so far, the Systems Approach to training provides the following benefits:

- decreased costs (14,950 trainee days saved per year so far).
- increased effectiveness — more about this in a moment.
- increased efficiency.
- increased acceptability of course by instructors and students.

Without further ado let us now look at the nuts and bolts of the Systems Approach:

**THE SYSTEMS APPROACH**

The Systems Approach used by Training Command is divided into five phases as follows:

1. **Analysis**
   - the job is analysed — what do we train and where do we do it?
   - training is designed to suit the results of the job analysis — how well do we train — to what standards?
   - the presentation of the training should be developed so that it is efficient as well as effective.
   - the course is conducted.
   - this is simply a check to see if the course did what it set out to do in the most efficient way.

I will now expand upon each phase in turn.

1. **Analysis**
   - In job analysis, we determine what a man has to know to do a particular job. This is the keystone of success for the Systems Approach, because after we have determined what the man must know — we get rid of all the rest.

   There are various ways of analysing the job. **MERIT*** might do it or we might assemble an expert panel. A list is made of all the tasks done on-the-job, both in peace and war. The tasks are sorted into priorities for training based on things such as their importance, how often they are performed, what percentage of soldiers perform them and so on.

   From these priorities we decide which tasks are for training and which are not. Each task which is selected is then further analysed to determine the conditions and standards required for success on-the-job.

   Now the results of this job analysis are then compared to any existing courses to see how much any of the existing courses match the requirements of the new course.

   This is a very important step. We do not want to be guilty of ‘throwing the baby out with the bath water’ when we apply the systems approach. In other words, there may well be a large part of an existing course that could well be retained.

   The final step in this phase is to select the location where the task will be taught.

   Under the current system almost all individual training takes place in army schools. This is going to change. Under the new system, individual training will be conducted in a variety of ways—
   - as a job aid. (i.e., a check list of tasks for a job such as vehicle servicing, electrical fault finding, etc.)

   * **MERIT**: an acronym which stands for Military Employments Research Information Team.
self study courses. These would be along similar lines to a correspondence course which can be used anywhere.

- on-the-job training.
- formal courses which can be conducted in schools or in units.

Thus selection of where to train is a critical decision that will be more carefully considered in future.

Looking back at what we have done so far in Phase I, we know that training will be more relevant and effective. We won’t be wasting our time and resources on things that could be classified as ‘could knows’ or matters that are interesting but entirely irrelevant to the job performance.

Phase I is now complete. We know what to train and where to train.

### Design

In this phase, we decide how well to train. This is done by writing precise training objectives which answer three questions about each task:

- Performance <> what does the student need to know or be able to do?
- Conditions <> under what conditions?
- Standards <> to what standards?

The answers to these three questions are expressed as a training objective.

Here is a good example of a training objective:

**Example 1**

**Performance:** each NCO must be able to navigate cross country.

**Condition:** on foot in daylight for 5000 metres over hilly wooded terrain, given a prismatic compass, a protractor and a 1:50,000 map which shows the start point and the objective.

**Standard:** to arrive within 250 metres of the objective in 3 hours or less from the time the materials are provided at the start point.

Many people may well say, “So what is new? We have always used objectives in the army!”

This is true. Instructors have always started each period of instruction with the statement “The objective of this class is ...............”

For example the following statement could well be typical of the old approach:

**Example 2**

**Objective:** To ensure that NCO’s are proficient in the use of map and compass for cross country navigation.

Look at Example 2 closely. You will notice it does contain a rather general statement of performance.

It does contain a statement of conditions, but it is also generalised and not as explicit as the conditions in Example 1.

Finally, does the objective contain a standard which indicates how well the performance must be done? The objective in Example 2 contains the word ‘proficient’, but how proficient is proficient? Would any two officers evaluate to the same level of proficiency? Probably not.

In summary, the difference between the two objectives is the level of precision which is used. Example 1 communicates a clear message to all those involved in the training effort. It tells students, instructors, supervisors and commanders precisely what is required. Nothing about the final results of training is left to value judgement or doubt.

Proper training objectives should serve 3 functions:

- what training is required and how to organize it
- how the trainee will be tested
- how the training will be evaluated.
Let us again look at the navigation objective (Example 1) and see if it fulfills these three functions. It does. Note that any instructor would be able to determine whether or not the training did what it was supposed to do. If a significant number of students could not meet the required standards laid down in the objective, the map and compass course could hardly be judged to be successful. The training would have to be re-examined to determine what is required for a higher level of success. It's a bit like a mechanic tinkering with a motor until it is perfectly tuned.

The next step in this phase is to develop tests which will be used for each objective. We have a choice of practical, written or oral tests. The choice is usually determined by the nature of the performance required by the training objective, for example I would prefer to eat from a mess where the cooks had passed a practical rather than a written test.

Decisions are then made about how and when the tests will be used. For example, they may be used as entry tests to identify those students who need some training before they even begin the course, so that they all start with an equal handicap.

Tests may also be used to see which sections of the training can be by-passed by the students who can already do some of the training objectives. Decisions about entry standards can then be made—

It can be seen from the diagram above that if the instructor finds that most students are already able to do Objective 1, then the amount of training on the course can be reduced.

Entry standards are also used to describe the qualifications students must have before they attend a given course. A precise definition of entry standards will help us to make better decisions about who should attend which course.

To review what we have said so far: in Phases I and II we decided

- what to train
- where to train
- how well to train.

III Development

It is the responsibility of instructors to develop efficient as well as effective instruction. This is the purpose of this phase. There are a number of techniques available which have been proven to improve the efficiency of instruction. One of these is the 'three steps backward' planning sequence. We do this as follows:

First Step: Plan the evaluation by deciding what we will accept as evidence that the trainee has attained the objective. If the objective is well written, the objective itself becomes the test, e.g. the navigation objective in Example 1.

Second Step: Plan the practices, drills and tests and so on that are needed to bring the student to the standard where he can pass the test.

Third Step: Plan the presentation of information, be it by lecture, demonstration, self study or whatever. The presentation tells the trainee what to expect and motivates him to accomplish the task.
You can see by now how this approach keeps the training effective and efficient. A task doesn’t even make it to the training list unless it’s actually done on the job and is a high priority at that.

The tasks lead to the objectives and the only things allowed in the course are what is needed to achieve the objectives — no more and no less.

Don’t waste time in nostalgic longing for the old days when we could fill courses with all sorts of interesting but irrelevant stuff. Remember the hard facts,

- increasing training load,
- relatively decreasing resources,
- decreasing time, and
- increasing costs.

In addition to the ‘three steps backward’ planning sequence, there are a number of proven methods which we can use in developing instruction to achieve an objective. Suffice to say that a great deal of research has been done on this and the results are available to instructors as ‘tricks of the trade’. For example, the most efficient way of teaching someone to name the parts of something is quite a bit different from the most efficient method to teach someone a physical skill.

In a similar vein, certain aids are more appropriate for certain types of objectives, and detailed guidance on this is also available to instructors.

The final step in the develop phase is to run a pilot course to iron out any wrinkles.

This concludes the develop phase. The remaining two phases are conduct and validate.

IV Conduct

During this phase the course is run. The systems approach produces some interesting changes:

- once a student can pass all of the objectives, he can go home. This could occur at the start or any time during the course. This can pose some administrative problems, but it has been done recently at the School of Survey.
- with the objectives set, students can use self study under some circumstances, e.g., the officers qualifying course at the School of Health for Medical and Dental direct-entry officers.
- our main interest now is the student’s performance — whether he achieves the course objectives.

Therefore, we now rate an instructor not by how he looks on the platform but by the results his students achieve.

V Validation

This is the final stage. All we do here is to check whether the training did what it set out to do in the most efficient way. This is approached in two ways. A check is done at the school to examine the efficiency of the course and secondly, by asking the customers whether they are satisfied with the product.

It’s no use beefing to each other around the bar on how badly trained the field engineers or drivers or whatever are. This information must get back to the training organisation where we can do something about it.

We realize filling in questionnaires as part of the external validation process is a bit of a bind, but it is necessary because it gives feedback into the system and needs the co-operation of all concerned.

CHANGE IN PHILOSOPHY

Where should training be done? This point was raised in Phase I. To expand a little on this, in the past, we have accepted that the normal place to train individuals was at the appropriate army school. We now believe this philosophy is not always right.

There are a number of reasons why we should export some training away from the schools—

- schools are the most expensive place to train
- on-the-job training (OJT) is the most effective way to train
- there is a leakage rate between school and job
- Army Office has placed a ceiling on numbers of students on course per year
- COs think too many of their men are spending too much time on courses
- courses are not always available when needed.
For all these reasons I believe that for many tasks the best and most economical place to train is on-the-job and the decision has been taken in principle to export some training away from the schools.

It is realized that many courses cannot be exported, but where possible any course or parts of a course than can be done by OJT or by a unit course may be taken away from the schools. The school's role will become increasingly that of training instructors, overseeing training and producing training packages and corps doctrine.

Note the major shift in philosophy. Training Command will not always be delivering fully trained soldiers to units. Units will have to accept part of the task of working up skills. This whole thing must be done in partnership. Where we believe training should be exported, we will consult and secure the agreement of the other commands.

We are not going to rush into this, and we still have to develop the detailed guidance and procedures needed. Nor are we going to wash our hands of the affair because of our change in philosophy. We will continue to train instructors, provide training packages and self-study courses, monitor instruction and so on.

What we will not do is to waste money, time and effort moving people from all over Australia to a school when the training can be done just as well if not better in their unit.

**PROGRESS REPORT**

I would like to conclude this article on the Systems Approach by tabling a brief progress report.

We are about halfway in converting all individual training to the systems approach and our target is to finish by 1980. Most of the work so far has been in phases I and II, i.e. analysing the job and writing the objectives.

This has taken a lot of effort although only about 60 people throughout all the schools are working on it full time.

The most tangible benefits so far have come from identifying areas of under and over training and I would like to give you some examples.

**Example of Under Training:**

**Transportation Centre**

<table>
<thead>
<tr>
<th>Freight Handlers</th>
<th>Course Scope</th>
<th>Course Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Systems</td>
<td>After Systems</td>
<td></td>
</tr>
<tr>
<td>After Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>—maritime —rail, and operations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example 1 of Over Training**

**School of Army Aviation**

<table>
<thead>
<tr>
<th>Air Traffic Controllers</th>
<th>Course Length Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment Before After</td>
<td>Days Percent</td>
</tr>
<tr>
<td>Course 30 10 20 66%</td>
<td></td>
</tr>
</tbody>
</table>

**Example 2 of Over Training**

**School of Artillery**

<table>
<thead>
<tr>
<th>WO Subject 2</th>
<th>Reduction Average</th>
<th>Average Number Man-days of Students Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course (Days)</td>
<td>Annual Annual</td>
<td></td>
</tr>
<tr>
<td>Locating</td>
<td>41 9 369</td>
<td></td>
</tr>
<tr>
<td>Sound Ranging</td>
<td>73 9 657</td>
<td></td>
</tr>
<tr>
<td>Radar</td>
<td>40 9 360</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1386</td>
<td></td>
</tr>
</tbody>
</table>

As can be seen we are making very substantial savings and we are only 40% of the way through converting our courses to the Systems Approach.

It must not be understood that our object is to shorten courses — well trained soldiers is the aim. We have only shortened courses after applying the Systems Approach and have been able to identify some areas of fat where we were wasting time on irrelevant stuff and non essentials.

Obviously, there is a good deal more to the Systems Approach than is contained here, and hopefully, by the middle of 1977 we will have the five doctrinal pamphlets on systems produced, one for each phase.

I hope I have been able to convince most readers about the worth of the Systems Approach to Training (SAT) and the importance it will have to our long term goal — training for war.
TRICKLE OR CONTROLLED TORRENT?
THE ADVANTAGES OF CORPS
RECRUITING AND ENLISTMENT

Major J. P. Shedick
Royal Australian Infantry

ALTHOUGH the Australian Army has its own proud traditions, we follow in most things the general organisational, administrative and tactical patterns of the larger armies of the English-speaking world, particularly Great Britain and the United States of America. One aspect, however, in which we differ radically from ‘big brother’ is in the allocation of recruits to corps.

An applicant for service in the British Army not only applies to enlist in a specific corps, but, in the case of infantry, in a particular regiment. A prospective soldier in the United States can nominate both his corps and formation, even to such elite units as Rangers and ‘Green Berets’, knowing in advance where that particular formation is normally based. The Australian Regular Army, as distinct from the pre-war Permanent Military Forces, has, during its 30 year history, not permitted any such choice to its recruits, who are allotted to corps during their recruit-training course, this allocation being based on the soldier’s indicated preference, his aptitudes as revealed in aptitude tests and training, and the vacancies existing in the Army at that time. Thus a person enlisting in our Army cannot be offered any guarantee that he will be employed in a field in which he is interested — a point emphasized by recruiters (despite what may be thought by RTB staff!) and may well commence his military career as a disgruntled soldier in a corps which holds no attraction for him. An exception to this is qualified tradesmen, who may be corps enlisted under some circumstances.

One of the unsatisfactory aspects of our present system is that recruits are ‘trickled’ from the Recruit Training Battalion to the Corps Training Establishments in small weekly groups. Surveys have shown that, for most soldiers, corps training is the nadir of their military service, instead of being one of the highlights, as it undoubtedly should be. In most cases, the reason that a young soldier considers square-bashing and bed-making-by-numbers at Kapooka to be more interesting and satisfying than the advanced training which he receives from his corps can be traced back to this ‘trickle-system’ when arriving at his corps centre. From the moment he steps off the bus at Kapooka he is fed straight into an efficient administrative and training system which does not falter, or allow him time to falter, until he marches out. For the majority of soldiers, arrival at their corps training centre means weeks or even months of employment in the time-hallowed Army methods used for keeping young soldiers ‘out of mischief’, methods which keep the lawns short, the gardens weeded and the baking dishes in the kitchen immaculate, but do as much for a soldier’s morale as being posted as a kennel-cleaner to a dog-handlers course. All this because the ‘trickle’ must be contained until sufficient soldiers have arrived to warrant conducting a course for them. I specifically exempt RACT Centre which has evolved a ‘trickle’ method of driver-training which copes efficiently with the present allocation system.

In view of the drawbacks to the present system of general-enlistment, with allocation taking place at the Recruit Training Battalion,
what are the arguments in its favour? Probably the main ones are flexibility which enables the Army to direct its manpower to where and when it is most needed; the opportunity to take a long, hard look at a recruit under Army conditions before deciding whether or not he is suitable for a certain corps; the fact that most recruits when first enlisted know little or nothing about the corps system and have probably been 'sold' on a certain corps by a friend or relative, or watching the late-night movie; and finally because our Army is so small that we cannot afford to corps enlist. This last argument is hardly valid, since the RAAF, which is even smaller, enlists all airmen to a specific mustering.

Whilst accepting that these arguments carry some weight and not being a believer in automatically following the example of the British, American, or any other Army, I nevertheless believe that limited corps enlistment has some advantages for our Army and could be carried out for a trial period without any great change to our present systems or inconveniences to its members. Under such a system, our advertisement would be aimed at attracting recruits to a particular corps, somewhat after the style of the Army Reserve advertisements. Counselling by Army Careers Advisers would be towards that corps and would thus be much more specific; for example:

"On completion of your recruit course at Kapooka, you would move to the Infantry Centre at Singleton in New South Wales, where you will commence a twelve-week course to qualify you as a rifleman. At the end of that course, that is about 6 months after enlistment, you will, as a qualified rifleman, be paid at pay level 3, which will mean a gross pay-rise of $28 a week. You will then join a battalion of the Royal Australian Regiment at Townsville, Brisbane, Holsworthy, which is just outside Sydney, or Woodside in South Australia, depending on where vacancies exist."

This compares with counselling for general enlistment, where the 'spiel' is, of necessity, rather vague:

"On completion of your recruit course at Kapooka, you would move to the training centre conducted by the corps to which you have just been allotted. This will be somewhere in either Victoria or New South Wales. You will probably not commence your training there straight away, as it is frequently necessary to wait until there are sufficient starters for a course. Once the course commences, it will last for between 3 and 5 months, depending on which corps you go to, and during this time you will be taught your basic Army job. On conclusion of the course, as a trained soldier, you will receive a rise in pay of between $11 and $34 a week, depending on the job in which you qualify. You will then join an Army unit somewhere in Australia, depending on where there is a vacancy for a soldier with your qualifications."

Recruiting drives for particular corps would take place according to certain time-schedules during the year, as for instance, does OCS recruiting at present. Corps enlisted soldiers would be enlisted on specific dates, so that their corps training would commence the week they arrived at their corps training centre, thus obviating the present morale-shattering delay, shortening the period between enlistment and receipt of trained-soldiers pay and also shortening the period of enforced separation for married soldiers. It would appear also to have advantages for Training Command, corps training establishments and major units in their planning of courses and training programmes.

Some changes in processing and testing applicants at Defence Forces Recruiting Centres would be necessary, since applicants for specific corps would need to undergo additional aptitude testing, but recruiting units would benefit in that, as mentioned before, counsellors would be able to offer recruits a specific 'package' and a definite enlistment date or dates. The applicant would benefit in that, if his mind was set firmly, for instance, on being a sapper, he could be told at the time of application whether or not vacancies existed in RAE and after testing, could be told whether he was suitable for that corps.

A major corps could, utilising this system, probably obtain its full annual requirement of soldiers from five or six 1 RTB intakes, whilst smaller corps would possibly need only a couple of annual manpower transfusions.

When discussing this idea, the most frequent objection raised is that we would never be able to recruit sufficient members for certain
corps which are regarded as unpopular with potential recruits. Surprisingly enough, not every Army applicant wishes to be a brain surgeon, vehicle mechanic, truck-driver, or helicopter pilot. There is no dearth of arms-oriented applicants, including the cream of the crop who enquire, rather anxiously “What are my chances of being accepted for infantry?” On the other hand, some applicants feel that they lack the aptitude for both ‘gung-ho’ or mechanical-type duties and seek the more ordered routine of clerical, storemen and steward postings; indeed Defence Forces Recruiting Centres are always crowded on the days that the RAAF advertise for cook assistants, stewards, clerks and even labourers.

At present there are approximately 48 yearly recruit intakes at 1 RTB. Do we really need that many? It would be possible to divide these up between courses for corps-enlisted soldiers and courses for general enlistments. By still having the GE category, we would be retaining some flexibility in our system and making allowances for the undecided applicant. We would also be leaving our options open, after a suitable trial period, to decide whether to retain limited corps-enlistment, revert to the general-entry system, or adopt a corps-enlist only method.

As a further suggestion let us corps-enlist female as well as male applicants and abolish WRAAC and RAANC as separate corps. We can then specify in appropriate cases that we are seeking both male and female soldiers and, whilst conducting separate recruit courses (although not necessarily at different locations), co-ordinate them so that the sexes are fully integrated at the commencement of corps training. The present restrictions on the number of girls in the Army and the small number of ECN in which they can be employed shows gross neglect of a potentially rich source of Army recruits. Why not female Army apprentices and staff cadets?

During the past twenty-five years many changes, mostly for the better, have taken place in the Australian Army’s organisation, administrative processes training programmes and recruiting methods. Our corps-allocation system has remained almost untouched by the winds of change during this period despite the anguish of thousands of recruits: “But I was promised I would go to the Transport Corps!” Why not, then, some orderly experimentation in the field of corps-enlistment, for, as the actress is reputed to have said to the bishop: “Don’t knock it if you haven’t tried it.”

We had for our Chaplain a zealous Presbyterian Minister, Mr. Beatty, who complain’d to me that the Men did not generally attend his Prayers and Exhortations. When they enlisted, they were promis’d, beside Pay and Provisions, a Gill of Rum a Day, which was punctually serv’d out to them half in the Morning and the other half in the Evening, and I observ’d they were punctual in attending to receive it. Upon which I said to Mr. Beatty, “It is perhaps below the Dignity of your Profession to act as Steward of the Rum. But if you were to deal it out, and only just after Prayers, you would have them all about you.” He lik’d the Thought, undertook the Office, and with the help of a few hands to measure out the Liquor executed it to Satisfaction; and never were Prayers more generally and more punctually attended. So that I thought this Method preferable to the Punishments inflicted by some military Laws for Non-Attendance on Divine Service. (1756)

—Benjamin Franklin

“The Autobiography of Benjamin Franklin”
FROM the time that it was possible to carry more than one person in an aircraft, the carrying of injured and sick people has been a reality. The movement of patients by air has changed from the simple 'hope for the best' arrangements to an intricate method whereby every precaution possible is taken. The RAAF aeromedical evacuation system has become recognised as a very sophisticated and skilful movement of patients.

Over the years a great deal of progress has been made in the science of aviation medicine, besides establishing the effect of flying under various circumstances for aircrew, it has assisted in the movement of patients. The only time that an aeromedical evacuation is mounted for a seriously ill person, the movement of such a patient has to be justified; specialist treatment is not available, or the patient requires movement to a specialised clinic. Every care and precaution is taken to ensure that firstly the patient will benefit or could benefit by the move and secondly that the flight will improve and not reduce the patient's recovery.

These precautions commence with the training of aeromedical evacuation teams. Courses are conducted at No. 3 RAAF Hospital at Richmond in New South Wales for Nursing Officers and Medical Orderlies. All RAAF Medical Officers do a short course in aviation medicine at the RAAF Institute of Aviation Medicine at Point Cook in Victoria. Besides the RAAF members, specialist civilian and reserve consultants are used whenever possible or desirable.

Regular medical evacuations have been carried out under active Service conditions direct to Australia from New Guinea, Korea, Vietnam and Malaysia or through staging medical facilities along the way. The largest single medical evacuation effort for the RAAF was following Cyclone Tracy at Darwin when in less than a month a total of five hundred and fifty-one patients were air lifted from Darwin. Although strained to the limit of resources the overall evacuation was successful.

Not all the patients carried are Service personnel, although many are. Mercy flight is the term used to distinguish that the patient is
a civilian; many are carried each year. The equipment used is as complex and varied as the patients. An aeromedical evacuation aircraft is the closest possible thing to a flying hospital that can be arranged in a transport aircraft whose major task is cargo flying.

Aeromedical evacuations and mercy flights have been carried out to just about every place where it is possible to land an aircraft within Australia. Places where medical evacuations have been outside Australia include Lord Howe Island, Norfolk Island, Cocos Island, Papua New Guinea, Malaysia, Singapore, New Hebrides, Christmas Island, Indonesia, Timor, Solomons Islands, Guam, New Caledonia, Fiji, New Zealand and others. Actual flight times can vary from as little as thirty minutes to as much as fourteen hours.

Because the transport aircraft of No. 36 and 37 Squadrons (C130) and 38 Squadron (Caribou) are based at RAAF Richmond, No. 3 RAAF Hospital is virtually the aeromedical evacuation centre. However, because of the training courses run over the years, evacuations can be mounted from most RAAF Bases. If the condition of the patient is very critical it is usual for the evacuation to be mounted by No. 3 RAAF Hospital as more equipment is available and a special rescue aircraft is used purely to do the evacuation (rather than using an aircraft on an alternative task to carry a patient).

No matter how sick the patient or how well trained the medical crew, no aeromedical evacuation could be mounted without the aircraft and its crew. Aircrews of the various Squadrons have been given some extremely difficult flying tasks, these include flying steadily through difficult weather at low altitudes. The co-operation between aircrew and aeromedical evacuation teams has always been of the highest order and is an object lesson in team work.

Many types of aircraft have been used. Currently the most popular aircraft used by the RAAF for aeromedical evacuations is the Hercules C130. This aircraft allows for long, relatively stable flights, under pressurised conditions and allows sufficient room for a degree of inflight nursing. Noise, vibration, temperature control and hygienic facilities are the largest problems faced by the medical evacuation crews. Over a number of flights the crews have learnt ways to assist patients, and they are learning and introducing new methods continually.

Hercules C130 aircraft have carried almost 5,000 patients during the eighteen years of RAAF Service. The number of mercy flights within Australia is growing, the trend will remain as the population increases. Aeromedical evacuations have a significant role in the RAAF. More and more the call goes out from civilian doctors to have RAAF assistance. Besides the public relations effect, aeromedical evacuations contribute to the medical treatment in the community and for that alone they are a worthwhile contribution by the RAAF.
INSTRUCTOR DEVELOPMENT

A TIME FOR CHANGE

Captain W. Glynn
Royal Australian Army Education Corps

An increasing number of educators (trainers) have come to recognise that each student is a unique human being—possessing combinations of aptitude, knowledges, interests, learning styles and needs which differentiate him from any other student.*

It is the purpose of this article to set out the case for a realistic appraisal of the needs of the Australian Army, in relation to the development of an instructional elite; correctly trained in the skills of the instructional "trade"; with a total awareness of the individual needs of students and having developed areas of competence that will determine the growth of a properly trained military force.

For the last three or four years the Army has been in a constant state of upheaval. Changes have been caused by the self-inflicted introduction of Functional Commands and externally imposed ideas from the differing philosophies of changing governments. In most circles these changes were not unwelcome. Change brings about new opportunities, new ideas, and alters mundane occupations to something filled with interest and intelligent challenge. As a consequence of this change, the mental climate of our times is profoundly evolutionary in character, distrustful of the traditional and favourably disposed to the new.

Evidence of the evolutionary character of this change can be seen daily in the continuing efforts of those people involved in the work of the Training Systems and MERIT organisations. Under the auspices of Training Command both of these organisations are having an impact on the training of soldiers throughout the Army. In terms of improvement in the overall structure of training there is as yet, little concrete evidence that this infusion of techniques and ideas will prove more effective than traditional methods — no doubt, it will soon be forthcoming.

The world is currently undergoing an explosion — the knowledge explosion. Since the advent of Sputnik there have been frenetic efforts by the Western World to close the apparent gaps in technology. One result is that educational and training organisations are constantly being subjected to innovations in technique and equipment. These innovatory ideas have included programmed learning — hailed as a panacea for instructional problems, it has lost favour because it has proved mone­tarily and physically difficult to employ; and audio-visual instruction — which relies on the use of relatively expensive “hardware” and “software” and has consequently suffered great stress under cost conscious bureaucratic systems.

As a result of these innovations though, much more is known now about instruction and instructional techniques. In fact so much is known that one wonders how the totality of this information can be devoured and passed on to others. We would indeed be fortunate in the Army if, year after year “Instructors” at all levels grappled with this knowledge, researched evidence from differing educational, psychological and instructional publications,

made the necessary adjustments to their instructional techniques, and then, using the best of instructional facilities, equipment, aids, and training support, imparted this information in an easily assimilated and employable manner. But this does not happen — why not?

One of the reasons it does not happen is because of the accepted tradition (and myth) that “Every Officer and NCO, by virtue of his rank, is an instructor!” State Education Departments, realising a need for longer training of their teachers have recently increased the time spent in initial training from two to three years. Courses for “instructors” in the Army range from two days to two months. Apart from academic development there is little difference in skills required by a teacher or an instructor. In addition to general academic enrichment, trainee teachers develop knowledge and attitudes related to teaching, instructional techniques and skills, and subject matter pertinent to the subject area each teacher is to specialise in. During training each teacher is required to spend a total of up to six months in assessed practice teaching at different schools with different class levels, under the guidance of a qualified senior teacher. At the end of this three year period the teacher is still required to attend in-service courses aimed at introducing new, or reinforcing old, skills. He or she is still not accepted as a trained teacher until the completion of a number of years probation.

In the face of all this training, the growing acceptance of the Systems Approach to Training has seen the emphasis on military instructional matters relegated to the lower quadrants of the training sphere. While “Instructor Development” is paid lip-service, little physical effort is being made to upgrade the expertise of instructional personnel. In an Army that is totally reliant on training personnel, it is essential that the “Instructor” be given more recognition and better training.

HQ Training Command, in recognition of the declining standards of military instruction, has initiated an Instructor Development study — but this pilot project is a long term study, the needs of the Army are NOW. The Army is failing to keep pace with change. Experienced NCOs are leaving the Army and are replaced by those with less experience, and as there is a greater concern for the implementations of the overall concept of Training Systems, interest in the mundane art of instruction has waned. There are still several voices “crying in the wilderness,” voices such as the Army Methods of Instruction Team, and Instructor Development programmes that have been instituted at some of the larger Army schools, but these voices are gradually being stifled by the weight of enthusiasm and support for other areas of the training sphere. It is interesting to note that in the Draft Catalogue for courses projected for 1977/78, there are only eleven course titles which have an association with instructional techniques. Of these eleven, nine courses are related to specific employments involving a trade or occupation, for example, Assistant Instructor (Gunnery) or Training Systems Instructor. The remaining two courses are entitled Sgt/Cpl Instructor Development and Officer/WO Instructor Development. Both of these courses have specific aims, “To improve instructional techniques.” There are NO courses in basic instructional techniques. From where will the students come to be improved?

The immediate rejoinder is that NCOs receive initial instruction on subject 1 courses, and officers receive it prior to graduation — a typical response! Are you aware, for example, that a corporal attending a Subject 1 course for sergeant receives only 26 periods of instruction in instructional techniques? An officer, who receives no greater amount of training, may not have the need, or opportunity, to practise his training because of staff postings, but is expected to be fluent in these techniques if he is ever posted to an instructional position.

The argument here, however, is not the amount of training an Officer or NCO receives — or in fact, whether they should receive more or less. The argument is that like a cook; or mechanic; or field engineer; an instructor needs to be trained in certain well-defined techniques and skills, and needs constant employment in that field. The successful passage of a soldier through an NCO Qualifying Course produces an NCO, NOT an instructor. Similarly, graduates from RMC and OCS are not instructors, but officers. The terms are not synonymous and should never be regarded as such. One does not expect a graduate of an NCO Qua-
fying Course to be a medical assistant because he has received instruction in health and hygiene, why then expect him to be an instructor? The ability of a student to stand in front of his peers and regurgitate a drill lesson, which he has learned by rote, does not indicate whether he can "teach" the information to a group of recruits. Yet the need for people with the ability to train others, to pass on information in a manner which allows for the greatest receptivity of the student, is fundamental to the needs of the Army.

Lt. Col. O'Brien, writing in another context, has said,

"training aids are supposed to assist the instructor, to enable him to vary his teaching methods, and to help the transfer of knowledge from teacher to student. Too often, the use of the projector replaces the instructor, causes him to standardise his teaching methods and impedes the transfer of knowledge."

It is agreed that there are dangers inherent in the improper use of teaching equipment. The fact that Lt. Col. O'Brien's whole article is a condemnation of poor teaching skills, exhibited constantly by partially trained instructors, is a further justification for presenting this argument. The article is, however, descriptive rather than prescriptive, in that ways of overcoming these difficulties are not prescribed. Behavioural faults, such as these, result from inadequate training, and while there is an expectation that instructors should "know" when they are committing instructional sins, it should be recognised that their limited training does not allow them to understand that they are doing wrong. Some of the advice currently emanating from Training Command is hardly indicative of a desire to clarify this situation.

The test edition of the "Reference Guide for the Selection of Instructional Strategies and Media", issued by Headquarters Training Command in July 1975 has the following introductory paragraph:

"This Reference Guide has been written primarily for use by Army Instructors at Army Schools. Specifically, it is intended that the users of this guide be Army school instructors who use training objectives and who routinely decide what instructional strategies (methods) and media (aids) are employed during their periods of instruction."

The mere fact that the author of this publication felt obliged to place the words "methods" and "aids" in parentheses, is a tacit acknowledgement that his readers may have difficulty in understanding some of the terminology used. Why then subject the reader to a further two hundred pages of verbiage, couched in terms that are generally not familiar even to university students? While it is not denied that the delineation of objectives, through the use of Bloom and Krathwohl's taxonomies, has merit in the instructional field, does the author really expect the average Army instructor to plough through the multiplicity of diffuse terms, and come to grips with such obscure concepts as an "evaluation strategy for a psychomotor, externally-paced objective"? This is, in no way a denigration of instructional talent in the Army, but, as the majority of instructors have an educational level of year 10 or less, it is unrealistic to expect university level comprehension from them.

Further evidence of the lack of awareness of instructor problems can be seen in the January 1976 issue of the Army Journal. The following platitudinous example is drawn from an article dealing with "A Systems Approach to Training". The co-authors have written:

"Traditionally, instructional staff is drawn from the best of those performing operational duties. High levels of professional expertise are thus sustained at schools and appropriate values can be transferred to students."

If one assumes that this statement is correct, then one must question three areas.

- Where do these instructional staffs establish instructional expertise?
- Why should it be assumed that there is some correlation between the performance of operational duties and the ability to instruct? and;
- If there is such a correlation, why is it that


CO/CIs have to run unit courses to upgrade the quality of instructional staffs? In places such as 1 RTB, officer and NCO graduates of these courses are still rejected by COs (much to the chagrin of CARO posting personnel) — rejected because they totally lack instructional qualities.

A further statement within the same article says,

"The service policy, reinforced by the Kerr Report, is that officers and NCOs have a responsibility as instructors or potential instructors. Our methods of instruction — the set of techniques for actually teaching — are sound and well established."

While it is agreed that present methods of instruction are sound and well established, it is also contended that they will not remain so unless cognizance is taken of on-going research into instructional techniques. Furthermore, service policy is wrong if it insists that ALL officers and NCOs have a "responsibility" as instructors or potential instructors. Instructors are made, not born — like Doctors, Lawyers and Teachers, they are trained people with an empathy for a particular calling. If one has a blocked drain, he either calls in the trained expert — the plumber — or does an inexpert job himself, trusting that what he does will work and not cause damage to the pipes. As "Instructors," most Army instructors today are second-rate plumbers — and it is not their fault. They are simply following the dictates of service policy which insinuates that because they carry some form of rank, they are automatically (and magically) trained instructors.

In the presentation of a proposed solution to this instructional dilemma, there are several points which have to be established at the outset. Firstly, this is not an argument for the re-establishment of an Instructional Corps. It is contended that an instructor must be a subject matter expert and a modern Army has too many bodies of subject matter to allow anyone to become master of more than one or two. The disassociation of an instructor from the Corps to which his particular block of subject matter belongs, would limit his career potential — and his expertise, as the disassociation from the practice of his skills continued.

Secondly, the solution suggested here is not the only possible solution, but it is presented with the knowledge that it is better than the present situation; with the knowledge that the New Zealand Army has for some time been able to identify and train instructors as separate entities; and that unless something concrete is done now to change the situation, the compounding effects of poor quality instruction and instructors will cause insurmountable difficulties for the defence of this country.

Thirdly, this is not a request for additional payment — the necessary identification of a trained instructor could be no more than the re-issue of something akin to the "Qualified Instructors' Badge" — with colour variations to separate the different classifications — but with more stringent regulations about its issue. No matter how he is identified personally, it is essential that CARO be able to identify him, and his areas of expertise, in order to organise proper postings. Finally, any changes that are suggested here will be in addition to whatever is currently planned or operational. For example, the teaching of instructional techniques to all officers and NCOs should continue unchanged — except for the recognition that this is training for knowledge, NOT expertise.

In establishing professional instructors and recognizing that these people are experts in particular fields, it is also necessary to establish various classifications of instructors. Classifications that are dictated by peculiarities in employment in a military organisation. The first of these classifications is that of Military Instructor (Regimental). Within this classification there are a number of already identified areas — areas which are peculiar to the Army and which use established methods of instruction, tailored to the needs of the Army and of proven worth — such subject matter areas as drill, fieldcraft and platoon-level weapons. It is accepted that a trained soldier should have some expertise in all of these basic military areas, but he could never, and should never, be totally informed or skilled in all of them — nor can an instructor. An instructor in regimental training should be a subject matter expert in two or three identifiable and recorded areas, and should instruct only in those areas. Identification of potential instruc-
tional areas can be made at subject matter courses where instructional staff will be required not only to assess instructor potential, but also whether students have established sufficient depth of knowledge to instruct in that area. The necessary recommendations would then be made on course reports. Changes in expertise from one area to another can be effected, but it should be recognised that establishing expertise in a further area can only be done to the detriment of skills in one of the original areas.

It is clear that this classification would upset instruction on current regimental courses, where instructors are required to be a “jack-of-all-trades”, or where instructors have become expert in particular lessons. The shock of this upset can be overcome by the use of assistant instructors i.e. those instructors who have limited expertise in certain areas, or trainee instructors who are in the process of developing further expertise, but who are qualified only to assist, not to instruct, in a particular subject matter area.

A second instructor classification would be that of Military Instructor (Training). Instructors in this area, both officers and NCOs, would be responsible for the development of expertise and instruction in other subject matters of military training, where information and techniques are in a constant state of flux, and where instructional techniques are more sophisticated. Areas readily identifiable include training systems, tactics, and leadership. This classification would have similar limitations to that of a third classification — Military Instructor (Trade or Professional).

Here the instructor is clearly a subject matter expert in a particular trade or profession and is required to instruct only in his area of expertise. He is not a part-time regimental or training instructor. He needs only to perform satisfactorily the normal military requirements of the regimental training areas, and NOT instruct in them. Most of his instruction will be done in a classroom or in a classroom situation in an outdoor setting. Therefore his training in instructional techniques would be concentrated in that area, not on the parade ground. Included in this classification apart from recognised trades, would be such groups as members of the RAAEC requiring military instructional qualifications, and people in the medical fields who have a training function.

The final classification would be that of Military Instructor (Officer/Special Requirement). In previous classifications the rank structure was not specified because it is accepted that these will encompass both the Officer and Other Rank structures. This classification, and qualification, would be for Officer Instructors who have a limited or specific requirement to instruct, for example, Army Lecture Teams. They would hold this classification only for a short period of time, not exceeding six months. Extensions over this period would be possible after requalification or reclassification. Instructional courses for this category of instructor would be specifically related only to the limited development of expertise in techniques needed to perform the task. The classification would lapse immediately on completion of the task and would have no bearing on future postings to instructional positions.

The next proposal will, no doubt, be regarded as highly contentious for it is suggested that the rank level of instructors should not extend below that of Corporal with two years in that rank, nor should it extend below the rank of Lieutenant. The minimum experiential level for Lieutenant should be graduation plus two years.

There are two main reasons for this proposal. First, members of a military organisation need to be experienced members before they can impart knowledge about, or fully understand, the traditions and procedures of that organisation. The task of instruction requires a mature mind and should not be entrusted to the immature. This may sound somewhat pretentious, but the maturity referred to is not that of physical and mental development, but rather that of experienced military development. Second, by establishing entry ranks at these levels, time is provided to establish whether potential instructors have the necessary aptitudes, and motivational chains can be established by using less experienced personnel in assistant or trainee roles. Where rank, or experience levels below those suggested, are currently employed on instructional duties, they can be phased out through normal re-postings and promotions. This is not really
a change of policy, but upgrading. Currently, private soldiers generally do not instruct because they lack qualifications and experience. It is contended here that the necessary experience is not attained until after longer periods of service.

How can such changes be implemented? The simple answer to this question is that, with relatively little effort, this scheme could be operating efficiently within twelve months. What is initially required is an expanded organisation of both Training Systems and Army MIT, to be co-located with a trainee establishment already in situ near one of the major capital cities. This organisation would be responsible for the presentation of modern comprehensive courses in all types and levels of military instruction, and research and development of skills and techniques required to upgrade and maintain professional standards.

The obvious location for such an organisation is at Balcombe.* The major deterrent to establishment at Balcombe is the World War II accommodation still in use. These inadequate and inappropriate buildings would have to be used until proper facilities were built. However, favourable factors include:

- An existing training facility with long term access to untrained soldiers. These trainees could be used for limited instructor-development periods, thus gaining a more realistic assessment of instructor potential.
- A range of skills is currently taught to trainees which includes educational, regimental and trade subject matter; instructor courses could be tailored to run concurrently with various phases of apprentice training, and make full use of this subject matter training.
- There are facilities for indoor and outdoor lessons, with close training areas suitable for lessons in subject matter areas such as fieldcraft and minor tactics.
- There is room for expansion and rebuilding.
- Sufficient facilities exist for the administration and maintenance of additional staff and students, and
- Balcombe is situated near a major industrial and educational centre — Melbourne. This would allow easy access for interchange of research in new techniques.

In establishing such an instructional organisation, there would be administrative difficulties to overcome. These include accommodation for families of the staff of this new organisation, the identification of the initial instructional staff, and the identification and classification of currently employed instructors who already hold the necessary pre-requisite qualities and qualifications. None of these difficulties is insuperable — the latter could be overcome by assuming that no current instructor has the prerequisite qualifications; that all instructors need some form of retraining to fit them for reclassification, and phase in the new classifications over a period of two or three years. With the identification of the initial instructional staff however, it is essential that only the best available instructors are chosen. Instructors here must optimise instructional perfection, and must have the facilities and support which will allow them to continue to do so — posting as an instructor to this organisation should be regarded as the pinnacle of the profession.

These proposals would not be complete without some considerations towards a career planning structure. At both the NCO and Officer levels, the identification of instructor potential would come from qualifying courses attended as a junior rank. Potential instructors would come from the top 10% of students attending qualifying or pre-graduation training. They must demonstrate a keenness and empathy for instructional duties, and volunteer for this type of career. After assessment of subject matter expertise, and psychological suitability, the potential instructor would attend a course tailored to suit his instructional classification. After successful completion of this course he would be posted to the instructional cadre of a unit or school, where he would undergo a probation period (one month), as an assistant instructor under the guidance of an experienced unit instructor. This probation period would not be a testing period but an orientation and adjustment period where the instructor would learn to fit into the instructional situation prevailing in his new posting. On further postings this period would be set at two weeks. Full instructor status would automatically be attained at the end of the probation period.

* Army Apprentice School, Victoria.
During his periods of service as an instructor, each member would be required to attend in-service courses as necessary, and an advanced/refresher course in instructional techniques after no greater period than three years. Failure to attend the advanced/refresher course within the three year period would result in an automatic loss of status.

The career of an NCO would be only slightly different from that of an officer. Through the ranks of Cpl to WO1, the NCO may remain as an Instructor, and accept no regimental appointments. In times of war his responsibilities would remain with the training of replacements. Alternatively he may qualify for instructor status and follow a regimental career where he would have a limited involvement in instructional duties. Because of this limitation he would be required to requalify every two years in order to maintain status. Where no instructional duties are carried out in any twelve month period, his instructor status would lapse and he would have to requalify. Instructors following this career pattern would be required to instruct at unit level, but would not pre-empt the rights of platoon level NCOs carrying out administrative roles using instructional techniques. These platoon level NCOs would also be made aware that the task of “instruction” within the unit would be the responsibility of the various trained instructors. Ideally all unit NCOs should receive this specialist training but where this does not happen COs would be required to organise training in relation to numbers, and availability, of qualified personnel.

An officer’s instructional career potential should not go beyond the rank of Lieutenant Colonel. Because of the vagaries of an officer’s career structure it is recognised that he may not serve continuously in an instructional posting. However, the three year limit before attending an advanced/refresher course would apply, as would the twelve month absence from instructional duties also require attendance at a refresher course, before reattainment of instructor status.

Ranks of the Military Instructor (Officer/Special Requirement) are not significant. As indicated previously Officers in this classification would be trained only for specific instructional duties, they would lose the classification at the completion of those duties, and would face the same constraints as instructors in other classifications where the specific task becomes an extended one. In addition they would have to be retrained to a different classification where the task was extended for six months. Except where an officer has been retrained, the instructor status would be lost immediately the task was completed, and after a further period of six months had elapsed then another period of training would be required if it was necessary to regain the status.

This then is “the case” for the Army Instructor. As has already been suggested, this is not the only solution. It is, however, an attempt to force people to recognise that a problem exists, and to put forward proposals designed to overcome the problem. Implementation of these proposals would bring about a realistic upgrading of instructional standard throughout the whole Army. CO/CIs will find that they have been relieved of the self-imposed task of improving the qualities of their instructional staff through intra-unit courses — with all the inherent dangers of differing standards and attitudes that this implies. The establishment of Army Instructors will overcome the differing levels of instruction within, and between, Army schools. Another expectation is that the Australian Army will start to regain its place in the forefront of industrial training and provide further career openings for soldiers in civilian life.

Soldiers, who appreciate the complexities of instruction and who are genuinely interested in improving their own skills and those of their students, will once again develop the spirit of innovation and inquiry that is essential if the Army is to keep pace with the technological advances occurring in the field of instruction. The field of audiovisual instruction has great potential in relation to military training. The development of auto-instructional materials, properly prepared, can complement instructional skills. But where are the instructors trained, and prepared, to develop these ideas? The Army Instructor is dying — but he can be revived! Implementation of these proposals will not only rejuvenate him, but will also ensure that the training of the Military Defence Force is comprehensive, exact, and pertinent.
TWENTY ONE YEARS IN THE MIDDLE EAST

Major Ian Hawke
Australian Army Reserve

Introduction

Many Australian soldiers served in the Middle East during the two World Wars. The numbers were much greater during the First World War, reaching 77,000 in the theatre in January 1916. After then the numbers dropped quickly as units were transferred to France but from October 1916 to January 1919 there were still between 15,000 and 18,000 Australian servicemen in Palestine. It was here that the Australian Light Horse Regiments served so gallantly and took a prominent part in the last great cavalry action, Allenby's grand sweep from Gaza to Damascus. Many battle honours were awarded to units for their efforts: Romani, Gaza, Beersheba, the capture of Jerusalem and of Damascus — and these names are remembered. Nearly 1,400 died and are buried in handsome war cemeteries in Kantara, Gaza, Beersheba, Jerusalem, Lydda, Damascus and elsewhere. The Syrian Campaign of the Second World War was much shorter, only five weeks. Even so the battle casualties were 2,840. The majority of the Australians who were in Palestine during the Second World War saw it as a vast training and holding area which accommodated large concentrations of troops.

For these reasons Australian ex-servicemen, and the community generally, remember the Middle East. The soldiers are also remembered, and fondly, by the people who live in the area. Both Arabs and Israelis talk of the big men on the big horses or the men in the big hats. For two armies to leave such a favourable impression must be quite remarkable.

What is not nearly so well known is that Australian Army officers have been serving in the Middle East continuously since 1956, as part of the United Nations peacekeeping effort.

Benefits of UN Service

The main benefit is the close association with officers of many other nationalities. Seventeen countries currently provide observers (see Table 1) and there is also a variety of services involved. In the interests of impartiality, UNMOs of different nationalities are deployed in pairs and normally with a different partner on each duty. While on duty observers live in very close proximity and the tendency is to "talk shop" and so one's experience is widened. These benefits may be difficult to measure but nevertheless are considerable.

The personal benefits are many. Duty rosters vary but there is normally a reasonable amount of free time. To live in two of the world's oldest cities is an experience and education in itself. UNMOs have considerable privileges and can travel about the area more freely than most. And then there is the UNTSO medal.

The real benefit for the Australian Army, as a whole, is the accumulation of expertise and experience in peacekeeping operations. This could be especially useful as Australia has offered to provide contingents of UN
peacekeeping missions on several occasions and this must be considered as a possible task for units of the Australian Army. If this were to eventuate, then the experience of UNMOs both from the Middle East and India-Pakistan, would be very valuable, especially in the initial stages.

United Nations Involvement

The United Nations has a special interest in the Middle East. The state of Israel has been called the child of the United Nations and was proclaimed when the British Mandate expired. This mandate was originally granted by the League of Nations and was continued up to 14 May 1948. There have been major wars in the area and the intervening periods have been more like a pause than a peace. The verbal exchanges in the United Nations have been equally long and bitter. The conflict has probably involved the United Nations more than any other due to both the duration and complexity of the dispute. There have been many United Nations bodies set up to assist in the search for peace in the area. The following are currently active:

- The United Nations Truce Supervision Organisation (UNTSO) is a peace-keeping instrument consisting of military observers which operate under the authority of the Security Council and the Secretary General. UNTSO has the longest history (27 years) among all peace-keeping bodies set up by the United Nations and it is unique in that its activities are spread over the territory of five Member States (Egypt, Israel, Jordan, Lebanon and Syria). This is the body for which Australia has provided military officers, mainly Captains and Majors.

- United Nations Emergency Force (UNEF). There have been two of these. The first was established in 1956 but was withdrawn in 1967. The second UNEF was formed in 1973 and still provides a buffer between the Egyptian and Israeli armies to ensure compliance with the United Nations Ceasefire. There are now four Australian utility helicopters and their crews attached to UNEF.

- United Nations Disengagement Observer Force, (UNDOF), established in 1974 with characteristics of both UNTSO and UNEF. This force separates the Syrian and Israeli armies on the Golan Heights.

History of UNTSO

UNTSO was originally set up to assist in the maintenance of the truce ordered by the Security Council in May 1948. In August 1949, it was mandated to assist the parties to the 1949 Armistice Agreements between Egypt, Jordan, Lebanon and Syria on the one hand and Israel on the other in the supervision of the application of those Agreements. Some sixty-three observers arrived in the area between 11 and 14 June 1948. These observers were supplied by those countries which were members of the Truce Commission, namely Belgium, France and the United States. Australia first provided officers in July 1956 when the United Nations requested additional observers to man observation posts along the Demarcation Line in the Gaza Strip. The first four officers selected were:

Major A. A. C. Carter, DSO, Retired List, Southern Command
Major J. D. Correll, Sydney University Regiment, Eastern Command
Captain H. J. Symonds, Headquarters, Southern Command
Captain B. W. Latt, 10th Infantry Battalion, Central Command

Following the June 1967 war and pursuant to Security Council resolutions of June 1967, United Nations Military Observers (UNMOs) were deployed along the Israeli and Syrian Forward Defended Localities in the Golan Heights and on each side of the Suez Canal. At this time the Australian contingent was increased to six, its present level.
In April 1972, under a Security Council consensus, UNTSO observation operations were extended to southern Lebanon and were further increased in November 1972.

Following the hostilities of October 1973, UNMOs deployed in the Egypt-Israel sector co-operated with UNEF in its tasks; i.e. marking of the lines of the zone of disengagement, periodic inspections of the limited armaments and forces areas and search for bodies of soldiers killed during the October hostilities. More recently, following the implementation of the second disengagement agreement between Egypt and Israel in 1975, UNMOs have been more actively involved in assisting UNEF in its operations.

With the establishment in June 1974 of UNDOF in the Golan Heights, 90 UNMOs were assigned to UNDOF. These UNMOs have been carrying out specialized tasks such as periodic inspections of the limited armaments and forces area, manning of observation posts located in and close to the area of separation, carrying out special patrols and serving in staff positions.

UNTSO continues its observation operations in southern Lebanon and maintains field stations and liaison offices in Amman, Ismailia, Rabah, Cairo, Damascus, Gaza and Tiberias.

**Operation of UNTSO**

In some ways the organisation is similar to that of a brigade group. The UNMOs report to their local headquarters. The main headquarters, for operational and administrative matters, is located at Government House in Jerusalem. Government House is a large, handsome, stone building built as the official residence of the British High Commissioner during the British Mandate. It is set in attractive grounds and commands one of the best views of the old city of Jerusalem — the site is superb but it is amusing to think that the spot has been known as the Hill of Evil Counsel since Biblical times. From the Operations Room in Government House the situation along the ceasefire lines is monitored and the reports for United Nations Headquarters in New York are prepared.

One way to describe UNTSO's various tasks in recent years would be to outline the duties of the Australian UNMOs during and after the most recent war in October 1973, as typical examples. When the war started at two pm on 6 October there were two Australian UNMOs on observation post duty on the Golan Heights. All UNMOs stayed at their posts which had proper bunkers with radios and other facilities as well as being marked with lots of white paint, UN flags and signs. Hence they were in an excellent position to observe and report as the battle swept past them, and so provide accurate, impartial and current information on the progress of the war. UNMOs along the Suez Canal were removed by the Egyptian Army in the first day or so. During the three weeks of the war there were Australians at Government House, as well as the local headquarters in Tiberias, Damascus and Cairo. Their responsibilities included compiling reports for New York based on the messages from observation posts, maintaining accurate records of the location of all UNMOs (still on post, evacuated, en route back to station, etc.) arranging the evacuation of posts including local cease fire agreements, and arranging for the evacuation of UN dependants (including those from some other UN agencies).

**COUNTRIES WHICH HAVE PROVIDED MILITARY PERSONNEL FOR THE CURRENT UN PEACEKEEPING OPERATIONS IN THE MIDDLE EAST**

- Argentina: UNTSO (8)
- Australia: UNTSO (6)
- Austria: UNTSO (12) UNEF UNDOF
- Belgium: UNTSO (7)
- Canada: UNTSO (20) UNEF UNDOF
- Chile: UNTSO (4)
- Denmark: UNTSO (12)
- Finland: UNTSO (35) UNEF
- France: UNTSO (25)
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After the ceasefire of 24 October there was a considerable redeployment of all UNMOs. There were two Australians in Cairo to provide some of the initial staff of UNEF, another was patrolling the Israeli salient in Egypt to plot the FDLs, and to investigate and report any incidents. Two others were performing similar tasks on the Golan Heights in Syria, and one was in the Damascus headquarters.

After the Egyptian-Israeli disengagement there was an Australian involved in the inspection of the limited forces zone and the search for bodies of soldiers killed during the October hostilities. During the early months of 1974 there were increasingly serious clashes on the Golan. Mortar, rocket, tank and artillery duels became routine, these were duly reported by the UNMOs (including two Australians) manning the patrol bases which were quickly established along the ceasefire lines.

The current deployment of the Australian observers is:

- One in UNTSO HQ Jerusalem
- One in Lebanon
- Two in Tiberias, Israel
- Two in Damascus, Syria

The reports of UNMOs provide independent and impartial information to the Security Council and Secretary General. Also the presence of UNMOs in the front areas can be helpful in preserving the cease-fire in ways other than reporting. The mere fact of their watchful presence can be something of a deterrent to military activity, and in dealing with the parties concerned, they can use their influence to defuse dangerous situations. It is difficult to assess the effectiveness of this presence but it is nevertheless a restraint.

THE DIGGER’S LETTER TO HIS WIFE

Dear Liz — Last night I was shickered;
To-day I’m as crook as can be.
I’ve finished with pots — I’ll have no more spots,
No plonk and no grog — just tea.

You know my old cobber, Curley.
We’ve quarrelled, I’m sorry to say.
I shouted last night at the canteen
And found that I hadn’t a trey.*

I think, as I gaze at your photo,
There’s no other sheila so cute,
You’re Phar Lap and Bradman all wrapped up in one,
You trimmer, you’re bonzer, you’re beaut.

I’m coming on leave in a fortnight;
I can’t wait till I’ll be on my way.
With the game by the throat I’ll leap in the boat.
My oath! Will that be the day?

My love to the sheep in the paddock.
My love to your old mother, too.
Your uncle — poor cow — is he better?
Good on you! Yours ever, Blue.

—J. H. TAYLOR


* Silver threepenny piece.
During the recent conscription era, various articles examined the value of a volunteer force versus a mixed volunteer-conscripted force. Without passing a judgement of any political decision it is proposed to examine some of the arguments. It is believed that no matter what decisions are made on the size of the army, the supply of soldiers will still obey the normal economic laws of supply and demand.

The basis of most arguments was that an all-volunteer army would make more effective use of manpower. The reasoning is that if cheap labour is obtained through conscription, the managers of that manpower will substitute manpower for capital because it is cheaper per unit compared with capital. They argued that an all-volunteer army would be smaller and tend towards labour-saving technology in response to the higher cost of labour.

**THE SUPPLY FUNCTION**

In recent years, the supply of manpower to the Australian forces in a conscription setting has been studied by various economists. In America studies by academics with data provided by the US Department of Defence have provided an econometric model which relates enlistments, number of persons eligible to enlist and of relevant age to average first term service pay and average civilian incomes of those eligible to enlist and of the right age. Altman and Fechter developed a supply equation; however, this equation is not applicable to Australia as it has a dependence on the percentage of non-white males in the age group available for enlistment. Further, McGaurr states that the American equations involving relativity of civilian and military wages may not produce conclusive results in an Australian environment due to our effective minimum wage legislation and awards for skill set in the main by national arbitration commissions.

A study of the Australian situation was made by Glen Withers in an article which appeared in the *Economic Record*, September 1972 and a book on conscription which appeared also in 1972. Withers uses the relativity that McGaurr has doubts about and he does obtain a significant co-efficient of the right sign. However, if cognizance was taken of the Australian wage fixing process, a far more satisfactory co-efficient may be obtained.

**SUPPLY DEMAND ANALYSIS**

In the case of the Army, the recruiter is competing with every other purchaser of labour. In this case because there is a large number of employers of which the Army is one, the labour market is perfectly competitive, and thus the normal economic laws of supply
and demand operate. The numbers available at a certain wage level can be ascertained by use of the supply demand curves. There is an equilibrium point at which the numbers supplied will equal the numbers demanded. In the Army's case the demand is fixed by a political decision and is therefore inelastic. The demand curve is a vertical line. The wage rate at the required number of volunteers depends on where the supply curve cuts the demand curve (see figure 1).

If the wage rate of the Army is above the equilibrium there will be more volunteers than there are vacancies on the Army establishment. In figure 2 $W_s$ represents a wage paid in excess of the equilibrium wage $W_m$ while the excess numbers applying to join the Army are represented by $D_2, D_3$. In the Army case where certain selection procedures are carried out and more applications than enlistments are required, a policy of this nature needs to be implemented. It is possible that instead of giving an increased wage, an enlistment bonus or non-pecuniary enticement may be substituted for a wage hike. In the long run it may be cheaper particularly if it is a tax free entitlement. If enticement is given without a tax component the total cost to the Defence vote is less than that of one with a tax component. Even though 45%-55% of a wage rise may go straight to Treasury, the total wage rise is charged against the defence vote, even though half the cost may be a straight transfer between Defence and Trea-

* See figure 2.
a greater use of capital as a substitute for labour.

When conscription is introduced to fill the deficiency the number of conscripts will equal \( C - R \), the number of soldiers which the Army does not obtain through the failure of the market to produce the right numbers at the wrong wage. The government uses the law to provide the numbers that its market operations fail to produce, thus we fail to obtain Pareto\(^7\) optimal allocation of resources (fig. 6).

If the market mechanism fails to supply sufficient volunteers, the argument is put forward that conscription is an implicit tax-in-kind received as insufficiently recompensed labour from servicemen.\(^8\) In the case of the volunteer, the implicit tax is what the economists call “rent”.\(^9\) In figure 5 the loss is equal to \( Wc - Wp \). Our analysis shows that a Pareto optimal situation does not exist. Whilst both these members are suffering a loss, those who are not called up are obtaining a gain because they are not required to pay the full amount required to provide the defence protection they are receiving. The implicit tax enables the general taxpayer to enjoy a lighter tax burden.\(^10\) Withers was unable to establish any relationship between tax saving and conscription voting in his paper “Institutional Choice and the Case of Conscription”.\(^11\) The advantage to each individual taxpayer will vary greatly with his marginal rate of taxation and is therefore hard to estimate.

In view of our analysis, a rational individual will choose to apply for enlistment to the Army if the present value of expected perceived returns from enlistment is greater than promised by his best civilian alternative. An individual whose best civilian alternative is equal to the military wage is indifferent and will tend to remain as he is.

This situation is stated as:

\[
Ym = Yc + dYc
\]

where \( Ym \) is military income, \( Yc \) is best alternative civilian income and \( d \) is the co-efficient of taste. An individual will only move into the Army when:

\[
Ym > Yc + dYc
\]

Those members who enlist at a lower wage than the equilibrium wage, have a large negative co-efficient of taste whilst those who do not wish to enlist have a large and positive co-efficient of taste.

**ELASTICITY OF SUPPLY**

The most important information from our analysis for military planners is the elasticity of supply of manpower to the Army. Elasticity is defined as the number of additional soldiers supplied in response to a given percentage change in the wage level. Samuelson in his book states that the elasticity of supply of any item tends to be greater in the long run when all adjustments in response to higher price have been made.\(^12\) In the short run lags may be too large, for any recognizable response to be noticed. A wage rise for soldiers will not provide an immediate reaction however in the long run, such pay rises may be quite significant.

Elasticity of Supply of Soldiers =

\[
\frac{\text{Percentage Change in Numbers Required}}{\text{Percentage Change in Wage Levels}}
\]

where \( n = \text{members change}, N = \text{total members}, Wm = \text{military wage}, \text{and} \ w_m = \text{change in military wage}. \)

It should be noted that elasticity of supply is not the slope of the supply although at certain points they may be the same. The slope of the curve depends upon absolute changes in numbers and wages where as elasticity is seen to depend upon percentage changes.\(^13\)

It is assumed that the elasticity of demand is perfectly inelastic. This is because the number of soldiers required is reached by decision outside the normal market forces and is a target that must be reached. There is no scope for examining the elasticity of demand as the slope of the curve equals the elasticity of demand. This is a special case.

However if the elasticity of supply of manpower is known and there is a desire to change the manning level in the services we can deduce from a percentage change in number of soldiers the necessary percentage change in wages which must occur, otherwise, we must expect a failure in the normal market mechanism and thus the equilibrium point.
will not be reached. When this occurs alternative means of obtaining manpower must be used.

By knowing the slope of the Army supply curve, it would be known if certain ceilings can be reached from the current service ceiling. Withers in an unpublished work has proved that the United Kingdom cannot reduce the size of its force to the new planned ceiling if her Army is still to maintain the ability to expand quickly to certain manpower levels to fulfil commitments already accepted. It is quite possible from our current service ceilings of 31,000 that the Army may not be able to expand to certain other manpower levels without raising wages dramatically or restoring conscription.

The Withers equations have a significant role for unemployment indicating that enlistments rise with unemployment. Unemployment is at a very high level historically and enlistments have been high recently. This unemployment could well prevail for a lot longer, inducing a high enlistment rate for some time. However in view of Withers unpublished work there may be certain parameters which prevent enlistments in spite of continuing unemployment.

In figure 7 below the cumulative income distribution is graphed. Both McGaurr and Withers make mention of the fact that although military income has been largely attached to civilian awards there has been a lack of recognition of over-award income and other net disadvantages of military life. It is contended that an increase in the military wage will mean a move to the right on the income axis thus providing a larger number of young men in the new region of the distribution and thus an increase in military numbers.

In his book Withers quotes two cases where an increase in the relative military to civilian income ratio leads to quite large increases in the numbers within the Army. Thus there does seem to be some areas where the elasticities of supply are in the Army's favour. In 1958, he quotes an elasticity of supply of one and one third and in 1964 one of one and two elevenths.

Withers in his Economic Record article states that the ratio of applications from a certain population is a function of the military wage and the mean civilian wage and its standard deviation. Using ordinary least squares multiple regression, Withers estimated the following equation:

\[ \ln \frac{A}{P} = a \ln \frac{Yc}{Ym} + b \ln (1 - \frac{I-Pc}{P}) + c \ln (1 - \frac{I-Pu}{P}) + d \log \text{enlistment} + \text{restriction dummy and a constant} \]

\[ a, b, c, \text{ and } d \text{ are co-efficients} \]

\[ A = \text{enlistment applications} \]
\[ P = \text{relevant population} \]
\[ Ym = \text{military income} \]
\[ Yc = \text{civil income} \]
\[ 1-Pc = \text{probability of not being conscripted} \]
\[ 1-Pu = \text{probability of employment} \]

The equation is interesting in that it does establish a relationship between civilian and military income relativities and thus bears out our analysis with the simple demand/supply curves. However some of the other variables in the equation do have some interest for future manpower studies.

The first and most interesting point is that the closer a factor of the equation is to the present time, the larger the standard error seems to be as in the case of the post-1964 conscription and public opinion variables in the equation. The size of the standard error tends to make the effect of these two factors difficult to assess. It is quite possible the large standard error in these two co-efficients may be due to the emotions raised towards the end of the conscription era and roughly about the time that this study was made.

However three other variables do seem to have some effect on wage-cost calculations. These are unemployment, pre-1959 conscription, and the ratio of applications to the relevant population.
tion and the enlistment restrictions which occurred during the period 1959-1962. The effect of unemployment on recruiting is not surprising and its effect would be expected. However the effect of pre-1959 conscription and the enlistment restriction of 1959-1962 is very interesting. It suggests two things for future military manpower studies. The first is that policies of past decades can have long term effects on future recruiting success. These points should be examined before short term manpower policy decisions are made, otherwise future military projections may be difficult to obtain.

Who would have thought that pre-1959 conscription would have affected the Army's supply of volunteers in the late sixties and early seventies as shown in the regression analysis? Further, why should a seemingly wise decision in 1959 to accept only six-year engagements have effect ten years after the implementation of that policy? Both these factors could bear significant information in the manpower study fields if evaluated further.

Secondly, the regression analysis tends to suggest that the further an event is moved from the date of analysis the more significant it is in the determination of wage-cost analysis. It is possible that the first two discussion factors may be given significantly different co-efficients if re-examined now that there is a time lag since the cessation of conscription.

Derivation of elasticity of supply is discussed in the article with a conclusion that an increasing elasticity of supply may exist between the mean civilian income and the mean civilian income plus average over-award payments. In this area there is likely to be an increasing enlistment response to change in military pay. However studies in this field within Australia have been limited; therefore any conclusions reached are only tentative.

The available statistics over the last years tend to suggest that the area of most response for the Army is in the 21,000 to 31,000 numbers range. The evidence seems to suggest that over 31,000, we enter a conscription range at the present accepted military pay levels. The rationale for this is that 31,000 is our largest peace-time Army and in the past to exceed this level, we have had to conscript. Below 19,000 we may be dealing with persons who have large taste co-efficients for military life. Only future research in this subject would prove how close or how far from the truth is this hypothesis.

This article, in its review of the military manpower supply does tend to ask more questions than it answers. Partly this is due to the lack of suitable Australian orientated econometric models on the subject. The assertions of the academics that a volunteer army at any price is cheaper than a conscripted army may be true or false. However, as most interest in this area seems to have waned since the end of conscription, the problem of military manpower supply seems to have lost the interest of many and only with the re-introduction of conscription will interest be quickened in our supply problem. The irony of the situation is that research now could prevent conscription ever being re-introduced. However, like most defence problems, unless the threat is immediate, very little interest is taken in the problem.

NOTES
2 Ibid, p. 15.
3 Ibid, p. 32.
4 Withers, op. cit.
5 Lipsey, op. cit., p. 359.
7 Pareto's view is that resources are not optimally employed if it is possible to make someone better off without making someone else worse off. Singling out labour, labour is not optimally employed in Pareto's sense if any individual is willing to work for the net value of his marginal product and is unable to do so. Tidsell, C. A., The Theory of Economic Allocation, Sydney, John Wiley, 1972, p. 4.
8 Withers, G. A., 'Conscription Necessity and Justice.
9 Ibid.
10 Ibid.
14 Conversation G. A. Withers/author at ANU.
15 D. McGaurr, op. cit., p. 32.
17 Withers, G. A., Economic Record, p. 327.
American, British, Canadian and Australian (ABCA) members of the Quadripartite Working Group on Combat Development have recently published and distributed the ABCA Armies' Operational Concept, 1986-95.

ABCA is the agreement whereby the Armies of the United States of America, Britain, Canada and Australia — with New Zealand as an associate — co-operate where possible to share information, to achieve operational compatibility and to obtain the maximum economy by use of the combined resources and efforts of the four Armies.

The ABCA Armies’ Operational Concept, 1986-95 (Short Title: ABCA 86-95 Concept) is the primary guidance document for the ABCA Programme and this article describes its purpose and particular significance to Australia.

The comparatively small number of material needs of the Australian Army, and the limited industrial and research and development (R&D) capacity existing to support the defence requirement, dictate that Australia must obtain much of its defence needs from overseas. Due to Australia’s strategic isolation, it is very important that we have ready access to information concerning military trends and equipment development available in the other countries.

After graduating from RMC Duntroon in 1966, Major Koek attended the University of Sydney where he gained an honours degree in Civil Engineering. He served with 17 Construction Sqn in Vietnam and ANZUK Support Group in Singapore before attending the Royal Military College of Science at Shrivenham (UK). On his return to Australia he was posted to the Directorate of Combat Development, Operations Branch, at Army Office in Canberra. Major Koek was involved with the preparation and publishing of the ABCA 86-95 Concept and was a member of the Australian delegation at the recent meeting of QWG/CD at Canungra.

Through the ABCA Programme not only are the latest trends and concepts made available, but loans of equipment, in some cases still under development, are provided at no cost to Australia. The arrangement provides an ideal means for promoting cost effective expenditure in the equipment acquisition field and in this way Australia and New Zealand are able to overcome to some extent the effects of their isolation from the main Western R&D centres.

The ABCA Programme

At the working level of the ABCA Programme are the Quadripartite Working Groups (QWGs), each of which covers a functional area such as Armour, Infantry, Command and Control, Air Defence and Combat Development. The QWGs work mainly by correspondence, but meet at intervals of about 18 months in each country in turn to develop quadripartite thought and ideas which could influence national R&D programmes, to exchange information on current and future equipment and tactics, to originate Quadripartite Standardisation Agreements (QSTAGs) and to identify areas which could lead to closer co-operation between Armies.

The Quadripartite Working Group on Combat Development (QWG/CD) is charged with providing guidance to the four Armies and the other QWGs by developing Operational Concepts set in future time frames. The concepts identify ABCA agreed long term objectives which form the basis for the development of common national material and non-material objectives and requirements. To this end QWG/CD has produced the ABCA 86-95 Concept.

The importance of the publication to Australia is that Australian Army ideas and needs are incorporated at the initial stage of development, and accordingly equipment developed by the ABC countries is more likely to meet...
our needs. This is probably the only way Australia can influence equipment being developed overseas, and as such the arrangement must be of great significance.

ABCA 86-95 Concept

The ABCA 86-95 Concept, has as its aim "... to provide a guide for research into and development of tactics, equipment and logistics for the ABCA Armies in all likely operational areas in the period 1986-95." It replaced the previous Concept, the ABCA 1981-90 Concept, in January 1976 and it is to be amended annually to take account of significant events affecting the Concept until it is replaced in January 1981.

The ABCA 86-95 Concept provides the framework on which Armies can base their national objectives/requirements in order that they be aligned at the conceptual stage of development. The publication is, however, only a guide to Armies; it cannot be a directive as national policies and economic considerations will influence the extent to which each Army can make use of it.

The ABCA 86-95 Concept has been printed on this occasion by Australia and it comprises two volumes, the first volume containing an introductory chapter and three sections (see Figure 1).

Section I addresses the factors influencing the concepts of operations such as the Strategic Appraisal, the Impact of Science and Technology and the Threat Assessment, leading to a discussion on the Factors Shaping the 1986-95 ABCA Armies. These chapters are really long range forecasts which have been prepared in consultation with experts in each of the three areas. Each assessment concludes with a forecast of the likely impact on future concepts of operations.

Section II contains the four Concepts of Operations — described as High Intensity Conflict (or General War), Mid Intensity Conflict (Limited War), Low Intensity Conflict — Type A (Counter Insurgency) and Low Intensity Conflict — Type B (International Peacekeeping). The concepts of operations are projected into the long term and take account of related social, political and economic factors, as well as the likely impact of scientific advances and projected threat assessments. From this exercise the authors of the concepts attempt to derive the necessary capabilities, both material (equipment) and non-material (e.g., procedures) for the Armies to be effective in the future. Although attempting to project concepts into the long-term — 10 to 20 years ahead — is fraught with difficulty and uncertainty, and the techniques to achieve this have still to be fully developed, it is possible to derive certain capabilities in broad outline. These capabilities arranged in functional groups such as armour, anti-armour, air defence etc, form the basis for expressing the Quadripartite Objectives (QOs), which comprise the important Section III of the ABCA 86-95 Concept.

The QOs are in essence statements of the desired military capabilities assessed as fundamental to both the ABCA 86-95 Concept and to the ability of the four Armies to operate together. While in no way operational instructions or directive, they have been formulated to provide guidance to those concerned with standardization, concept studies and national R&D. By incorporating the future needs of all four member Armies at the conceptual stage of development it is possible to achieve savings through co-operative R&D, potentially greater sales and reduced unit cost.

Volume II of the publication is entitled, “Associated Studies” and it contains three specific studies, “The Strategic Appraisal for 1986-95”, “The Impact of Science and Technology, 1986-95” and “The Threat Assessment, 1986-95”. These studies were undertaken to support the relevant chapter in Section I of Volume I and were carried out by a variety of agencies, academic as well as military. Due to its detailed content, Volume II has been issued on a more limited basis than Volume I. Volume I has been distributed to Army schools and Commands and widely within Army Office and the Defence Central Office in Canberra. Navy and Air Office were also included in the distribution to provide an idea to the other Services of the Armies' future thinking particularly as to the future requirements of ground forces for support from the other Services.

QWG Concept Papers

Having described the capabilities required by the four Armies, in the form of QOs, the other working groups (QWGs) transform the
ABCA ARMIES' OPERATIONAL CONCEPT 1986-95

VOLUME I

Ch 1
Introduction

Section I

Ch 2 *
Strategic Appraisal

Ch 3 *
Impact of Science and Technology

Ch 4 *
Threat Assessment

Ch 5
Factors Shaping the 1986-95 ABCA Armies

Section 2

Ch 6
High Intensity Conflict

Ch 7
Mid Intensity Conflict

Ch 8
Low Intensity Conflict - Type A

Ch 9
Low Intensity Conflict - Type B

Section 3

Ch 10
Quadripartite Objectives

* Supported by Study in Volume II

Figure 1
broad objectives into more detailed Quadripartite concept papers, thereby refining and clarifying both the non-materiel as well as the materiel requirements. The QWG concept papers based on the QOs are then used as a basis for initiating or influencing national requirement documents, R&D, or, in some cases, formulating Quadripartite Standardization Agreements (QSTAGs).

Australian Army Development Cycle

The Army materiel development cycle is aligned at all stages with the ABCA standardization process, thereby enhancing the possibility of achieving common objectives/requirements with the other Armies thus leading to co-operation and economy in the R&D field. Also, long term Army concepts for the defence of Australia and Australian interests are being based where appropriate on the ABCA 86-95 Concept. As Australian requirements are incorporated into the R&D guidance for our ABCA partners, there is a strong possibility of fulfilling some if not most of our requirements from these sources so long as the development cycles remain compatible.

Limitations

Although the ABCA 86-95 Concept provides a very useful basis document to guide the work of the other QWGs and national development programmes, it does however possess some limitations. The continuity between the sections is not entirely successful largely due to the difficulties of international, as well as national, staffling and with infrequent meetings of QWG/CD. One result has been an inadequate coverage of urban warfare. In other respects the ABCA 86-95 Concept provides effective guidance and it is hoped that its limitations will largely be overcome when the next ABCA Concept, to cover the period up to the year 2000, is issued by QWG/CD in 1981. As the techniques for forward projection are developed and improved, it can be expected that the successors to the current ABCA Concept will also improve.

Conclusion

With the increasing costs of military equipments and decreasing defence budgets, it is imperative that the ABCA countries achieve the most from the resources devoted to Defence. The ABCA 86-95 Concept provides a dynamic guide to the four Armies for their national research and development efforts. It is of special importance to Australia as it allows Australia to influence the R&D programmes of the other Armies as well as providing guidance for the development of national concepts of operations. Through its wide distribution it is available to all major military establishments throughout Australia and because of its importance nationally as well as internationally it forms prescribed reading for Army Officers who are serious about their profession. Those without access to the ABCA 86-95 Concept, or requiring further information on ABCA long term planning should contact the Directorate of Combat Development, Army Office, Canberra.

...
Service Recruiting
In The Northern Territory

Capt. R. Stevenson ED, BA, BEd, MED, MAPsS, MACE, AA Psych Corps

MOST Australians have never been to the Northern Territory. Ask someone to tell you something about the Territory and the disjointed phrases which are likely to emerge include Darwin, the Top End, Alice Springs, Ayers Rock, the Flying Doctor and the Outback. Pressed for details, most will mention that Darwin was virtually destroyed by Cyclone Tracy on Christmas Day, 1974. The older generation may recall the series of Japanese air raids on Darwin beginning on 19 February 1942, but to most of us the Northern Territory remains as remote as Siberia. The comparison is not as extreme as at first glance.

The Northern Territory encompasses an area slightly larger than the combined land masses of Great Britain, Northern Ireland, France, West Germany and Italy. While these European nations contain a population of over 221 million inhabitants, the Northern Territory holds a mere 87,000 people, of whom about 22,000 identify themselves as Aborigines. The largest Territory centre is Darwin, population approximately 45,000, smaller than many State provincial cities such as Townsville, Ballarat or Bendigo and only slightly larger than Broken Hill, Wagga or Albury. There is no major secondary industry in Darwin, the largest single employer being the Commonwealth Public Service.

Darwin is drenched by 1524mm of rain between November and April, but for the rest of the year the weather is dry and the skies are cloudless. Daytime temperature varies little from a constant 32°C, throughout the year but the humidity rises sharply during the Wet to evoke images of a steamy Somerset Maugham tropical town. By contrast, at the other end of the Territory, 1,600km from Darwin, the town of Alice Springs, population 12,000, is surrounded by desert and its hot days are tempered by cold nights (down to -4°C in July) which provides a shock for the uninitiated.

The only other sizeable settlements in the Territory, each with populations less than 3,500 are Katherine, Tennant Creek and Nhulunbuy. This latter town relies entirely for its existence on the rich bauxite deposits on the Gove peninsula. Isolated from the rest of the Territory except by air, the track out being generally impassable even to four wheel drive vehicles, it has developed a very community-minded spirit among its people. Katherine and Tennant Creek, linked with Darwin and Alice Springs by the sealed Stuart Highway, are currently suffering from depressed conditions in the pastoral and copper mining industries respectively.

The tyranny of distance is compounded by the unreliability of communications. The Stuart Highway is cut each Wet south of Katherine for weeks at a time by floodwater up to four metres deep. The railway line, originally planned to link Darwin with the Central Australian Line when it was commenced in 1885, was never completed further south than Birdum, leaving a gap of 990km to Alice Springs. Traffic on this line has been suspended since July, 1976 as it is currently not an economic proposition, especially since the closure of the iron ore mine at Francis Creek.

The actual physical isolation of the Territory has been reinforced by feelings of economic, social and psychological isolation. Unemployment is high, the short term economic and development prospects are not bright and
The only post-secondary education institution in the Territory is the Darwin Community College, a multi-level, multi-purpose establishment which attempts to offer some of the services normally provided by an evening college, a technical college, an institute of technology, a college of advanced education and a university. Naturally there are limitations on the range of courses which can be offered — for example, in the tertiary field courses are at present restricted to the areas of teacher education and business management.

The population of Darwin can best be described as transient. A large segment of the population is not Darwin born nor does it intend to remain in Darwin. Many public servants serve two or three years in Darwin then return south again, a stint in Darwin being seen as a stepping stone to other more popular career postings. Migrants and refugees have settled in Darwin as a result of troubles in their homeland, e.g., Greeks, Timorese, although some of these ethnic groups such as the Chinese are long established. There is a large turnover among teachers of the Commonwealth Teaching Service, Canberra being the favourite destination of many. Darwin serves as a base for the Navy, Army and Air Force and few of their personnel stay longer than two years. Darwin is also perceived by some tradesmen, construction workers and businessmen as a place to make a "quick quid" before returning south. This, then, is the social and physical setting for the major Territory centres and these considerations need to be borne in mind when we look at the factors influencing recruiting for all three Services.

There are no full-time recruiting officers in the Northern Territory and all recruiting administration is centred on Darwin. Recruiting is part of the staff duties of other personnel; for example, the Secretary to the Naval Officer Commanding Northern Australia acts as Recruiting Staff Officer and the RSM of the District Support Unit acts as the ARA recruiting officer. For supporting medical and psychological services, the RAAF has its own medical psychologist, a Territorian.* There has thus been continuity and reliability of service and the demands on his time have increased considerably as RAAF personnel become aware of the role of a consultant psychologist.

The RAN and ARA have now established common test facilities, recruiting and interview rooms. They also share a RAN medical officer and an A Res psychology officer. Prior to Cyclone Tracy, psychological services were provided to the RAN and ARA by flying personnel to Darwin from Adelaide or Brisbane to test and interview batches of applicants collected over a period of months. This procedure was not particularly satisfactory; as well as the ever increasing costs involved in such an operation, the stockpiling of applicants to create a viable test group meant that some applicants felt the delay was unreasonable and did not proceed with their applications. Not only were potential recruits lost, but the image of the Services was little enhanced by such administrative delays. While these may have been inevitable, the reasons for them were not readily appreciated by civilian applicants, who naively expect to be able to enlist on the spot.

Recruiting forms the major demand on psychological support services but increasingly psychologists are being called upon to do more internal duties such as assessment procedures for RAAF and Army pilots, foreign language aptitude testing for RAN and ARA and change of branch interviews for RAN. Because there are fewer psychologists in Darwin now than there were prior to Cyclone Tracy, other government departments and agencies are also requesting increased assistance from those who are here.

Potential recruits from outside Darwin must be flown in and accommodated for psychological testing, medical check and recruiting interviews, or if numbers warrant it, as happens at Nhulunbuy, the Services must go to the recruits. Alice Springs, being almost equidistant from Darwin and Adelaide, has its recruits processed by the Defence Forces Recruiting Centre, Adelaide.

Applicants for the Services are overwhelm-

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* In local folklore, a Territorian is one who has been born in the Northern Territory or has lived in it for a minimum of twenty years.
ingly young males who have recently left school or are considering doing so. The greatest interest is shown in apprentice entry, mainly for RAN and RAAF, and this is understandable. Few employers are taking on apprentices in the present economic climate and there is, of course, a finite number of apprentices who can be placed anyway; with 869 apprentices in the Territory in 1976, the limit is probably close to being reached. Australia wide figures suggest that 40% of the unemployed are under 20 years of age, so there are fewer job vacancies for school leavers than usual. Many youths see the Services as a means of gaining a recognised and worthwhile trade qualification. This is particularly the case in Nhulunbuy, where there are almost no job opportunities for school leavers, and those who wish to pursue technical studies would need to come to Darwin anyway, to attend the Community College. Young people in Nhulunbuy come from families in which the father is an engineer, technician, tradesman or skilled worker associated with the mining industry and so there is an awareness of and disposition towards the importance of gaining a trade qualification.

Two other factors may precipitate the leaving of school reasonably early to seek employment. Transfer from primary to secondary school occurs at the beginning of Year 8, not Year 7 as in New South Wales, Victoria and Tasmania, and there is no award of a school certificate at the junior secondary level, the matriculation examination at the end of Year 12 being the only formal assessment leading to a recognised award. Matriculation is perceived by pupils and parents as being of value only to those who wish to follow tertiary studies at a university or college of advanced education. Even in the services, full matriculation is only demanded of those who seek entry to Royal Military College, Duntroon, RAAF Academy, Point Cook and RAN College, Jervis Bay.

Among all grades of school leavers in the Territory there seems to be a desire to head south to study, to work or just to see the world. This may be a case of "the grass in the other paddock is greener", or it may be a realistic appreciation. It has already been pointed out that those who wish to pursue post-secondary studies must come to Darwin to do so, with the result that many young people feel that if they must leave home for studies or career then why not head towards the bright lights and imagined delights of a southern capital city? Compare the drift to the city by school leavers in country towns and the analogy holds good, for in many ways Darwin fits the social pattern of a country town. There is an attitude prevailing that the Services are a means of getting away from the Territory. This is particularly the case with young male ARA enlistees and RAN junior recruits, but applies also to girls who see WRANS or WRAAC enlistment as a more glamorous career than the low status occupations generally relegated to women unconsciously, or otherwise, by an overwhelmingly male oriented Territory society. It is an observable fact that the least attractive traits of pseudo-ockerism (prejudice, intolerance, belligerence and beer gut) are unfortunately alive and well in some segments of the community, despite the work of men and women who would see it otherwise.

Whether the desire to escape the Territory for the imagined alternatives of elsewhere via the Services is a legitimate reason for enlisting or not, the fact remains that it does motivate young people to apply. Their perception of the Services may be unrealistic, as they fantasize themselves in the exciting life depicted by such a well produced television series as "Warship", and sometimes, unintentionally, our recruiting advertisements and literature may give a false picture to immature minds. It is the job of the recruiting officer to present the Services realistically and in the Territory, as elsewhere, this is done through attendance at high school career nights, and the prompt and courteous answering of personal, written and telephone enquiries. It does no good to the image of the Services or to the young person himself to encourage him to apply for apprentice training if he has, for example, a weakness in Mathematics. Without wishing to enter into the current debate on the literacy and numeracy of Australian children, it would, however, be wise for recruiting officers to look closely at school reports in the light of the demise of external examinations, the replacement of formal and written terminal assessment by progressive, often intuitive assessment,
the progression through secondary grades as a result of age rather than academic attainment, and the growing suspicion that one can no longer assume competence in the basic skills by the end of compulsory schooling.

Recruiting involves realistic counselling of applicants and, if necessary, parents and school principals; it is not a numbers game. Fortunately, this is realised by experienced recruiting officers and in the Territory, although the reasons which motivate young people to seek enlistment are understood and accepted as legitimate for them, every opportunity is taken to advise and guide the applicants and to ensure that the aspirations of potential recruits are in keeping with their aptitudes and interests.

While recruitment does occur in other categories such as RAANC (male and female), OCS and corps enlistment, the overwhelming number of applicants are 18 years of age or under. Despite the lessened support by successive governments of the Australian Cadet Corps and the numerically smaller but related Air Training Corps and Naval Reserve Cadets and the alleged disdain of youth for the profession of arms, it seems that the Services are still perceived by many young people and their families as a worthwhile career.

THE INFLUENCE OF LAW ON SEA POWER by D. P. O’Connell, Manchester University Press, 1975.

Reviewed by Captain I. W. Knox, RAN, S/P Division, Department of Defence

WAR, in the Clausewitzian sense of unrestrained conflict in pursuit of purely national aims, must now be seen as a remote prospect. However, since 1945, there have been more than one hundred instances of resort to coercive sea power, involving about fifty navies with the use of limited force on many occasions and a tendency to progress to higher modes of weaponry, including the use of surface to surface missiles.

In an era of local conflict and naval diplomacy rather than full-scale war at sea, a premium is put on politically mature and sensitive naval officers steeped in the law and politics of the sea, governmental policy and international relations. International law is thus having an ever increasing effect on those who use the world’s oceans, and yet our awareness of the potential influence of international law on sea power is generally lacking. The “Influence of Law on Sea Power” is a great aid in understanding this potential and its inherent problems.

D. P. O’Connell, Chichele Professor of Public International Law at the University of Oxford, as an historian, international lawyer and Commander RNR, is uniquely qualified to clarify the complex ramifications of law in the exercise of sea power. Using an historical perspective he cites examples from World War I, the Spanish Civil War, World War II and almost every instance of hostilities at sea since 1945 to show how international law affected, and in many instances even decided, tactical operations and strategies of nations. His analysis deals with the law and the theory of graduated force, the relationship between self-defence and weapon capability, legal restraints on weapon systems, the rules of engagement and the different aspects of self-defence operations on: the high seas, the territorial sea, the seabed and the rights of neutrals.

One wonders how much our naval equipment procurement policy is influenced by considera-
tions of international law, yet Professor O'Connell devotes one chapter to discussing the suitability of different naval units and weapon systems for law-based sea power.

As a seaman officer I found the book easy to read, interesting and a most valuable background for my profession.

Because of the implications of the currently rapidly changing international maritime legal situation which is being brought about by negotiations in the Third United Nations Conference on the Law of the Sea and by unilateral actions of States claiming jurisdiction over extended maritime zones I hope that Professor O'Connell will direct his attention to that area in a future work of the calibre of the book under review.

"The Influence of Law on Sea Power" is a fascinating and lucid analysis which is highly recommended reading for defence planners, naval officers (in particular naval staffs), lawyers and historians.


Reviewed by Major A. E. W. Stormer
UK Exchange Officer,
Army Office, Canberra

ROGER BEAUMONT’s study deals with corps d’elite formed under military systems in the twentieth century. It is not a catalogue, nor a digest of histories of elite forces. The author asks three questions about elite forces. Why did they thrive in the face of collectivization? How did they reflect or contradict the value of their parent system? And how much did they match their creators’ hopes and justify immunity from orthodox control and special access to resources?

Elite forces vary in type from the pure ceremonial through a spectrum to the frankly ritualistic. It is the authors contention that the most rational form of corps d’elite were those units formed to operate a technological system. There is a fascinating chapter examining these “Cybernetic” elites. They have, says the author, shattered many of the old social communities of the military world and more seriously have unintentionally undermined the citizen-soldier concept and universal military training, for they gave the illusion that victory could be bought by substituting gadgets for human beings. This illusion still lingers and is increasingly attractive in times of harsh military budgets but as the author wisely observes, “the effect of employing mercenaries is the same on their employer whether they be men or machines.”

Many elites once formed became misused as their raison d’etre disappeared or was overtaken by events. Commanders, reluctant to let elite troops remain idle, either committed them in a conventional role or created new roles for them. Either way they became misused. Airborne forces have often suffered this fate and get special attention. This corps d’elite has, in the space of a lifetime, gone from being a secret weapon to an anachronism. The choice of a striking photo of the French para Colonel Marcel Bigeard on the books cover confirms, I suggest, that airborne forces, despite being misused and misunderstood, have captured the public imagination as nothing in the way of ground warfare has done since the decline of cavalry.

Throughout his book Roger Beaumont stimulates thought and spices his arguments with interest. Nor is he without humour. Apparently certain Russian elite units, apart from receiving extra pay, received a much more practical and beneficial privilege: extra artillery support!

Elite forces require the best men and this alienates them from conventional forces. A whole chapter is devoted to this and rightly so. Creaming off the best men is only part of this complex problem. In a cynical vein the author concludes that, “the best balance of military forces in a society with antimilitary values and an elected government would be the use of elite forces and of conscripts and/or recruits from politically impotent elements of the population”. Cynical maybe but one wonders how the British public would have reacted to the Northern Ireland operations had they involved national servicemen and not professional soldiers.

The Australian Army is cited by the author as a “virtual large scale corps d’elite”. However the author sounds a warning. He feels that confidence in the “Digger” has led to Australian defence displaying a certain casual-
ness and overconfidence. "Confidence in legendary courage of an elite" he says, "is all too durable, and breaks up only under hammer blows of decisive defeat". This attitude is not exclusively Australian, however, and is becoming the pattern in other industrialised nations as the burden of defence increases.

Where there are military forces there will be corps d'elite. In the twentieth century the form and nature of such elites is increasingly indicative of the society that creates them. I suspect this to be due in part to the increased political involvement of such forces. The most significant point for their proliferation in this century the author concludes is as symptoms of stress in institutions reaching desperately for nostrums in crisis or moral bankruptcy.

Whether pro or anti corps d'elite this provocative, stimulating book, which is well illustrated and easily read, is objective enough to be of genuine value and interest to all.


Reviewed by Lieutenant Commander W. O. C. Roberts, DSC Royal Australian Naval Emergency Reserve

Despite its rather grandiose sub title "Ships Beneath the Sea" is not a history in any true sense. Certainly it is equipped with an appendix which traces the evolution of the diving machine from 333 BC to AD 1972, a bibliography listing 40 different authorities and an index. Nevertheless, its sixteen chapters, each complete in itself and written in breezy journalese, give the impression of a series of separate articles originally aimed at the popular magazine market and now drawn together in rough historical sequence to form this book.

The contents are heavily slanted towards U.S. endeavours in the underwater field and, as it happens, had the book come to a conclusion half way through this bias would have been justified. Chapter 8 takes us up to 1912 when the principles established by the Americans John Holland (constant positive buoyancy, diving achieved by forward pressure on hydroplanes) and Simon Lake (modern neutral buoyancy system) had been perfected and examples of both types of submarine boat were in service in all the major navies.

There is no doubt of course that it was American enterprise and ingenuity which gave the submarine to the world and the first half of the book, therefore, gives a fair account of the development of the practical submarine. Of interest in the operational field are stories of the first ever submarine attack, that of the Turtle on HMS Eagle during the American revolutionary war which though unsuccessful nevertheless scattered and unsettled the fleet blockading New York; and of the first ever successful attack, which occurred during the American Civil War when the Confederate submarine Hunley sank the USS Housatonic, the former being lost also during this operation.

However, as the tale unfolds towards the present day incredibly neither the German, British nor Japanese submarine services receive any mention whatsoever. A neophyte on completion of reading would have no reason even to suspect their existence; in the context of the book they do not exist, nor did they ever exist. The mind boggles.

Even if it is conceded that the author concentrates on the progress of the art rather than on wartime exploits it seems that the development of the large German cargo carrier, the Deutschland, or of the ingenious, though disastrous British K boats should merit mention in this context ahead of his only reference to World War 1 which is a detailed account of an early chariot attack on Pola harbour by the Italian Navy which resulted in the sinking of the modern Austro-Hungarian battleship Viribus Unitas. Similarly the considerable advances in hull design and propulsion made by the Germans in World War Two would surely be more relevant than the breathless "Boys Own Paper" account of the exploits of the submarines Wahoo and Tang in the Pacific which comprises the author's sole acknowledgement of the latter conflict. Here is a sample of his style:

"At ten second intervals Tang fired her four aft torpedoes. As the fish leaped away... O'Kane saw an amazing sight. Unable to change course quickly enough to avoid a collision the Japanese transport plowed straight into her sister ship. Amidst ripping steel and screaming men, the Tang's four
torpedoes struck the two entangled trans­ports. Both ships rose in the air in a series of violent explosions that left little but huge pieces of fiery wreckage to plunge back into the sea and disappear." And so on.

The later chapters of the book cover the period between the conception of the nuclear submarine and the present day deep research vessels. In it Rickover, Cousteau and Piccard receive honourable mention and suitable coverage but here again there is little evidence of the chapters being originally planned as sequential parts of an overall book rather than as separate articles.

"Ships Beneath the Sea" may be classified as light entertainment and as such it is readable enough, however, it has no place in the library of the serious student.


Reviewed by Captain M. G. Smith
Department of Defence, Canberra

RICHARD ALDINGTON once said: "Patriotism is a lively sense of collective responsibility. Nationalism is a silly cock crowing on its own dunghill." Cynically, perhaps, this is what George Hills' latest book — The Battle for Madrid — is all about, but unfortunately it is, in such circumstances, hardly ever possible to distinguish the 'patriot' from the 'nationalist'.

On a more fundamental level the book is a politico-military account of the long campaign waged by Franco's Nationalists to capture the Spanish capital from the Republican forces. It is not (nor is it intended to be) a study of the Spanish Civil War — rather a chapter about it and a reflection upon it. There has been excessive romantic fiction written about the Spanish Civil War. Most of it has fostered the image that far from being 'civil' the war was not particularly 'Spanish' either. Rather, it was an international conspiracy: a testing ground where differing political ideologies (all the usual 'isms'), sponsored by foreign governments, could actively compete. The Spaniards themselves have too often been presented as mere pawns held to ransom by competing international interests. George Hills clearly shows this not to be the case. Foreign influence was present — French and Russian assistance to the Republicans, German and Italian support to the Nationalists, and the ever-present 'international brigades' — but the campaign was from first to last very much a Spanish affair.

Hills describes the melting pot that was Madrid in 1931. This provides the back-drop for the campaign that later followed, throughout which military objectives and military logic were constantly frustrated by political and social pressures. Madrid itself was not of significant strategic importance. For the Republican Spanish Government a campaign waged from Valencia, not Madrid, would probably have brought greater military success. For the Nationalists, the repeated attempts to storm Madrid against greater odds, instead of consolidating gains elsewhere, served only to prolong a stalemate of doubtful military value. But such was the magnetism of the capital — the belief that who controlled Madrid ruled Spain — that undue importance was placed on its capture.

Hills has analysed manuscripts previously unpublished which further help to dispel the myth (once so widely propagandised throughout much of the world) of the Republic's disadvantage in manpower and military equipment. For most of the siege on Madrid Franco's forces were in fact numerically inferior and generally had less artillery and armour than the Republicans. The Nationalists also suffered long lines of communication and were not strong enough to cut Madrid off from Valencia. The Republicans, therefore, had much in their favour, but they lost mainly because they were poorly organised and led, and suffered deep divisions within their own ranks.

Those readers primarily interested in the conduct of the campaign will doubtless enjoy the military lessons to be re-learnt from The Battle for Madrid: the importance of infantry-armour co-operation; the need to utilise air support to achieve maximum effect; the folly in believing that the enemy can be demoralised and neutralised solely by air power; the success of militia forces against trained infantry in street fighting operations; the requirement to concentrate forces and still retain a reserve...
element; the vulnerability of armour when used in the stationary role as supplementary artillery; the maximum use of terrain especially in defence; above all the need for troops to be fit, capably led, well disciplined, and thoroughly indoctrinated. Hills comments concerning one of the few Republican successes against the Nationalists are penetrating. He says: "Officers and men of the four brigades ... involved in the capture of Brihuega had obeyed orders, operated coherently, and shown professional knowledge of tactics down to platoon and section level. They were an army and not autonomously-minded collections of anarchist, communist or socialist militia." It was unfortunate for the Republicans that these attributes could not be sustained.

It is of interest to note that of the officers in the Spanish Army before war started most senior, but only a few junior officers, chose to remain with the Republican Government. Conversely, only relatively few senior, but most of the junior officers, chose to join Franco's Nationalists. Readers interested in the interaction of armed forces and society might find it a pity that Hills does not analyse this event in more detail. It has promises of being a valuable case study of the socialisation pressures acting at variance within the stratified structure of a military force.

Seemingly well researched (but not 'footnoted' to the point of distraction) Hills book is easy to read and is liberally sprinkled with maps and photographs. For those who prefer campaigns to be related in every detail there may be some disappointment, but for those looking for an introduction to the Spanish Civil War The Battle For Madrid is an episode well worthy of attention.

* Available in Australia through Hicks Smith and Sons Pty Ltd, 301 Kent Street, Sydney, 2000.


Reviewed by Captain I. W. Knox RAN
SIP Division, Defence

DURING the naval conflict in the Pacific in World War II there was a little known war-within-a-war: the US submarine offensive against Japan. A mere handful of submarines sank more than 1,000 Japanese merchant ships and a significant portion of the Japanese navy, including one battleship, eight aircraft carriers, three heavy cruisers and eight light cruisers.

Japan depended on secure lines of communication for imports of strategic materials and exports of military material to reinforce captured possessions. When submarines succeeded in stopping this commerce Japan was doomed.

By mid 1944 submarines imposed a virtual blockade against Japan. After the war, when the full impact of the submarine blockade became known, many experts concluded that the invasion of the Palaus, the Philippines, Iwo Jima and Okinawa, and the dropping of fire bombs and atomic bombs on Japanese cities were unnecessary. They reasoned that despite the fanatical desire of the Japanese to hang on and fight to the last man, the submarine blockade alone would have ultimately defeated them.

However, it was no easy victory. The US was bound by various international treaties not to engage in unrestricted submarine warfare and the submarine was considered as part of the US battle fleet. Their peacetime training was therefore aimed at sinking important enemy men-of-war. After Pearl Harbor the US ordered unrestricted submarine warfare and the submarine force was found wanting in strategy and tactics which it took some two years to correct. The other major problem was defective torpedoes. The torpedo design had not been thoroughly tested and peacetime training had not allowed sufficient practice firings. This again took almost two years to rectify.

Although the US Navy codebreakers were able to provide excellent intelligence on enemy naval and merchant shipping movements this often led submarine force commanders to divert far too many boats from the war against merchant shipping to pursue high value targets. Countless times, submarines were vectored to such targets only to find that, because of navigational errors, these high-speed prizes passed just beyond attack range and could not be overtaken.

The publication of Silent Victory fills a major gap in the annals of World War II.
Here for the first time is the definitive history of the US submarine war against Japan which has, for the most part, been shrouded in secrecy for over three decades. Only recently have the codebreakers who played such a pivotal role in the submarine war been willing to talk about their work. And only recently have the private papers, diaries, and official reports of the submarine admirals and captains been made available to historians.

*Silent Victory* takes you into the submarine war at all levels — the highest strategy sessions in Washington, the tense moments in a submarine trapped on the bottom for hours as depth charges explode around it, the efforts of a torpedo crew coaxing an emaciated chicken to lay an egg. It tells of jealous infighting of admirals vying for power ... of “overcautious” skippers who were ill suited for war ... of the torpedo scandal and the toll it took ... of the later breed of younger skippers whose daring was so effective against Japanese shipping that the war, as Blair argues, could have ended months earlier, saving thousands of lives.

The book is over 1,000 pages and the average reader may not wish to read every word of the countless patrols which are described, but there are many lessons for the defence planner, naval strategist and tactician.

Clay Blair has been described as one of the foremost submarine specialists in the world and this is his fourth book on submarines. It is an excellent work and set the submarine war within the framework of history and the overall war in the Pacific.


Reviewed by Wing Commander F. O. Pederick Department of Defence, Canberra

Anyone seeking to gain a better understanding of the balance of power between the United States of America, the Soviet Union and the Peoples Republic of China could find new and better insights into Chinese part of these complex relationships by reading John Davies’ book.

Davies was born in China of American missionary parents in 1908. He spent his boyhood in China and part of his college studies were undertaken at Yenching University near Peking. Davies joined the US Foreign Service in the early 1930s and most of his service until mid-1945 was in China and Korea. He was selected to be General Stillwell’s Political Adviser in the China, Burma, India theatre in 1942. His understanding of the realities of power in China brought him into conflict with both the American and Chinese supporters of Chiang Kai-shek. He was accused by Senator McCarthy and others of being a Communist and of having contributed to the “loss” of China. This led to Davies being transferred from Foreign Service to State Department and eventually in 1954 to his being fired from the State Department by John Foster Dulles. It was not until 1969 that his case was re-examined by the State Department and he was again granted a security clearance.

The book relies extensively on Davies’ diaries and personal papers written during his various assignments in China. His own recollections have been aided by those of his father and wide reading of Chinese literature and of Western commentators on the Chinese scene. In the opening chapters Davies attempts the near impossible, an holistic view of China and the Chinese peoples. These chapters provide a fine summary of the effects of topography, climate, early conquerors and philosophers, language, traditional beliefs and governance on modern Chinese history. This approach to the subject is then blended into a review of modern Chinese history and the influences of Western nations and Japan. This naturally leads smoothly into Davies’ personal involvement in the area in the US Foreign Service.

Davies saw how the Kuomintang under Chiang Kai-shek, although supported by both the USSR and the USA, lost the support of the Chinese people and became enmeshed with gangster elements and warlord generals. The Communists, on the other hand, recognised and rode on a wave of nationalism inspired in the Chinese peasantry by the Japanese invasion of China and its attendant atrocities. His accurate reporting of this situation lead to Davies being branded a Communist or Communist sympathiser.
The book ends at the conclusion of World War II and doubtless has been written as a vindication of Davies’ work in China. However, his pen is only occasionally dipped in acid. Time and distance have enabled him to coolly review the events with which he was so intimately concerned within the whole context of world affairs. Davies concludes that modern China has been a “huge and seductive practical joke”. All who have tried to modernise, democratise or conquer China have failed. Even Mao failed — Davies believes Mao “lost” China to the generals and bureaucrats.

Although today the nexus between China’s population and food production may have been broken, the Government is intimately concerned with feeding the people. Still some observers contend that China will be a major power by the end of this century. Davies’ book provides an insight into recent history which has moulded what is happening in China today, and gives a good indication of China’s strengths and weaknesses.

A useful addition to a mess or unit library.


Reviewed by Major D. M. Mueller
Directorate of Artillery, Army Office

Since 1886 Brassey’s has been well known as a Defence Annual. Recently the company has launched a new series of artillery reference books intended for use by military officers in staff or instructional appointments. Edited by Brigadier Shelford Bidwell, a well known military author and former Chief Instructor at the British Army School of Artillery, Artillery of The World is the second of Brassey’s new reference publications. The co-authors, Lieutenant Colonel B. E. Blunt and Major M. T. Taylor are both active regular officers of the Royal Artillery.

The book is primarily a descriptive catalogue of all types of artillery equipment currently in service with the regular and reserve forces of the world. Air defence, anti armour, and locating artillery equipments are included.

All information has been derived from sources available to the public, be they governmental, industrial or persons versed in the lore of artillery. Equipments described vary from the obsolescent retained in service by certain reserve forces, to those currently under development and likely to enter service in the near future. Consequently the reader finds the FH70 155 mm howitzer which is shortly to enter service with the British, German and Italian Armies, sharing space with the famous French soixante-quinze (75 mm) gun which is still in service with several third world armies.

Similar equipments are grouped into sections, each of which is preceded by a brief but adequate description of the tactical function and design considerations of the equipment type. In addition, there are separate sections dealing in more detail with the characteristics of guns and howitzers and their ammunition. Equipment details are supported by an excellent glossary of artillery terms, an adequate index and a comprehensive table listing artillery equipments currently in service with the armies of the world.

Details on each item include its nomenclature, country of origin and a table of salient technical characteristics. These are amplified by a description, which varies from a paragraph to a page or more, of selected facts such as the equipment’s history, design or technical peculiarities. Most entries are supported by a photograph or line drawing of sufficient clarity to enable the reader to identify important features.

As is to be expected in a book of this nature, there are some minor errors in technical detail and other more general facts, but these do not significantly detract from what is a first class reference. The general presentation and layout is attractive and makes for easy reading, a quality invariably lacking in official equipment catalogues.

If, as the editor suggests, “at least half the ground based fire power on the battlefield is provided by artillery,” this publication appears to be assured of a wide patronage. It is recommended as a worthwhile addition to military reference libraries, especially those in training establishments. For those who delight in the acrid aroma of burnt cordite, it will be a welcome companion.