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COVER: Detail from war artist Ivor Hele’s large painting ‘Operation “Bulimba”. 2/15th Battalion attack near Tel el Eisa, Egypt, September, 1942.’
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A junior officer of the 29th Australian Infantry Battalion addressing his platoon before the advance upon the second objective during the Battle of Amiens, 8 August 1918. The heavy morning mist then rising was increased by smoke from a German counter-attack.
Economic Considerations of Limited War or Military Involvement in South-East Asia

Major M. M. van Gelder
Royal Australian Engineers

On 10 March 1970 the Minister for Defence, Mr Fraser, told the House of Representatives that in its latest defence review the government had rejected the concept of isolation and detachment from the security problems of the South-East Asian region. He said the government believed there would be no security in isolation, that there would be no permanent security for any of the small countries of the region until there was permanent security for all, and that within her resources Australia’s military capability must be geared for deployment in the region of which Australia is a part. This statement of defence policy sets the stage for any further consideration of the economic aspects of military involvement in the region.

The direct military implications of an increase in Australia’s overseas commitments are readily apparent to most Service officers. What may not be so obvious, however, are the implications in terms of national finance, and in particular the effects on Australia’s economic...

Major van Gelder, who graduated from RMC Duntroon in 1955, was allotted to the RAE and early biographical details are shown in previous issues of the journal. In 1966 Major van Gelder attended the Staff College at Queenscliff from where he was posted as OC 23 Construction Squadron at Holsworthy. In February 1968 he was sent to Vietnam as OC 17 Construction Squadron. A graduate in civil engineering and economics he gained his Master of Engineering Science from the University of NSW in 1968. After a posting to AHQ as DAAG DPS(A) he is now a student at the Joint Services Staff College (and temporarily promoted to the rank of Lt Col). He is currently engaged in the writing of a thesis for his Master of Economics at the Australian National University, the subject of the thesis being the application of economic efficiency criteria to defence expenditure.

With this paper Major van Gelder won the 1969 AMF Gold Medal and ASCO Prize Essay competition.
development. This is because a soldier — in the past at least — was concerned primarily with the methods of execution of war, and had little contact with the economics of war and defence.

Many will doubt that a knowledge, say, of the relation between defence spending and Gross National Product, or the politico-economic reasons behind the allocation of defence funds, will ever assist a soldier in discharging his military duties. There is an element of truth in this, but there are many advantages which follow from having the military profession well informed in the economic implications of defence. First, in strategic studies it is possible to assess partly a nation’s capability of waging war from a knowledge of its economic strength. Secondly, in realizing the sacrifice caused by a deflection of government expenditure from national development towards defence, an officer will more readily appreciate the necessity for exerting economy in the use of resources devoted to defence.

Again, while soldiers expect the politicians to acquaint themselves with some military detail before making defence decisions, it is rare that the soldier considers the financial aspects when he is contemplating military action. In a limited war, as in total war, he assumes that the patriotic fervour of the nation will always provide the wherewithal to carry out this action.

This discussion will serve a purpose if only, in considering defence expenditure, the sources of war income and the national sacrifices required to provide this income, it impresses the officer with a need to be cost conscious. It may provoke in some officers a more ready response to the management tools of cost-benefit analysis, systems analysis and operations research; all able to assist in the greater utilization of military resources.

**Political Decision**

It is necessary to ensure that the economic factor in a nation’s defence policy is seen in its true perspective. A democratic country’s defence policy, and therefore the size, composition and equipment of its defence forces, depends on that country’s foreign policy, which in turn is formulated in the light of a number of factors. These factors include an assessment of the threats to her national security, the necessity to honour international obligations, the prevailing political atmosphere, and her economic situation. It is important to realize that the defence
policy is not simply a matter of a political party assessing the strategic situation and then adopting a basic defence approach.

Whether a country commits its forces to war — limited or otherwise — is a political decision made in the light of foreign policy and the professional military advice of her Service chiefs. The extent to which she will direct her economic resources to prosecuting the war will generally depend on the extent to which her interests are threatened.

Under all circumstances it would seem wrong that a country's defence expenditure should ever be considered as an arbitrary percentage of, say, her Gross National Product. Instead, it is an amount which is determined by costing the resources necessary to support the country's military programme, and is therefore dependent upon the current or anticipated threat and the country's economic capacity to wage war.

Not only must the absolute capacity be considered, but also the capacity which can be devoted to defence at any given point of time after consideration of the competing interests of national development and social welfare.

**Economic Assumptions**

To provide a common background for later discussion it is advisable to state some simple economic assumptions. First, 'neither side to an expensive modern war ends up economically better off at the conclusion of the war'. A nation fighting a war may come to explore and develop its industrial potential more fully than it would have done otherwise, and certain sectors may be stimulated as the direct result of war, but overall, resources are directed away from avenues of national development or social welfare. This assumption is not universally accepted and some would assert that military expenditure is a very necessary means of generating economic progress.

Secondly, the block of nations which has the greatest combined Gross National Product is the side which wins in a protracted conventional war. More simply stated, the side which has the greatest capacity to support large, efficient forces in the field will ultimately win. ‘Capacity’ must be liberally interpreted to include the support given by allied or friendly nations. For example, North Vietnam’s capacity for

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waging war would be severely limited without the assistance she receives from other communist countries. Israel would be hard-pressed without the financial assistance of Jewish communities throughout the world.

The superiority in capacity must also be sufficient to offset the comparative advantages which guerillas possess in a counter-insurgency situation or Vietnamese style war. The subject of comparative advantage will be mentioned later.

A third assumption, and one which amounts to the simplest economic truth, is that nothing is free. If a country wants a high state of armed preparedness or an active participation in war it must be prepared to pay for it. The community must give up something to pay for its defence. The war cannot be fought by manipulating paper money, but by devoting real national income to the prosecution of the war.

**Financing the War Effort**

Any increase in defence effort means either an increase in government expenditure or an alteration in the pattern of government expenditure — or both. For example, the increase in the defence vote from $748,000,000 in 1965-66 to $1,000,000,000 in 1966-67 occurred at a time of an overall government expenditure increase; but whereas the defence vote increased by 34% other commonwealth spending increased by only 7%. In the words of the then Treasurer 'defence has come to claim a very large additional amount of resources that would otherwise have gone to development and consumption uses'.

The reduced defence expenditure in 1969-70 would have reversed this process but the disclosure by the Minister for Defence that defence spending in 1970-71 would be 'noticeably increased' would indicate a return to the former situation, depending on the growth of the Australian economy in the meantime.

Two questions immediately come to mind — how can the nation's output be increased to allow for greater government expenditure to finance an expanded war effort, and what other avenues of expenditure will be affected in an alteration in the pattern of government spending? ('Expanded war effort' means one that takes defence expenditure beyond the levels where it is simply a budget manipulation, to where it makes

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serious inroads into other expenditure and causes a dramatic increase in overall government spending).

In a total or world war, particularly when there is a patriotic or moral motivation, a nation’s wartime output can be vastly increased even when there is existing full employment. This is done by such methods as enlarging the work force to include older men and women and employing more married women, working longer but still reasonable hours, and raising the productivity of each man-hour. There were well-tried and successful methods used in World War II.

In a limited war, however, the overall motivation is not necessarily there, and there may be even some opposition to the war. As far as Vietnam is concerned the opposition is not insignificant in either the United States or Australia. Therefore, in lieu of voluntary expansion of output, the government can look only to an increase in government expenditure which is not related to an increase in the country’s output or to a drastically changed pattern of expenditure.

Using national accounting convention and neglecting the rest of the world, a country’s Gross National Product (GNP) may be represented by the sum of private consumption (consumers’ expenditure), government expenditure and gross private investment. GNP is generated by some form of expenditure. Therefore, for a given GNP, if government expenditure is to be increased, then the elements of private consumption and gross private investment must be reduced. There are fiscal and monetary weapons at the disposal of the government to enable it to reduce private consumption and investment. The alternative is to offset defence spending by decreases in government expenditure on such things as health, education, public works, housing and developmental projects. This latter alternative in a limited warfare situation and where the unanimous support of the population is missing is obviously undesirable, both socially and politically.

To further compare the situation of total war and limited war, the capacity of Australia to participate in a total war will be illustrated. This will put current rates of defence expenditure in true perspective.

Suppose the Gross National Product at market prices is $30,000,000,000 a figure which shortly can be anticipated (actual 1968-69 was $27,000,000,000).

As there is virtually full employment, assume only an expansion of total output of one-fifth, i.e., $6,000,000,000, through induced increases in manhours and productivity.
Normal consumption activity of families and the government could be curtailed releasing, say, $5,000,000,000.

By diverting gross private investment of, say, one-tenth, i.e., $3,000,000,000 to the war effort, then the total amount available is as follows:

\[ 6000 + 5000 + 3000 = 14,000,000,000. \]

In other words, approximately 40% of the expanded wartime GNP could be devoted to the war effort if we are prepared to accept lower consumption and lower capital formation, due to the diverting of investment. This figure accords with the war expenditure of the allies during the world wars.

The Australian 1968-69 defence expenditure of $1,073,000,000 represented 4% of the GNP at market prices. The defence expenditure excludes $91,000,000 of United States Credits. The percentage of GNP can be portrayed as a much higher figure by including the United States credits and using Gross National Product at factor prices, giving a percentage of 4.8%. As the percentages are used only for comparison purposes it is important only that a consistent formula be adopted.3

Estimated payments from appropriations for defence in 1969-70 are $1,053,000,000 which will represent 3.9% of 1968-69 GNP at market prices and a lesser percentage of anticipated GNP. On the assumption that GNP would top $30,000,000,000, the percentage is very small at 3.5%.

**Comparison with Other Countries**

To make comparisons with other countries on the basis of percentage of GNP is fraught with danger but is at least some indication of relative defence expenditure.

GNP is an acceptable measure of the growth of a country’s economy, and is generally judged to be the most important strategic factor in determining a country’s wherewithal to wage war. The

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3 As stated by Professor H. R. Edwards in his ‘Defence and the Australian Economy’ p. 43 (Economic Papers No. 29 November 1968). 'one may conclude that the more usual procedure ... of expressing proportions in relation to GNP at market prices may in respect of any point of time somewhat overstate the proportionate real absorption of resources into personal consumption and understate it in the case of defence. However, the assessment of changes over relatively short periods of time (constant rate of indirect taxation) would not be affected.'
percentage of GNP which the country is prepared to spend at any one time is therefore taken as a guide to that country's defence preparedness. Two corollaries which emerge from this are; first, when defence expenditures are maintained as a fixed percentage of GNP (the famous '5%' for example) and non-strategic items of production are contained at an acceptable minimum, the means which can be allocated to defence can expand only with expansion of GNP; and secondly, if the national output grows no faster than population, it is a difficult political task to compress public sector expenditures on, say, welfare in order to expand defence production.

A study has revealed that the ratios of military expenditures to GNP are related to the absolute values of the GNP. In other words the rich country cannot only afford to spend a higher absolute amount, it can afford to spend a higher percentage of its GNP. The study revealed also that one of the major determinants of non-personnel defence expenditure per military person is the GNP per capita.

The state of industrialization of a country is very important. If a country can develop and buy new weapons within its own economy, 30% of the labour cost (wages and salaries) — which represents nearly 80% of the cost of new weapons systems — comes back to the government in revenue. Therefore a country which has an industrial base such that it can produce most of its military needs, for example the United States, has an advantage over a country with an underdeveloped industrial base which must import most of its defence needs, for example Malaysia.

Therefore comparisons of defence effort on the basis of ratios of military expenditure to GNP, should be tempered by a knowledge of the absolute GNP, the per capita GNP and the state of industrialization.

An arbitrary selection of countries with varying commitments have the following approximate ratios of defence expenditure to GNP — Britain 6.2%, Canada 3%, Denmark 3.2%, Netherlands 5%, Turkey 5.3%, United States 9.6%, USSR 12.9%, North Vietnam 21%, Red China 10%, France 4.8%, Philippines 3%, Indonesia 9.6%, India 4% (Figures, which relate to 1968, are taken from ‘The Reference Handbook of the Armed Forces of the World’ of R. C. Sellers & Associates).

The Problem

However adequate we may think Australian defence expenditure is, relative to that of other nations, we are still faced with the problem of paying for it. This is not an easy task in a country which is still in its development stage, particularly in the light of strong opinion that the best contribution Australia can make to any military pact is the furthering of its own industrial development.

Once a pattern of economic growth has been established — in the absence of any upsurge in national product — any increase in defence spending will cause a deflection of funds away from development or investment projects, and therefore a disruption of the normal economy. A high growth rate (expanding GNP) provides, of course, the possibility of both higher defence spending and higher expenditure on development.

If we operate at low rates of defence expenditure, a gradual increase year by year will not be too disruptive. In fact, if there is no enforced sacrifice of civilian consumption and there is only a reduced rate of capital formation, people may even be led to believe that war is not a bad thing at all. The people who will worry are those who realize the possible long-term ill effects of war expenditure (by virtue of the denial of resources to other uses).

We have seen that even in times of little external military involvement, the stability of the economy is an elusive thing for any government conscious of its political popularity. More so then is this stability difficult to maintain when increased government expenditure is churned back into the economy in the form of inflationary inducing spendable income.

In a limited military involvement and for a moderate increase in defence spending from say, $1,100,000,000 to $1,300,000,000, monetary policy or credit control, working in conjunction with the normal price mechanism, should be adequate to maintain a stable economy. For a greater increase in defence expenditure some form of direct taxation will probably be necessary. This will be required not only to finance the war effort but to remove wartime inflationary pressures and to avoid the post-war inflation.

It is not proposed to discuss the advantages and disadvantages of war taxation. It is interesting however to quote P.A. Samuelson, ‘warring nations often for political reasons tax less than the optimal amount’.

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If involvement in South-East Asia developed from the limited conflict in Vietnam to something much larger, then the Australian government would be forced to introduce direct controls, such as rationing and price control (referred to as ‘pseudo-remedies’ by Keynes⁶). These direct controls should be resorted to only after taxation has been exploited, a degree of inflation has been accepted, and all cheaper methods of war financing such as Keynes’ ‘deferred pay’ have been exhausted.

Selective national service is a form of direct government control. It was introduced during the Vietnam ‘campaign’ rather earlier than would normally be expected because of the high state of prosperity existing in Australia at present. This prosperity has produced a state of full employment, and in the absence of very attractive conditions of service being offered to career servicemen, a consequent lack of service recruits.

Developed versus Underdeveloped Countries

Any economy-conscious citizen must wonder why the immensely wealthy nation of the United States finds it necessary to go on to virtually a war footing (1968-69) simply to fight a counter-insurgency war against the relatively underdeveloped North Vietnam. The GNPs of the two countries are not even comparable. What chance has Australia, with her limited resources, of supporting a worthwhile force in South-East Asia?

As mentioned earlier, part of the answer is that North Vietnam is supported by aid from China and Russia. The industrial power of these two countries is capable of supplying North Vietnam with her needs. Fortunately for the West, this situation tends to change the guerrilla army’s view of its own needs as well as adding to its logistical tail, and in the long term eliminates many of the advantages which such armies possess.

The rest of the answer lies in the fact that the United States is forced to fight under conditions in which she is unable to use her ‘comparative advantage in capital intensive weapons’.⁷ Although, by virtue of her wealth, the US has almost complete control of the air and sea, the issue has to be resolved primarily by ground forces. It is in this area, particularly in primitive under-developed countryside, that the well-equipped and expensively supported ground troops are at a compa-

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rative disadvantage. For all the modern advances in weapons and tactics, counter-insurgency warfare is still ‘labour-intensive’.

The fact that the Viet Cong and North Vietnamese fight at a comparative advantage when engaged in a labour-intensive type of warfare springs from the fact that most are peasants engaged in agricultural pursuits, and peasants have many qualities that make them good combat soldiers.

Conclusion

Much as we abhor the necessity to maintain large defence forces in peace, it is probably true to say that the deterrent they present to possible aggressors results ultimately in a saving, because of the avoidance of wasteful total or limited war. Australia, because of her small population, cannot allocate sufficient monies to maintain the size of force necessary to afford her complete protection in the absence of strong allies. Therefore it is necessary to make the most economic use of the defence allocation which is made available.

Fighting a limited war can be a very expensive process, particularly when fighting under conditions of comparative disadvantage. From the example of the US involvement in Vietnam and Laos, the lesson already provided is that any direct involvement in a subversive situation in South-East Asia can require a massive effort on the home front as well as in the field.

The expense is shown up too when increasing defence expenditures fail to be met by increasing national product, and have to be financed by cutting back on development, social welfare and personal consumption.

On the other hand, it has been shown that Australia is capable of a much greater defence effort than at present. Up to date she has taken a calculated risk, concentrating her attention on economic growth under the protective umbrella of the United States. It is little good however building up the nation for a greater defence effort in the future if it is left highly vulnerable in the process.

Despite the greater threat to Australia’s security (represented by the withdrawal of British forces from Asia, the increasing interest of Russia in the Indian Ocean and the worsening situation in certain parts of South-East Asia), and an obligation to carry a fair share of the burden of regional defence, it is not maintained that the proportion of
GNP devoted to defence should be arbitrarily raised to accord with that of some other nations. It should be raised, however, to accord more closely to the existing threat. A small defence vote can only be justified when the needs of national development far outweigh in importance the need to defend Australia adequately. This is difficult to justify in the light of present events in Asia.

Should the case for economic growth be a stronger one than for current defence expenditures, then it is necessary to ensure that the pattern of economic growth be in accordance with Australia’s defence interests. Growth should not be directed at simply augmenting total output, but at improving production in commodities and services that have a military worth.

On a concluding note from Hitch and McKean, it takes both GNP and willingness to yield resources for national defence. Military power is a function of economic output only when it is backed by a firm resolution to accept material discomforts. If democracies seem less willing to tighten their belts in order to secure the national defence (instead of just expanding production by taking up previous unemployment or adding to capacity by postponing peacetime civilian investments) it follows that higher growth rates are even more necessary for them. Only through accelerated economic growth can they preserve their standards of living and simultaneously finance the required defence objectives.

The message to Australia is clear — she must recognize that economic growth is an essential prerequisite to greater defence effort in the future. She must not, however, entirely forsake current responsibilities to protect the nation in its growing phase.

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Reorganization of Logistic Support—The Ultimate Solution?

Lieutenant Colonel D. White
Royal Australian Army Service Corps

Introduction

THE Australian Army; strained, fatigued and perplexed by its expansion in peacetime to meet active military operations in South Vietnam, is at present facing the problem of a fundamental reorganization of the defence services.

Changes in overseas defence organizations, the continuing military commitment in South Vietnam, the withdrawal of the UK forces from Malaysia/Singapore by 1971, and the need to provide modern, expensive hardware for the armed services in the 1970s all aggravate the situation.

In the recent past, the UK and Canada have both faced problems of defence reorganization. In both countries, changes have been made in an atmosphere of comparative peace and minimum involvement of armed forces in overseas military operations. Economic factors also have influenced reductions in the size and structure of their armed forces, whose role today is primarily confined to the defence of Europe and homelands.

In approaching the problem of reorganization in the field of logistics for the Australian Military Forces the atmosphere is somewhat...
different. The location and size of Australia in relation to her South-East Asian neighbours, her military alliances with some of them, her enormous potential wealth, and the steady advance of Communism throughout the South-East Asian area generally, indicate that her defence forces must be expanded to meet quickly a number of possible military threats. The likelihood of Australian forces becoming involved in counter-insurgency operations and limited war in Australia’s zone of interest is far greater than the UK and Canada in Europe or continental America. Moreover, current developments in South Vietnam indicate that Australia will have to rely more and more on herself to meet the basic logistic requirements of her forces, and those of her Asian allies.

The following general principles have been taken as guidelines for a study of the problem. First, logistic support of forward troops in operations must be simple and efficient; no organization, however tidy and economical on the surface, should be allowed to provide an excuse for failure in operations. Secondly, one service should be responsible for providing those items and services which are common to and used by each of the three services. Thirdly, where practicable the service responsible for distribution and storage of common user items in forward operational areas should retain responsibility for providing them in the home base. Fourthly, each of the three fighting services should retain responsibility for provisioning, research, development and storage of those items which are used in operations by a particular service.

The purpose of this article is to discuss the application of the above principles to the Army and, in particular, to the role of the supply and transport service in the future. Their application to the other services shall be mentioned, but obviously require independent examination.

Logistic Support of the Army on Operations

As stated, any reorganization of the Army must function in operations. Both ends of the pole must be considered — a change at the top, however economical and logical, must work effectively right down to the bottom. An examination of the lessons from the war in South Vietnam and a comparison of organizations in the British, Canadian and UK armies should give us a clear indication of the best type of organization to adopt for the future.
When the decision was made to build up the Australian Force in South Vietnam a seismic quiver ran through the planning staff at AHQ and the Army in general. This was no longer a field force exercise held in continental Australia, where administrative disasters could be quickly averted by priming the pump from ‘out of exercise’ resources. In the rush to get to war, the provision of administrative service backing was pared to the absolute minimum.

Once again, an Australian expeditionary force fell on its feet administratively. The US Army, like the British Army in two world wars and in Malaya, undertook responsibility for general base support. Although extensive, this base support has not satisfied all Australian requirements. Differences in organization, equipment, tactics and national taste brought to light inadequacies in Australian administrative organization and planning.

In outline, the organization provided to support a two-battalion task force consisting of: a headquarters Australian Logistic Support Group (ALSG); an engineer construction squadron; a divisional transport company RAASC (two transport platoons, a supply platoon, a workshop detachment and an air despatch detachment); a composite ordnance depot; a field workshop; and in addition, signal, engineer stores, provost and postal detachments. The administrative ‘tail’, headed by the HQ ALSG, was situated thirty-two kilometres in the rear of the fighting elements, occupying a minor port area.

Compared with the administrative backing afforded similar forces overseas in World War II — where the rule was to place approximately fifty per cent of the total force in the rear of the forward formation boundary — the allocation of administrative manpower was decidedly light. Moreover, the decision to place at the start of operations the fighting elements of the force thirty-two kilometres from the second line administrative backing, was unusual.

Within days, the administrative structure began to groan under pressures in excess of its capacity. Each administrative service soon required reinforcement and, in some cases, fundamental reorganization. Certain service elements were clearly unable to work with any degree of efficiency for at least six months.

The one administrative service which worked effectively from the first day, because it had to, was the ST service. Although the divisional transport company was severely overworked and required early rein-
Forcerment, its basic structure was sound. The fighting troops received their rations, petroleum and ammunition, and were lifted into the combat area. It should be noted however that the ST service, unlike other administrative services, was not required to import its commodities from Australia; it mainly distributed rations, POL and ammunition provided from United States sources in South Vietnam. In addition, the headquarters of the divisional transport company found itself saddled with the added responsibility of fostering the HQ ALSG, movements, postal, pay, military police and signals.

Faced with the concurrent problems of forward maintenance and base development, and to a much lesser extent, protection of its own area, the ALSG needed at least two quick transfusions to survive. First, reinforcement and reorganization of its initial structure, and secondly, further reinforcement to meet an ever increasing demand forward: also the addition of new administrative units forward to set up a task force maintenance area for a three-battalion task force, with an armoured squadron added.

In the task force area the headquarters of a second transport company has been provided to command a task force maintenance area, comprising new sub-units of several services.

Throughout the campaign road transport has been required to lift the bulk of maintenance tonnage from the base into the forward area. Earlier notions that maintenance tonnages would be lighter in revolutionary warfare, and that air maintenance would largely supplant a road lift of routine daily maintenance, have been found to be erroneous.

During forward deployments out of its normal tactical area of responsibility, the task force has made extensive use of medium helicopters (provided by the Americans) and road vehicles. In these operations supply and transport headquarters, road, air despatch, petroleum and supply detachments have coped effectively with novel maintenance problems.

In general the main lessons learnt from South Vietnam are; first, complete reliance on allies to provide the majority of our logistic requirements in the future is not practicable; secondly, administrative units must enter the field at full strength and be capable of operating quickly; thirdly, adequate land transport resources must be provided as a firm basis for forward maintenance; and fourthly, the current supply and transport unit, the divisional transport company, continues to work effectively under the changed conditions of modern warfare.
A comparison of the British, US and Canadian organizations, performing the role required of the Australian ST divisional organization, is illustrated in the following table:

<table>
<thead>
<tr>
<th>Detail</th>
<th>Aust Current Estb</th>
<th>US Current OE</th>
<th>CDA Current Estb</th>
<th>UK Current Estb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlling HQ at Division</td>
<td>HQ CRAASC</td>
<td>HQ Sup and Trans Bn</td>
<td>Note (B)</td>
<td>HQ Tpt Regt</td>
</tr>
<tr>
<td>Divisional Units</td>
<td>Two HQ Coys Supply Platoons (4) Tpt Pls (4) Air Despatches Coy (1)</td>
<td>Tpt Coy (1) Sup and Svc Coy (1) Note (A)</td>
<td>HQ Tpt Coy Tpt Pl (5) composite Pl (per each bde)</td>
<td>Three Tpt Sqns Combat Sups pls (3)</td>
</tr>
<tr>
<td>Task Force Bde level</td>
<td>Div Tpt Coy</td>
<td>Dets only</td>
<td>Div Tpt Coy</td>
<td>Div Tpt Sqn</td>
</tr>
<tr>
<td>Comment</td>
<td>All one Corps (RAASC) with RAEME att</td>
<td>Mixed QM and Tn Corps</td>
<td>All one Corps (RCASC) with RCEME att</td>
<td>Mixed RCT RAOC REME</td>
</tr>
</tbody>
</table>

*Note A:* Except in the US airmobile division, the supply and transport battalion is *not* required to carry or distribute ammunition (Class V). In the US system ammunition supply is carried out between the US equivalent of force transport and brigaded first line transport under staff control. First line transport is provided on a much more liberal scale in US establishments.

*Note B:* At present the Canadian forces do not group formations above brigade level.

From the table it should be noted that the pioneers of 'separatism', the Americans, have returned to the old British concept of combining supply and transport in one organization. The Canadians have not changed. The British have introduced three corps into the deal and are known to be having problems with it in Germany.

Experience in the Boer War and two world wars produced the current Australian ST organization. In essence, hard practical experience brought home the lesson that detailed co-ordination of supply and transport operations in the field requires the work of specialists working for and on behalf of formation staffs. South Vietnam has continued to
stress this lesson. Why then should an obviously efficient organization be sacrificed for a theoretical idea?

In short, the Australian Army should not change its divisional ST organization which has proven itself to be economical, efficient and capable of coping with technological change. Moreover, the organization provides a special expertise, below staff level, on which an inexperienced staff can lean heavily in times of operational stress.

The One Service Concept

When the recommendations of the McLeod and Nye Reports were implemented in the United Kingdom, they were modified by the decision to 'rationalize' the responsibility for certain administrative services between the three major services. For example, responsibility for provisioning food supplies was handed over to the Royal Navy, and the barracks service was made the responsibility of the Royal Air Force. These subsequent developments, which had a far-reaching effect on all three services, appear to be the result of expediency rather than adherence to a fully developed original plan.

What then do we want in Australia? Blind adoption of overseas changes in military organization has not met with unqualified success in Australia. The organization evolved in 1944-45 by the AMF for operations in the South-West Pacific Area is still sound in structure.

Returning to principle number two, some administrative functions and services required commonly by the three services are:

- Supplies (food/fuel/light).
- Petroleum, oil and lubricants.
- Food science.
- Road transport.
- Rail transport.
- Inland water transport.
- Ground organization for air supply.
- Movements by land, sea and air.
- Catering.
- Postal services.
- Pay.
- Staff clerks.
The possibility of placing the above functions under control of one military service will be examined.

In relating the fourth principle on which this article is based to the Army it is evident that such administrative corps as the ordnance, RAEME and engineer stores are tied to providing and repairing items which are used mainly in land operations. They therefore should remain under Army control. Similarly, logistic organizations providing functional equipment for the RAN and RAAF should remain part of their respective services.

Looking at the common functions in detail the following comments are made:

**Supplies.** The Supplies and Transport Service (RAASC) provides food, fuel/light commodities and expense items on a well organized system of central procurement, with regional depots for storage and distribution. Management of this service has been both effective and efficient since the beginning of the 1939-45 war. In war-time and in certain localities in peace, for example Darwin, the RAASC provide supplies for the three services. The Army Food Science Establishment has provided a scientific advisory service for the Army and the armed services in general. Working under the overall sponsorship of the Supplies and Transport Service, it has established itself as an international authority on army operational rations in the tropics.

In the United Kingdom, responsibility for providing supplies for the Army was originally that of the Royal Army Ordnance Corps but later was passed to the Royal Navy, under the 'rationalization' scheme. It is felt that such a transfer of responsibility is wrong in principle and should not be adopted by the AMF. The Directorate of Ordnance Services is fully committed controlling its present functional sections (sixteen in all) without adding further to its burdens. Moreover, division of responsibility for movement, holding and distribution of supplies in forward areas has been known to fall down in past operations.

Functionally therefore, it would be more logical and efficient to place this service directly under the Department of Defence, allocating its units and detachments for service with field and base units of the three services.

**Petroleum Oil and Lubricants.** Since the beginning of the war in South Vietnam the RAASC has perfected a petroleum organization, well provided with modern equipment, to undertake storage and dis-
tribution of POL in the field, both to the Army and the RAAF. In the 1939-45 war the AASC distributed POL to the three services in the Northern Territory and the SWPA and undoubtedly could do so again if required. The passing of this logistic commitment to the ordnance service suffers from the same disadvantages as those mentioned for supplies.

Transport and Transportation. The largest road operator of B vehicles in the armed services is the Supplies and Transport Service (RAASC). At home and abroad the necessity to provide road haulage for the three services is an inescapable commitment. Currently there is a need to co-ordinate the demand and usage of road transport between the three services. The Supplies and Transport Service has the organization and expertise to sponsor, control and operate a fleet of B vehicles capable of serving the three services.

Complementary to the road transport service is the RAE (Transportation) organization which controls military railways, docks operating and water transport. Although this service requires access to heavy engineering design, construction and support, it could operate successfully as a defence service. The grouping of this service with road transport in rear of the forward army division facilitates co-ordination of the various movements agencies generally.

In forward areas, the necessity to combine supply and transport operations under one head dictates that the one corps or organization should undertake both tasks. Should the defence department take over the supplies and transport service it will therefore be necessary to allocate adequate defence ST resources under command of formations of the army field force.

Movements. The proposal to sever this organization from its status of a staff branch and giving it the subordinate rating of a service has always been a vexed issue. Clearly, movement must be co-ordinated between the three services and the movement organization must have power to impose priorities determined by the highest military authority in the land — the Department of Defence. Therefore, the movements staff should be represented at the staff level of that department. The allocation of the personnel allotted to movements could be placed conveniently under direction of a defence service head — a defence director of supplies and transport.

Ground Organization for Air Supply. When operating in war at home and overseas, the Army Air Supply Organization (AASO) must always
be closely associated with the movements organization. The delivery of essential maintenance by air must be co-ordinated by the highest military authority to meet the just needs of the three services. Consequently, AASO should be so placed that it can fill a tri-service role in close cooperation with movements under a defence service head.

Catering. This service is closely tied to the supplies service and food science. Considerable economy could be effected in having one overall catering service under the Department of Defence, capable of providing highly trained caterers, cooks and stewards to all services. Properly constructed, such an organization would provide a sound career structure for catering personnel, giving them a wider variety of experience and postings.

The placing of this service under a Director of Supplies and Transport serving the Defence logistic staff would ensure essential co-ordination of effort between the producers of food, the caterers and consumers.

Postal. The postal service in the Army has had a nomadic existence. Originally sponsored by the Royal Australian Engineers and directed by the Q staff, it has now become the responsibility of the Supplies and Transport Service. In an overseas theatre the handling and distribution of mail must be co-ordinated between the three services to ensure that all servicemen receive their mail expeditiously and as fairly as possible. Tied closely with movements and air supply organization it seems logical that the Department of Defence should assume responsibility for sponsorship and control of the Postal Service. The placing of Postal Service personnel under a Defence Director of Supplies and Transport for administration and training would facilitate further the efficiency of its service to the three fighting services.

Staff clerks. For uniformity in standard and economy in training overheads there are distinct advantages in providing these men from one source, under direction of the Defence Department.

Command and Control

Having decided that functional control of the aforementioned services should be placed under the Department of Defence, how could this be effected? The answer is not simple — but no fundamental change is ever simple.

The British, under Lord Mountbatten, faced up to the problem admirably. The latter, fully appreciating the difficulties of ending the
time-honoured system of war by committee, introduced a unified command under a Chief of Defence Staff (CDS). Mountbatten's experience convinced him that success in modern war depended on complete co-operation in military plans, organization, logistics and operations.

The development of an organization in peace to facilitate effective co-operation between the Department of Defence, the three fighting services and the Department of Supply, the main government department involved in logistic support of the services, is surely a step in the right direction.

In essence, the proposal is to transfer the current Directorate of Supplies and Transport, Transportation and Movements from the Army to serve directly under the Chief of the Defence Staff and his combined staff, and is given in outline in the accompanying diagram.

The main features of the reorganization are: first, the formation of a defence service corps to serve the chief of defence staff and his combined staff; second, the setting up of a supply and transport staff headed by an able logistician known as the Chief Supply and Transport Officer (Defence) CSTO (D); third, placing of defence service corps staff representatives, units, sub-units and detachments under command of each of the three services for operations at home and abroad; fourth, the new corps should undertake complete responsibility for those common user functions now the responsibility of the directorates of supplies and transport, movements, transportation and the army postal service.

The next questions to be answered would obviously be — from what source would the personnel be recruited for the new corps? What would be its conditions of service? Where and how would it be trained? How would its control organization be planned?

Obviously a much more detailed examination must be made to find a satisfactory answer to the above questions. However, a general guide is given.

First, the initial source of manpower would come from current personnel performing the common user duties in the three services. For replacements of officers, NCOs and men: through the tri-service academy for officers, and for NCOs and men the current basic training machine of the army. The present RAASC and RAE Training Centres could be taken over by the Department of Defence to provide trade and advanced logistic training for the new corps.
PROPOSED OUTLINE ORGANIZATION

The new organization is broken functionally into two basic branches - Supply and Transport.

A. The transport branch must maintain close liaison with the Department of Supply in regard to co-ordination and control of defence service transportation requirements. The scope of responsibility to include detailed planning and control of movement at home and overseas by land, sea and air, making use of defence computers. In addition, the corps should provide movements representation at Defence Staff level.

B. The central provisioning office of the defence supply branch to be located with the Department of Supply to provide co-ordination of demand, quality control of product to defence standards, and cross liaison.
Second, conditions of service should conform generally with those of the three fighting services. The corps must be military (subject to military discipline) and be capable of being placed under command of each fighting service for operations at home or abroad. The legal machinery for this would have to be provided but should not be an insuperable problem for the legislators.

A proposed outline organization of the new corps directorate is illustrated. The main feature of the organization is the functional break into two branches — Supply and Transport: the supply branch embracing supplies, POL, catering and postal services, and transport incorporating all forms of surface movement and ground agencies for movement by air and sea. The whole organization is designed to co-ordinate defence requirements in its specific fields of endeavours and to form close liaison between the Departments of Defence and Supply in these fields.

What are the advantages of the proposal? Summarized, they are: to ensure that future expeditionary and home defence forces will be sent into battle with sound administrative backing; that logistic planning for vital commodities takes place in advance of, or at least simultaneously with, armed service planning; co-operation between the armed services, and finally, economy of effort generally.

In dealing with the first advantage, we can see that the Chief of Defence Staff, through his Chief Supply and Transport, could exercise a check on individual service plans to ensure that administrative considerations are given their rightful place in operational planning. In the future, where Australia may have to 'go it alone', at least in the initial stages of a conflict, administration and logistics will assume greater importance in deciding where, when, and how we intend to fight.

The importance of administrative planning has never assumed a critical degree of prominence in operational planning by the AMF. Apart from the terrible fright, now largely forgotten, when Darwin was bombed in 1942, we have rested content in the assumption that our great and powerful allies will always provide the cow for us to milk. Defence control over vital logistics will ensure that the degree of administrative risk is considered early in all service plans and that proper care is taken so that our troops are placed in operations in the best possible way. Control of vital logistics would have the effect of ensuring co-operation between the services and economy of effort.

A further important consideration is the inexorable advance of the computer in the production of defence plans and estimates. Compu-
terization of movement and transport controls will soon become commonplace in handling the tempo of modern tri-service operations. It is therefore necessary to look well ahead in our planning to see that our organizational changes are capable of making full use of modern technology. An interim reorganization could easily be made obsolete by current advances in modern technology.

To sum up, the proposed reorganization is designed to give the army a well-proven system of maintenance in the combat zone. The division and its task forces will continue to be given appropriate supply and transport units under command, designed to provide efficient advice, service and maintenance to which the fighting troops are entitled. In the rear of the combat zone abroad, and in the main support area at home, the new defence service corps would provide advice, service and maintenance to the three services with maximum flexibility, co-ordination of effort and economy. The scheme provides an 'ultimate solution' in its field.

BALIKPAPAN, AUGUST 1945

The Balikpapan operation—the largest amphibious attack carried out by Australian troops—succeeded fairly swiftly. The attackers possessed the support of powerful weapons; aircraft using bombs, napalm and guns; naval guns; tanks, including flame-throwers; man-handled flame-throwers. The Japanese, who were in well-prepared positions and well equipped with guns and mortars, resisted with their usual fortitude, and paid more than seven lives for each Australian life they took. Once again they demonstrated how a force of resolute men well dug in could delay a stronger force far more formidably armed.

The immediate objectives in Borneo were to establish bases and re-occupy oilfields; the long-range objective had originally been to advance westward to Java. If the attack on Java had been carried out it would have been in progress at a time when American forces were committed to an advance northward to Japan proper, and the British-Indian forces to an advance southward against Singapore. In retrospect the wisdom of embarking upon this third thrust—westward against Japanese forces isolated in the Indies—seems doubtful. Strategically the only gain would have been to the Japanese whose isolated and otherwise idle forces would be given employment; it would have been proper to place this third front on a low priority for equipment, and not improbable that it would have been plagued by shortages of men, ships and aircraft.

—Gavin Long, The Final Campaigns (1963)
The Camp of Tran Van Hoang

Major P. R. Phillips, MC
Royal Australian Infantry

Know your enemy

Of course, Tran Van Hoang knew the enemy. He had fought the 'long noses' in Ninh Hoa Province, ambushed the puppet government forces on the canals of Tra Tinh, struck down the mercenaries in the bamboo forests of Quang La. All this and ten years of service to the Cause — devoted service — which set him above the 'bean shoots', as he called the young guerillas in his unit, J84 Sapper (Regional Camp Construction) Platoon. But at the moment Hoang, the finest field engineer in all of Ninh Hoa Province, was more concerned with the irksome presence of two new enemies much closer to home.

The first was Nguyen Vien, political commissar of the Tenth Inter Provincial Military Region; an upstart, officious, with sleek pomaded hair and equally sleek new ideas, which he inflicted upon Hoang like some imperious Mandarin tutoring a dull peasant child. Hoang did not enjoy the endless hours spent in political discussion, double talk or double double talk as he thought of it. Even less did he like the painful sessions with Vien and Vien's interfering and worthless criticism of his work in the jungle.

But the deepest scourge with which he was constantly afflicted was his sister-in-arms, Piao Poh Pee, J84s medical orderly. Pee was no ordinary girl — not a suggestion of mystique, no feminine vanities, no flaunted figure, but nonetheless female in a neutral or, should one say, leftist manner. She was the only delight on whom Hoang could rest.

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Major Phillips graduated from the Royal Military College in 1955. He served as a platoon commander with 3 RAR from 1957 to 1959 during the Malayan Emergency. He served again with 3 RAR as a company commander in 1968 in Vietnam when this article was written. His other appointments have included Adjt 1 RTR, Staff Captain HQ Puckapunyal Area and company commander with 2 RAR and 6 RAR. He attended Staff College, Queenscliff in 1966 and at present is an instructor in the Tactics Wing, ITC, Canungra.
his eyes during the long weeks in the jungle. His song book was filled with odes in her honour instead of the patriotic songs he should have inscribed there. What hell he endured because this Marxist virgin seemed not to even recognize the fact that he was a man. She was too intent on the Cause of Revolution. So Hoang had to endure the meddling of a political pedant in his life's work and bear not only the frustration of unrequited love, but also the scorn and abuse heaped upon him by the object of his desires.

Ten years ago, Hoang had fled his village, in Quang La Province after he had been accused of poaching from the gardens of General Huong Din Diem's villa. He had drifted into the Cause and stayed, though not for political reasons. And it was certainly not because he was a fighter, even though he would regale young recruits with stories of his exploits, and he delighted at any excuse to display his sheaf of commendation certificates. On the contrary, though he would not admit it even to himself, Hoang was a peaceful man and a man who took pride in his work.

At first it had just been scraping out a sleeping pit, helping comrades dig a bunker, being selected to build a kitchen, later even designing tunnels; till now, when he knew that he was unequalled in the whole region. Had not he alone been asked to advise on the digging of 62 Rear Services Group's hospital in An Tonh Province? Had not he designed the pyramid bunker supports used by F700 Battalion, more widely acclaimed each day? As proof, he could tell Vien of the twenty-eight good camps both in Quang La and Ninh Hoa Provinces which were still undetected and undamaged by the enemy. And also there were his caches; masterpieces of ingenuity which he prepared with the devotion of a virtuoso.

Who else could hide 200 litres of rice and keep it free of vermin and undetected for eight months? At least, F700 Battalion appreciated his efforts and he could rely on An Beh Che, the battalion commander, to support him at the meetings of the council of Inter Provincial Military Region 10. He enjoyed the company of the F700s squads who staged through his camps. They helped keep his mind off Piao Poh Pee and she was kept too busy tending the sick to chastise him with her shrewish tongue.

Apart from Hoang's difficulties with Pee, and the forbidding efficiency with which Pee drove her comrades, Hoang's squad was a happy though rather unmilitary lot. There were nine others in the
THE CAMP OF TRAN VAN HOANG

squad: seven youths, peasant boys, used to labouring and idealists in their devotion to the Cause; an old, one-eyed cook, and Van, a senior soldier who had served in armies supporting many causes over the last thirty years. Hoang knew that Van was a rogue, a convicted felon, and he secretly despised him for the fellow's lack of enthusiasm for their construction tasks. However, Van was useful as a scout and as a sentry: his knowledge of weapons and munitions and his ability to improvize made him invaluable to the squad.

Hoang had a paternal pride in J84 and even more in the results of their labours. He often felt that a part of his soul was left in each of the camps, the caches, way stations, dispensaries and hides which they had left along more than 200 kilometres of the three provinces which made up Inter Provincial Military Region 10. This aura of pride was swept away rather brusquely one Sunday, in the early part of the dry season, when Vien called for him at Regional Headquarters. A new task was at hand. J84 was to build a new camp in the Ba To area. It was to be a big one — an important one. 'I cannot believe such a reactionary and ignorant coolie could be given such a vital task,' said Vien. A way station and a cache area at first, it was to be ready in six weeks to accept the headquarters of F700 Battalion. They would be replaced in April by the headquarters of 251 Regiment. 'They are strangers here, professionals from the north . . . . You cannot give them some shabby hole in the jungle . . . . What is required is a properly constructed military camp that will reflect credit on the political awareness of the members of this region's . . . .' continued Vien in his sing-song falsetto.

But Hoang was already planning. This was a challenge he would gladly accept. A successful job here and he would be the envy of every sapper in the region, his name would become famous, a Hero of the People, and perhaps, when the Revolution was over, a medal and a pension. He would make Vien eat his words; he might even make some impression on the cold heart of Piao Poh Pce.

Ba To was an area he knew well. Its bamboo thickets and tangled undergrowth were ideal for concealing his camp. Enemy armoured vehicles had only penetrated the fringes with difficulty. No aeroplane could spy into the depths of its forests and only the most resolute of enemy infantry would penetrate. Here a squad could hold off a battalion, for manoeuvre was impossible and only the machine-gun and rifle could be successfully deployed. Here the jungle would absorb
the impact of artillery and prevent the enemy’s helicopters from landing. He drew out of his pack a battered sketch of the area and marked a cross in the area he had already selected in his mind.

The area which he selected was close to a way station which they had used eighteen months before. Hoang’s comrades were enthusiastic and anxious to start off for the new area. They remembered it as a slight rise in an otherwise low-lying and swampy area of thick jungle. To the north and west of the site, Hoang recalled, there was an impenetrable matted scrub rising on a rocky slope. Here, even with machettes and careless of noise, one could not progress more than 200 metres in the hour. To the south was a swamp, dark and overgrown with fleshy weeds, an area where no man could move without being heard by the squelch of his feet in the knee-deep mud, or the clashing of the hollow swamp reeds one against the other.

![Figure 1. Tran Van Hoang's sketch of the Ba To area.](image)

The open flank on the east fell sharply for 50 metres to where the forest had been defoliated, and thorny secondary growth and nettles were asserting themselves at the feet of the dead forest giants. Hoang knew that it would look featureless from the air. The only landmarks were the signs beneath the canopy by which he would navigate. Digging would be easy if he stayed near the low ground and there would be no shortage of the ten-centimetre hardwood logs that Hoang insisted on for revetting.
A week after the Lunar New Year they gathered their tools—hoes, shovels, axes and cross-cut saws—slung their weapons, and set off. Each man carried 10 litres of rice, dried fish and green fruit which would sustain them during the construction. Although it was a mere forty kilometres, the journey took ten days because of the difficulty in getting clearances to move beyond the various way stations along the infiltration route. This could have been overcome if they had had an authorization from the Regional Council. However, this would have meant a request to Vien which Hoang had stubbornly refused to make.

They arrived at a stream some 400 metres to the south of the site late in the afternoon. Here they selected and cut a track off towards the general area. Particular care had to be taken to conceal the point where their track turned off. Also their track had to meander through the jungle so as not to indicate the exact bearing to the camp, and to make best use of the concealment from aerial observation offered by the forest roof. Hoang decided to take his track to a rocky creek just west of the camp, where they would make a dummy camp and water point. Here he would make another track along the rocky creek bed, then cut back to the east before entering the camp so as to deceive any enemy patrols.

Till now there had been no sign of the enemy but for the occasional sound of a passing aircraft. All went well until they reached the rocky creek, when Van signalled that there were enemy on the far bank. Cautiously and timidly they retraced their steps and hid in the bamboo for the night. Next day Van crept down to observe. In a few hours he returned shamefaced to report that there were no enemy. Instead, he had found a recent enemy bivouac site where the pigs had rooted up some rubbish pits. It was the smell from these that had first startled him. Hoang cursed Van loudly, which relieved his taut nerves. But he knew the outburst was resented perhaps most of all by Pee who would throw it in his face at the next study and criticism period.

At noon the next day they reached the site and Hoang spent the whole afternoon in careful reconnaissance while his squad made a temporary camp. Late into the night Hoang sat by a spirit lamp transforming the plan in his mind into a sketch which would become his blueprint. It was drawn in a tattered old exercise book in which he faithfully recorded, in his elaborate but school-boyish hand, all his camps and construction details.

The squad started work in good spirits on the next morning, impressed by Hoang’s enthusiasm. Even Pee did not long persist in
her arguments for calisthenics before breakfast nor for a political study and criticism period before the work began. First they built the main defence bunker. This was the forward position in the keep or inner perimeter of the camp. It would be manned by the security squad of the headquarters occupying the camp, but for the present it would be a sentry position. After this they developed the headquarters bunker and the staff sleeping bunker. These three formed the basis of the camp’s defence, to which the occupants would withdraw if attacked by ground troops.

![Diagram of Tran Van Hoang's Master Plan of the Ba To camp.](image)

Each bunker had an underground area four metres by two metres, by two metres deep. The overhead revetment was held up by a pyramid or tepee of logs which Hoang swore would withstand the direct impact of a 175-mm artillery shell. The bunkers were connected by tunnels and there were three narrow entrances to each bunker which also served as firing bays. On top of each bunker a hut was built to be used as a living and working area by day. These huts were about four metres square and two metres high. Their thick brush roof kept the monsoon rains off the bunker below. Their sides were left open for coolness.

In the roof over the main defence bunker Hoang built a sniper’s platform. It was protected on two sides by a giant buttressed tree...
which formed a support for the roof. Hoang added rocks to the other side of the platform to give complete protection to the sniper. Hoang knew the value of an elevated position, where one rifleman could hold off a squad of enemy and cover the ground concealed to machine-gunners in the bunker below.

The keep was sited so that no enemy, however gallant, could rush the position. The rope-like vines and tangled scrub restricted the attackers’ visibility to a few metres. Grenades and rockets were useless and even heavy bangalores pushed forward on poles would barely clear a hole big enough for a man to crawl through.

The keep was completed in the second week and they all then worked to build a dispensary at Pee’s behest. However, it was willing work because they knew what a refuge this was to the wounded guerilla and its heartening effect on morale in the combat units. In the next week, Hoang was able to give some attention to their domestic comfort. In particular they built the main kitchen, a large bunker with storage areas and a large clay oven. Dry wood was collected, which with some meagre supplies of kerosene was their only fuel. Over the kitchen a heavy brush roof dispersed the smoke from the oven fire. This in turn was covered with black plastic which collected the rain water runoff and sent it in gutters into a tank made from the same plastic on wooden supports. This held about forty litres and gave them a reserve of clean water, saving the long and arduous carry from the water point.

Hoang knew the value of concealment and spared no effort to achieve it. Whenever a log was cut for overhead protection he was there to smear mud over the top of the stump, so that it could not be observed from the air. The squad, weakened by malaria and the scant rice ration, could not go far afield to get these logs. Most of them were cut from the rising ground 200 metres north of the camp.

It worried Hoang that the enemy might come upon the cuttings by chance but it was an unavoidable risk. The latrine and rubbish point were one hundred metres from the camp on the edge of the swamp. Hoang insisted that the squad members use these even though it was not their usual custom. A deep hole, swamp water and a cover of brushwood kept away the flies and vermin which might have attracted attention. Spoiled food was buried separately where it would not attract the attention of wild pigs.

Three food caches were prepared. The largest, a rice store, was built by excavating a large cavity under an ant hill. When
completed, only a small trap door showed at ground level and this was kept covered with ant bed. Hoang saw that the rice was sealed in plastic and when the carrying parties arrived he would hover about anxiously to ensure that not one grain was dropped, lest a flock of raucous birds descend upon his haven. The smaller caches were concealed in bamboo thickets. One was made by sinking three earthenware containers below ground level. It was difficult work but Hoang's small wiry body could twist into almost inaccessible corners amongst the roots of those thorny reeds. High in the centre of another thicket the third cache was prepared on a platform. Hoang knew that the falling husks of the bamboo would cover any signs of their presence and he had taken pains to ensure that the caches were not obvious.

In the thick scrub 150 metres north of the camp he cleared an area about thirty metres square, being careful to leave a canopy to hide it from the air. Major Che, the commander of F700 Battalion, would be extremely pleased with this spot, where he could lecture his men and conduct sand-table exercises with his officers. Hoang knew also that it would be useful as a bivouac area if there were more people in the camp than he could accommodate.

Finally, the guard bunker and sentry post were built. The latter was a one-man pit on a rocky outcrop overlooking the track in. Leading back up the slope was a crawl trench along which the sentry could make his way to the guard bunker. It would be here that members of the security squad could hold off the enemy until everyone was within the safety of the inner perimeter. The camp was nearly complete and Hoang said a quiet prayer to his ancestors that no enemy might spoil his handiwork.

At the start of the fifth week the carrying parties arrived with their first consignment of rice and propaganda material. Also there were six directional mines which Van quickly installed to cover the approaches, the main track and the paths to the water point and latrine. No sooner had the porters left when a helicopter circled overhead, swooping like some dark bird of prey and buzzing like an angry hornet. It remained in the area skimming the tree tops for twenty minutes — which seemed like hours. Hoang was disturbed; he cursed the carrying parties, blaming them for this invasion of their privacy. He made the squad stay close by the camp and had them sleep in their bunkers, rather than the hammocks which they found so comfortable. Nor was his mind eased when enemy artillery rained into
the swamps over the next three nights. Hoang had nothing but contempt for artillery fire in the jungle — but did this mean that the enemy had some special interest in his area?

In the sixth week, the squad made some rough furniture and were able to rest and gather strength from the new stocks of rations which arrived. The caches were filled, but there was still a large quantity of food, grenades and ammunition dumped on a platform near the main defence bunker. At the end of the week An Beh Che arrived with F700s headquarters group, security and reconnaissance squads. Hoang welcomed his old friends and modestly accepted the praise Che showered on his squad for their efforts. He was proud to point out the advantages he had built into the camp but also admitted that it still had defects.

The bunkers could not withstand aerial bombs, but they were sufficiently separated that probably only one would be destroyed in an attack. He knew that napalm could destroy its occupants. However, the enemy only used bombs and napalm to support infantry withdrawn several kilometres for safety. This they could escape, although he had nightmares that the enemy might develop a close support napalm — a flamethrower that could penetrate the undergrowth or, worse still, a helicopter which could pour the flaming fuel through the canopy. He took pains also to warn that the camp was not proof against detection.

There was a ‘house warming’ of sorts one night when Che produced some rice wine. They talked and played Che’s transistor and then sang songs until the dawn; traditional songs which Hoang loved so much more than the political hymns Pee insisted on. Hoang felt a sense of achievement. No longer was he a ‘common ill-disciplined sapper’ but a man of substance who had made his mark in the Cause. But these pleasant days were not to last.

In the seventh week a courier brought word that Che and his men were to leave on the next day because F700 was required to assist in a new operation in Quang La. There was also a note for Hoang which told him that Vien would arrive that week with new instructions from the Regional Council. It also advised that the headquarters of 251 Regiment were expected to reach the camp by early May and that Vien would inspect the camp to ‘see that it was satisfactory and all was in order’. Hoang laughed to himself.

Vien arrived just two days later but there was no time for inspections. He had been ambushed and his two bodyguards killed.
Vien himself had a slight wound and though he had run for two kilometres he was still white and trembling. 'The enemy have discovered the main trail on Route J. One of the carrying parties has been ambushed as well,' said Vien. 'There could be enemy quite close to the camp at this very moment.'

Hoang knew his task well. At all costs they must avoid disclosing their position. At worst, they might have to fight to gain sufficient time to move the thirty sacks of equipment which were still lying unconcealed in the camp. Hoang hurried off to call in three of the squad who were noisily cutting trees in the swamp. As they returned, a shot, an explosion, then more shots rang out. They ran into the bunker. Van followed them panting. 'There are twenty of them coming up the track like geese. I shot one and fired the mine before I left.' But Van's story was not finished before the crack of bullets overhead told them that the enemy had closed up to the keep.

Artillery was firing now to the north where the enemy thought they might be escaping. Hoang knew that nothing could harm them as long as the enemy was kept from the bunkers: they dared not use their massive firepower and risk hitting their own men. The fire from his bunkers and the jungle itself would hold the enemy and deny him manoeuvre.

Grenades were exploding in the vines only fifteen metres from the bunker. But Hoang knew the enemy was held. His sniper was firing confidently and the machine-gunners at the bunker entrances were holding their own. They heard screams: this pleased him because it would weaken the enemy's resolve. It was late in the day, so he told the gunners to slow their fire so as to let the enemy withdraw. The battle subsided; the enemy would be moving away to secure a landing area for his helicopters and would rely on aircraft to destroy the camp.

They waited until dark, and after the artillery had ceased, before cautiously moving the stores into hides near the camp. By dawn they had gathered up their belongings and left. They could hear a light observation aircraft skimming the tree tops overhead as they trekked up the slope and away from the camp. Twenty minutes later they took cover in the rocks at the top of the slope whilst the strike aircraft rained their bombs on the camp. Hoang's heart was heavy and the tears welled up into his eyes as he listened to the screaming jets and felt the quaking ground.

When it was over Vien urged Hoang to hurry on. Even Pee would not spare him this moment of anguish. 'Forget your stupid camp,' she
cried, 'it was not so good and anyway the Cause is more concerned with destroying the enemy than crying over your haven in the jungle.' Hoang was weeping inwardly but he picked up his pack and followed them. As they trudged into the next valley he consoled himself with these thoughts. 'They can’t have destroyed more than one bunker... in six months the jungle will be as good as new... no reason for not using it again... my next design will have no track in... use a creek bed... I could try a minefield... just a little one, with a rope bridge....'

EPILOGUE

The following is an extract from an intelligence summary issued in II Allied Corps’ area during the week:

**Ba To Area**
185 Bde reports minor contact in area XT 1904 . . . Company A/2/185 located an occupied enemy camp in area XT 243044. The company withdrew to permit airstrikes. Results — two friendly KIA, two friendly WIA; enemy — two KIA.

**Airstrikes** — Enemy camp XT 243044 struck with two sorties at 150650H. Bomb damage assessment revealed one bunker destroyed and 30 metres of trench uncovered.

**Operations** — Operation SORBONNE. Reconnaissance in force operation in the Ba To area ends. 185 Bde now located BLACK HAWK.

MONTHLY AWARD

The Board of Review has awarded the $10 prize for the best original article published in the May 1970 issue of the journal to Major P. N. D. White for his contribution ‘The European Scene—A Visitor’s View’.
Military and Economic Links in Japan 1870-1920

Captain R. J. Lamb
Royal Australian Army Ordnance Corps

This short review of a vital period in the economic growth of Japan is interesting for its broad implications. First, it illustrates the evolution of external policies of a nation which finds itself in the middle of a regional power game. Second, it demonstrates one of the ironies of nature: that economic growth and national strength can be fostered in an atmosphere of heavy military preparations. Third, it aids in an analysis of the role of the military in society. These implications are vital to the study of the growth and place in the world of many of the developing nations in South-East Asia, South Asia, the Near East and Latin America.

Japan, in 1970, is the third largest nation in the world in terms of Gross National Product. It is rapidly approaching the US and USSR in industrial strength, resource capability and ability to exert power. To the other implications can be added a further one. What will be the effect of this, as Japan is the first non-Western nation to gain such heights?

The purpose of this paper is to examine the broader aspects of the foundation laying from 1870 to 1920 in relation to external policy and thus, by logical extension, military capacity. Let us begin by examining the Pacific situation in the 1850 to 1870 period.

The Orient was fast becoming an object of attraction for trade and colonial expansion. The rich whaling grounds were necessary for sperm whale oil, then the chief illuminant. Ocean going steam ships were being introduced and in 1869, the Suez Canal was opened. In the

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midst of this was a closed tradition-oriented nation moving slowly forward. The rude intrusion of Western powers (US, Britain, France, Germany, Holland, Russia) in the 1850s and 1860s was a major factor in the 'explosion from within' which resulted in the Meiji Restoration of 1868. The feudal lords or daimyos symbolically presented the Emperor with their estates in 1869 with a memorial document, the last words of which ran 'Thus the country will be able to rank equally with the other nations of the world'.

The scene was now set for the basis of national policy for the next seventy years. This mood of thinking resulted from three things:

1. The 'demonstration effect' of the power that can be exerted by a modern state with modern technology, for example, US, Britain.

2. The example of a subservient China where the foreign penetration was rampant.

3. The 'extra-territorial' one-sided trade treaties imposed on Japan by the Western intruders.

From the beginning, the aim of the Japanese leaders was to absorb and adapt Western ideas. The Navy was built up along British lines, and the Army on German lines with German advisers. In 1881, the political system was based on the Berlin model — 'A baleful effect on the course of Japanese history'. Small-scale industries using Western technology were expanded into steel making, munitions, ship building and ordance production.

In the 1870s and 1880s it was, to the Japanese leaders, extremely vital that the nation catch up and be able to protect itself. It was a natural reaction to the commercial and colonial expansion in the West Pacific. The French were dominating Indo-China, the British and Americans penetrating into the Chinese economy via the open door policy in the China ports. The Russians were menacing in Northern Manchuria. The Japanese automatic reaction was fukoku kyohei — 'a rich country and a strong army'.

It was almost as if the strains of the previous two decades were too much — the short, sharp and tactically perfect war with China in 1894 yielded wonderful results. It proved the effectiveness of a modern army.

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2 Storry, p. 115.
The old *samurai* ideals had died; the army was mainly conscripted and marked on Western methods. The *samurai* who bent with the wind between 1868 and 1877 were in business and government.

However, the wholesale acceptance of Western ideas was given a severe jolt with the 1895 Tri-Partite Intervention of France, Germany and Russia, forcing Japan to give up her new possessions. ‘Bear the unbearable’ said the Emperor Meiji, reinforcing a psychological shock which had much to do with future events. The Western nations came to be distrusted and viewed as hypocrites as Japan watched China and Southern Asia carved up in the colonial scramble of the Western powers.

The economic effects of the national policies since 1869 were becoming noticeable by the turn of the century. The most important industry in the manufacturing sector was textiles, mainly silk, but also cotton and woollen goods, aided by the military demand for uniforms etc. The indemnities obtained from China for the 1894 war were equal to a third of her 1895 National Income providing a valuable boost to government spending. But the nation was still predominantly backward and poor (by Western standards) with 80% of the workforce still in agriculture and only 6% of the population in towns of greater than 100,000 in 1893.\(^3\)

The wily and ever pragmatic British had remained out of the 1895 intervention and used other methods to counter-balance Russian and French power. In 1902, the Anglo-Japanese alliance was formed and was highly advantageous to both parties. *The Times* of London, describing the Japanese naval attack of Port Arthur in 1904, praised it as ‘daring’ and destined to go down in the annals of naval history. The Russo-Japanese war of 1904-05 was to the Japanese inevitable and they thought they were forced into war — similar to the 1941 attitude, and this does seem to be justified. The results of this similarly decisive war were ironic. For Russia, it seriously weakened the position of the czarist hierarchy which was given the death blow a decade later. For Japan, it heralded a new era in international relations for she had tackled and beaten a Western power. Consequently, the alliance with Britain was renewed whilst her international prestige soared.

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Internally, however, the results were even brighter. The decade 1894 to 1904 had seen industrial expansion quicken and broaden. The place of the military was firmly established, aided by the Yagamata law of 1900 that the Ministers of War and the Navy had to be serving members. The nation was ultimately ruled by the genro (Ito, Okuma, Yagamata and Matsukata) — the old wise samurai leaders, although the Emperor was the apparent head of state. In 1910, Ito, the moderating influence of the genro died, leaving Yagamata to wield his influence. It was in this year that Korea was annexed, with the aim of creating access to the rich raw materials in Manchuria.

We have seen that the two short wars had stimulated the economy as well as fulfilling the complementary objectives of external policy. The wars had expanded government expenditure; it tripled from 1893 to 1903 and military expenditures were 27% of National Income in 1913.\(^5\)

The greatest stimulus, however, came with World War I where Japan did not enter the conflict in Europe, although she sided with the Allies. She entered into the markets previously dominated by Britain, especially the cotton goods markets in India, and South Asia. Allied demands for munitions and shipping were strong and also provided great stimulus. Her gold reserves increased sixfold from 1914 to 1920, her steamship tonnage doubled and the number of workers in industry nearly doubled.\(^6\)

As a postscript, the industrial expansion during this period caused vast changes in the internal structure of Japan’s industrial sector in the 1920s. She became able to develop heavy industries (metals, engineering and chemicals) on a large, intensive scale. Concurrent with these changes were developments in the political and social spheres. Of prime importance was the widening gap between the rural and urban outlooks. The military obtained most of its support from the rural areas. Its young officers had risen through the ranks from middle class rural classes. It was here too that the origin of the fierce religious nationalism was to be found. The businessmen of the zaibatsu (industrial corporations) in the cities were responsible for the financial stresses that accompanied the rapid expansion in the 1920s. They were not be overtly trusted. Allied with these underlying changes

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\(^6\) Allen, pp. 97-8.
was the fact that the last of the genro (Saionji) had died in 1924. The young men in the Army and Navy were restless and strongly desired to fulfil the destiny that seemed to befall Japan. Of importance also were the rumblings of unity in China when Chiang Kai-shek began extending his control over the Chinese lords after 1927. It was these slow but inexorable changes that were leading Japan into the kurai tanima — the dark valley of the 1930s. The postures which she came to adopt had an element of the bitterness and loneliness she had felt after 1895.

Having briefly examined the growth of Japan in this period, how can comparison be made with the developing countries? We can say that these countries have advantages which Japan did not possess, for example, massive foreign aid, more natural resources; although there were advantages that were unique to Japan — a strong, centralized government, lower population growth, a strong internal demand and no serious religious/class rifts.

A developing nation today must trade off one power bloc against the other under the guise of neutrality. Japan did not have this problem to this extent and combated foreign influences with a fierce desire for growth and strength. Japan also was able to maintain a difficult internal balance in her growth, i.e., between industrial expansion and agricultural development with heavy military expenditures. Today, many developing nations are more concerned with military capacity and a resultant misallocation of resources. The role of the military in many developing nations is consequently overplayed. The death of Ito, as a moderate leader who saw the dangers of military over-expansion, serves as an example. Yagamata was left holding the reins and he did not have this insight. It is unfortunate that the military, although able to shape the prerequisite of a strong centralized administration in many developing countries, often commit the error of military over-expansion. This sacrifices the development of a balanced internal economic structure.

In regard to the fourth implication above, Japan is finding herself in a similar position to that following 1868. But it must be noted that a major part of her so-called ‘economic miracle’ since 1945 has been due to a negligible allocation of resources towards military preparations. This cannot continue for much longer as the US exerts diplomatic pressure via the use of economic power. Japan cannot ignore the growing potential power of Mainland China, nor can she fail to take into
account the benefits she can reap from economic co-operation with the USSR in the Siberian region. This would counter-balance Mainland China, at the same time providing further internal economic stimulus. In short, then, Japan is amidst a new regional power game — this time with Asian players.

The reason we have extended beyond the period in question is because that era was a foundation for the part Japan has played and will continue to play in the West Pacific area. It was between 1868 and 1920 that the basic structure of industrialization was formed. During this time the impact of war was strongly felt; the 1894-95 and 1904-05 wars aided the process of industrial change. It is ironic that the war in which she played no part, World War I, provided the impetus which effected the change to a mature, industrialized nation with a highly intensive resource capability.

REFERENCES

Works cited in footnotes.

THE AUGUST OFFENSIVE, 1918

Ludendorff attributed the Allies' success on this 'the black day (der schwarze Tag) [8 August] of the German Army in the Great War' to failure of the German soldiers' morale. 'Six or seven divisions which certainly could be described as battle-worthy,' he says 'had been completely broken . . . . ' He was told of 'behaviour which, I openly confess, I should not have thought possible in the German Army' — bodies of men surrendering to single troopers; retiring troops shouting 'blacklegs' and 'you're prolonging the war' at the reserves who went through them. Many German regimental historians explain the Allies' success as due to tanks.

Australian Tank of 1912

Staff Cadet C. D. Clark

AS the brief artillery barrage lifted, German troops emerged from their dug-outs deep in the chalky French soil to repel the expected infantry assault. They were dismayed to see monster-like machines lumbering awkwardly towards them through the morning mists. It was 20 November 1917, and the place was Cambrai. In the first ten hours of the ensuing battle these ‘land destroyers’ were to demonstrate to the world the potentials of armoured warfare.

There is no one person who can claim the distinction of having invented the tank, for, as Liddell Hart observed, ‘it was flowing in the universal stream of thought beneath the surface before it spurted out through different springs, under pressure of circumstances’. It was only towards the end of the nineteenth century that armoured fighting vehicles ceased to be creatures of the realm of fanciful speculation and became serious possibilities. Frederick Simms’ ‘motor war car’ went on display at the Crystal Palace in London in 1902. Three years earlier he had offered his designs (several points of which showed considerable promise) to the War Office, but they were not accepted. H. G. Wells, a pioneer of science fiction, wrote a story, ‘The Land Ironclads’, which contained a minute description of a land destroyer, and which appeared in Strand Magazine in December of 1903. The idea of a tracked vehicle had appealed to Wells, and it also impressed many people, including several who were later involved in the development of tanks during World War I. In 1904, Paul Daimler, son of the motor-car magnate, demonstrated his armoured car, featuring a revolving machine-gun turret and four-wheel drive, to the military authorities of Austria and Germany—‘arousing their interest, but little more’.

It seemed that nothing could impress upon officialdom the value of armoured vehicles on the battlefield — it would take a conflict bogged down in the stalemate of trench warfare to do that — although it should also be pointed out that the war of 1914-18 provided the impetus for

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the technological advances which were necessary before such vehicles were practicable.

Even so, the case of Launcelot Eldin de Mole, an Australian engineer, must stand as a prime example of the blindness of the authorities at the time. Born in Adelaide on 13 March 1880, de Mole came from a family of distinguished engineers. His father, William de Mole, was a civil engineer in Adelaide, and his great grandfather was Henry Maudslay (1771-1831), one of the greatest British engineers and inventors of the early nineteenth century. Brought up in Melbourne and Berwick, he became a member of the Institute of Engineers, and invented an automatic telephone, including the complex switchboard, three years before a similar type was first introduced into the United States. He had however, been unable to get the Postal Department to even test it.

De Mole hit upon the idea for a tank while engaged in survey work in very difficult swamp and scrub country around Geraldton, in Western Australia, in 1911. He sent sketches and drawings of his design to the British War Office in 1912, but was notified in June the next year that his invention had been rejected, as the War Office was 'not further experimenting with chain-rail vehicles'. The designs, the sketches of which were kept by the War Office while the drawings were subsequently returned to de Mole, provided for a vehicle 37 feet long, with a wheel base of 25 feet, which enabled it to cross 12 feet wide trenches. The vehicle could turn within a radius of 66 feet, and the object, as de Mole explained it, was to 'provide a chain-rail vehicle which could be easily steered and carry heavy loads over rough ground and trenches', although it could also carry guns mounted in small turrets above the main frame. De Mole did not show armament in his designs or on his model, preferring to leave the weaponry to the gunnery experts.

In the following passage de Mole explained how his tank worked:

It can be steered to the right or left, when proceeding forwards, by altering the direction that the chain-rail is laid in by screwing the front portions to one side or the other as shown on the model; or steered, when proceeding backwards, by pressing the bogie nearest the rear end of the tank to one side by means of the screw gear shown or a hydraulic ram controlled by the steersman, thereby causing the body of the vehicle to be thrown to the right or left as required so that, as the vehicle proceeds, the links of the chain

3 de Mole records in the Australian War Memorial Library.
4 ibid.
5 ibid.
will be laid to the right or left of the line that the vehicle has been proceeding on and so form a curve, which as the vehicle proceeds will alter the direction of travel. The four bogies under the vehicle are fitted so that they may move laterally and conform to the curve of the chain-rail.\(^6\)

As was acknowledged by the Royal Commission on Awards to Inventors in 1919, in some aspects de Mole's design surpassed that of the first tanks actually used by the British Army, which were steered by driving one track faster than the other.\(^7\) In addition to easier steering, de Mole's design allowed that the chain-track be partly enclosed within the body of the tank, thereby giving the tracks greater protection from shell-fire. The high under-body clearance and wider tracks meant there was less danger of bogging, and the idea of a climbing face at the rear of the tank (which de Mole included in the drawings returned by the War Office, but not in the sketches which were retained) meant that the tank could retrieve itself from difficult situations.

Friends urged de Mole to sell his designs to the German Consul in Perth, but he refused, knowing 'that a war was imminent'. In a letter to the *Sydney Morning Herald* on 16 June 1933, de Mole said, 'I ... do not regret this decision, though, possibly, I would have been in a very different financial position today'.\(^8\)

Colonel G. W. D. Breadon (who had worked with de Mole in Western Australia in 1911) wrote to the War Office from India, where he was in charge of a munitions department, in September 1914. In the letter, which was received in October, Breadon pointed out that the sketches of de Mole's designs were still in the possession of the War Office, and he suggested de Mole be sent for. The letter was ignored.

De Mole submitted his designs again in 1915 by sending drawings through a friend, H. N. G. Cobbs, a mining engineer, at Westminster. He was informed that a working model would be necessary before the design could be considered. After this second rejection de Mole tried to interest the Australian Inventions Board, which sat in Adelaide, but here again his invention was not appreciated. He therefore set about constructing a model of his tank and, not being able to afford the expense of travelling to England, he tried to enlist, but failed.

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\(^6\) de Mole records in the Australian War Memorial Library.


\(^8\) de Mole's letter to the *Sydney Morning Herald* is reprinted in *The Royal Tank Corps Journal*, No. 173, Vol. XV, September 1933, p. 130.
In 1916 the first tanks were used on the Somme, and de Mole thought and hoped that his designs had finally been used. He soon realized, with disappointment, that they had not, and determinedly set about once again trying to make the War Office consider his tank design.

De Mole's working model, on display in the Australian War Memorial, Canberra.

It was in the following year that de Mole met Howard Leslie Boyce, a lieutenant in the 10th Battalion who had been badly wounded and returned to South Australia for discharge. Boyce\(^9\) became interested in de Mole's invention, and as the twenty-fifth reinforcement of the 10th Battalion was then being raised, both Boyce and de Mole enlisted for active service in August 1917. The unit sailed on the Blue Funnel liner *Aeneas* with de Mole's model well-crated with the orderly-room stock. In a letter to the Adelaide *Advertiser* (11 November 1964), Mr L. J. Burton, then a member of the orderly room staff, wrote, 'Our staff had special orderly room permits signed by Lt Boyce. I still have mine as a souvenir, and a reminder of the plan to force the British War Office to take an interest in the invention'.

After disembarking at Plymouth, de Mole and Boyce managed to bring the tank to the notice of the British Inventions Committee. After seeing de Mole demonstrate the model, the committee reported its decision on 31 January 1918 to send the invention to the Tank

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\(^9\) Boyce, the son of Sydney solicitor Charles Macleay Boyce, was born in Taree, N.S.W., in 1895 and educated at Sydney Grammar School and Oxford. After discharge from the Army he read law and was called to the Bar, Inner Temple, in 1922. He was MP for Gloucester in the Commons 1929-45, an alderman of the City of London, 1942, and Lord Mayor of London 1951-52. He was created KBE in 1944 and died in 1955.
Board. Nothing further was heard for six weeks. De Mole made investigations, finally uncovering his model in the basement of the Tanks Experimental Corps building — the model had not been unpacked and the letter to the second committee recommending the designs for examination had never been sent!

De Mole was not allowed to personally demonstrate his model to the Tank Board, as this had to be done through one of the staff. The committee promised to send for him, since he was in camp on Salisbury Plain, but before this transpired, he was sent to France in March 1918 — to serve as a private in the front line. Several times while in camp de Mole had been able to obtain special leave to personally see Captain Wilson, who was then in charge of tank development, and show him the model and how it worked. Wilson wrote an unfavourable report on the invention, but his report was described to the Royal Commission on Awards to Inventors in 1919, by Colonel Johnson, then in charge of tank experiments, as ‘not being a reasoned and proper report, and the criticisms [in that report] are not justified’.

When the Royal Commission was set up to decide awards to inventors of devices which aided final victory in the war, de Mole lodged a claim, but was refused a hearing on the technicality that his claim was submitted late. Largely due to the efforts of a friend, Major T. G. Tulloch, de Mole’s claim was heard before the Commission on Monday, 3 November 1919. The Commission found that:

the credit of designing and producing . . . the ‘Tanks’, as actually used, was to be attributed to Sir William Tritton and Major Wilson [see note 10], who in fact carried out their work in the latter part of the year 1915 and the early part of the year 1916; and it was recommended that a large award of £15,000 should be made to them. On the other hand, it was found that a Mr. L. E. de Mole, an Australian engineer, had made and reduced to practical shape, as far back as the year 1912, a brilliant invention which anticipated, and in some respects surpassed, that actually put into use in the year 1916; and that this invention was in fact communicated at the time to the proper Government Department, but was not then appreciated and was put aside and forgotten . . . . We regret that we are unable to recommend any award to him . . . a claimant must show a causal connection between the making of his invention and the user of any similar invention by the Government.

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10 Major W. G. Wilson, CMG (b. 1874), was an engineer of Winchester, England. During the war he was Chief of Design, Mechanical Warfare Department. He was accredited, with Sir William Tritton (1875-1946), an agricultural implement maker of Lincoln, England, with designing the first British tank.

11 Sydney Morning Herald, 19 October 1935.

12 Ernest Scott, Australia During the War, pp. 251-2.
The Commission went on to say that, 'had Mr de Mole's invention been brought either directly or indirectly to the notice of Major Wilson or Sir William Tritton, as was clearly not the case, a different result would probably have been arrived at by the Commission.'

This decision sparked off a furore in the London Press. *The Times*, the *Daily Telegraph*, the London *Observer* and the *Illustrated London News*, all came out in support of de Mole.

On 29 November, the latter publication printed a full page of illustrations headed 'Better Than the Somme Tanks of 1916 — a 1912 Model'. The next day, in a leading article, the *Observer* quoted the Commission's findings, and commented:

> It is an astonishing individual feat. It means that one man, single-handed in the quiet times of peace, was responsible for an achievement barely equalled by the co-operation of some of our best brains and by long experiment under the stimulus of a national emergency. We are glad that his claim is on record. The fact that it cannot be entertained by the Commission will not lessen the tribute of sympathy and admiration due to him. Had this been an inquiry upon the ideal, and not upon the actual machine which took the field round about Delville Wood, in September, 1916, the judgement would have been different. If he cannot point to a substantial reward, he has the higher satisfaction of being ranked, a latter-day Leonardo, among the signal few who have earned the distinction of being ahead of their times.'

De Mole was awarded £965 for out-of-pocket expenses, but after having paid the men who had enabled him to build and submit his model, he was left with £432-10-0 for all his trouble. It was admitted that de Mole's design 'was imperfect in form, and could not be described as a completed invention ... [but] had its existence been known ... the design might have served as a very useful nucleus which might have saved much costly experimentation and delay, and perhaps a more perfect machine than the original Mark IV tank might have been evolved.'

De Mole had been made a temporary corporal and attached to A.I.F. Headquarters (London) on 21 January 1919, and honorary corporal on 12 May the same year. He was created a CBE in 1920, but apart from this the Australian Government of the day accorded him no other honour or gratuity. He was to remain the inventor who, through no fault of his own, only just missed out on the 'jackpot'.

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13 de Mole records in Australian War Memorial Library.
14 Letter of G. Moore Williams (Secretary to the Royal Commission on Awards to Inventors) to the *Sydney Morning Herald* on 13 June 1933.
wife, Josephine,\textsuperscript{15} wrote to the Prime Minister asking that the Australian Government use de Mole's genius, suggesting he be employed in the construction of soldiers' homes and the adaption of his chain-rail for farm tractor work,\textsuperscript{16} but nothing came of it.

In February 1920, de Mole returned to Australia on the steamer \textit{Mejantic}. Despite the unfortunate experience over his tank, de Mole continued to invent, and shortly after the war patented throughout the world a new style of motor lorry chassis especially designed for heavy work. He died, after a long illness, at the Liverpool State Hospital, Sydney, on 6 May 1950.

De Mole, however, was not the only inventor who suffered at the hands of inept and unimaginative officials during World War I. In June 1915, two months after the first German gas attacks on the Western Front, three professors at Melbourne University invented a highly efficient respirator. The British Government had also been experimenting and came up with a similar type in the meantime, and by mid-1916 the new respirators replaced the crude gas-helmets which the British Army had had to use for over a year. The work of the professors was therefore wasted but, as Scott comments, 'had machinery existed for collaboration and the swift interchange of ideas, the work of these Melbourne scientists would have been of the greatest advantage to the British Army'.\textsuperscript{17} De Mole and the academics were certainly unfortunate in their treatment, and one is reminded how completely different was the case of Louis Brennan (1852-1932), an Irish-born Australian mechanical engineer, who invented a torpedo for coastal defence in 1874, and who received awards totalling £120,000 from the British Government for his device.\textsuperscript{18}

Today virtually nothing is heard of de Mole's tank of 1912, and the only relic of his invention is the $\frac{1}{8}$-scale working model on display in the Australian War Memorial, Canberra. Tanks are an accepted feature of modern warfare, yet few people are aware of the work of such frustrated pioneers as Launcelot de Mole, an Australian engineer. 

\textsuperscript{15} De Mole married Josephine Walter, daughter of G. F. Walter of Bendigo, Victoria, in Adelaide in 1915.

\textsuperscript{16} Josephine de Mole to W. M. Hughes, 6 November 1919: de Mole papers in Australian War Memorial Library.

\textsuperscript{17} Ernest Scott, \textit{Australia During the War}, p. 253.

THE joint announcement last January by the Minister for Defence, Mr Fraser, and the Minister for Supply, Senator Anderson, approving the manufacture at the Government Aircraft Factories of two prototypes of a twin turbo-prop STOL (Short Take-off and Landing) aircraft (‘Project N’) to meet a series of roles for the Australian services, as well as fulfil a civilian requirement, marked the start of a new phase in the working partnership between GAF and the Australian armed services.

Since its birth as the ‘Beaufort Division’ early in World War II the factory has produced aircraft for the RAAF, from the Beaufort, Beaufighter, Lincoln, Canberra, to the Mirage — a total of some 1,300 aircraft to date.

This article, prepared by GAF at the request of the editor, Australian Infantry, was offered to the Army Journal because of its general interest. Performance figures quoted are projected only.— Editor.
For the RAN the 'Ikara' anti-submarine weapon system has been
developed and is in full production, and following on its success with the
RAN and RN, the Navy will next get the 'Turana' target drone, a system
based on 'Ikara' and able to use 'Ikara' launcher and other shipboard
equipment.

The 'Jindivik' target aircraft has been used at Woomera, Sweden,
Cardigan Bay (Britain), Point Mugu (USA), and more recently by the
RAN at Jervis Bay, for the development and service training of almost
every anti-aircraft guided weapon in the western world, including
'Sea Slug', 'Bloodhound', 'Thunderbird', 'Sidewinder', 'Fireflash', 'Fire-
streak', 'Rapier', 'Terrier', 'Tartar', 'Talos' and 'Matra'. The 'Malkara'
heavy anti-tank guided weapon was manufactured in quantity for the
British Army as its first operational guided weapon.

Now, GAF will work for the first time with the Australian Army
and RAAF to develop Project N to fulfil, inter alia, some of the Army's
fixed-wing aviation needs through the 1970s.

Over fifty engineers and technicians have been involved in the
design, drawing, tooling and planning of the aircraft and about 150
workers are now engaged in the manufacture of the prototype.

The outcome of over four years of design studies and discussions
with the services, Project N embodies the performance, maintenance and
survival features required to ensure successful operations under South-
East Asian forward area conditions.

The broad philosophy behind the design has been simplicity of
structure and systems, flexibility of loading and internal layout to exploit
the full load-carrying capability for short range operations, and an
outstanding take-off and landing performance from short, rough fields.
Unlike most other aircraft which have been used for military forward
area duties, Project N has been designed from the outset as a military
vehicle and incorporates self-sealing fuel tanks with flash-suppressant
poly-urethane foam in-fill, duplicated primary flying control cables,
fail-safe structural design, personnel and critical systems armour, engine
nacelle fire detection and extinguishing systems, and a rocket-powered
crew escape system operable down to zero speed/zero altitude conditions.

The twin 400 h.p. Allison Model 250-B17 turbo-prop engines have
adequate power to maintain a safe rate of climb on only one engine
even in the most adverse loading and temperature conditions, and are
fitted with reverse thrust propellers for ultra-short field landings. Since
Cabin Dimensions and Loading Provisions

SEAT & CARGO TIE-DOWN RAILS - INCREMENTAL ADJUSTMENTS OF 1"
the engines are mounted on the wings and have a propeller tip clearance of over four feet, the fear of stone damage during the blast of reverse thrust operations on loose ground need not limit its application.

The Allison Model 250 is basically the same unit as is fitted to the Hughes OH-6 Cayuse and the Bell OH-58 Kiowa light observation helicopters used by the US Army. The engine was specifically designed for the US Army and incorporates many features to simplify maintenance in the field environment. For example, all major components such as compressor, gear box, and combustion chamber can be removed and replaced without removing the engine from the aircraft. Free-turbine design allows propeller speed to be reduced to minimize propeller noise when desired. Other developments, including infra-red and acoustic shrouded exhaust systems, are being investigated to minimize hostile detection and warning times and reduce the threat from light-weight man-portable IR weapons.

The cabin is rectangular in cross-section with interior dimensions of 51 inches wide, 62 inches high, and 165 inches long; a total volume of 300 cubic feet over the main load-carrying floor, allowing up to 13 passengers to be seated in addition to the two crew positions. The flat, level floor is loaded through double doors opening down to floor level
and an optional ‘swing-tail’ system will permit the entire rear fuselage to be hinged at one side to load bulky items or items over twenty feet long, such as helicopter rotor blades and tail-shafts.

As shown in the accompanying photographs of the cockpit mock-up, the visibility provided is quite exceptional. Excellent visibility is a prime requirement for forward area military observation and resupply duties, and for operations in and out of difficult airstrips where trees and other obstructions require steep approach and climb paths.

The outstanding performance capabilities of Project N lie in the short field and low-speed areas rather than high-speed. Nevertheless, speeds of up to 200 m.p.h. can be maintained and ranges of up to 1,000 nautical miles can be flown on normal tankage. By using roll-up bladder tanks stowed in the fuselage the ferry range can be increased to nearly 2,000 miles, enabling positioning flights to be made from Australia to anywhere in the South-East Asian area.

Take-offs and landings to clear a 50-feet obstacle can be made from an 800-feet strip under full load. This is made possible by using a high-efficiency double-slotted wing flap and spoiler control system in conjunction with a specially developed high-lift wing section, the combination having been developed in the 9 x 7 feet low-speed wind
tunnel of the Aeronautical Research Laboratories at Fishermen’s Bend in a series of tests extending over several years. The lateral control system has some three times the power of conventional ailerons at low speed to maintain safety in the severe ground level turbulences often found near STOL strips in hilly terrain.

The basic systems of Project N also reflect the keynote of simplicity and ruggedness. The undercarriage has long stroke oleo-pneumatic suspension developed at GAF for both the nose and main gear. Tyre pressures have been held below 30 p.s.i. to allow operation from the softest fields, and the wide track geometry, with steerable nose-wheel and differential braking, add up to ensure good ground stability. The undercarriage is retracted by an electric actuator into streamlined ‘pods’. Free-drop capability is provided in the event of actuator or electrical system failure or damage, and the trailing link geometry of the main gear and its mechanical connection to the nose gear ensures that, even if the down-locks fail, the gear cannot collapse after an emergency extension. Since the main wheels project over twelve inches below the fuselage underside when retracted, damage is minimized even in the unlikely situation where the undercarriage cannot be released.

Project N has the potential for command-liaison and battlefield surveillance applications, since it has adequate cabin volume and payload capacity, and can readily be developed to provide a quick-change ability between roles. The first prototype is expected to fly from the Avalon flight test centre near Geelong in June 1971 and, subject to early production approval, production aircraft deliveries could be made from early 1972.

Because of its unique capabilities, markets are seen for Project N not only in the Australian armed forces but in export to other military services around the world. Later, a ‘stretched’ commercial variant is also planned, deleting the military features and increasing payload capacity still further for use in such duties as flying doctor services, coastal and fisheries patrol, etc., and for mixed passenger/freight operation in developing areas such as Papua/New Guinea.