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A handwritten signature in cursive script, appearing to read 'B. W. Smith', is written in black ink.

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### FRONTISPIECE

In World War 1 (1914-18) Australia raised five divisions for overseas service. Each division had its own divisional cavalry regiment, whose duties were broadly similar to the duties of the Reconnaissance Squadron of the Pentomic Division. The picture shows one of these divisional cavalry regiments on the march near Bray, on the Western Front.

# AUSTRALIAN ARMY JOURNAL

*A Periodical Review of Military Literature*

Number 136

September, 1960

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Photo Australian War Memorial Canberra

Australian Light Horse at Bray, August, 1918

## AUSTRALIAN ARMY JOURNAL

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# MATHEMATACTICS

## THOUGHTS ON PENTROPIC LAYOUTS

The Directorate, Royal Artillery, AHQ

**T**HIS article is about possible layouts in the Pentropic Division—tactical layouts arrived at by some simple mathematics—hence MATHEMATACTICS. The material in the article is part of a study made by the Directorate to provide some background to Artillery problems which were posed by the new organization. It is offered for general interest and in the hope that it will stimulate discussion.

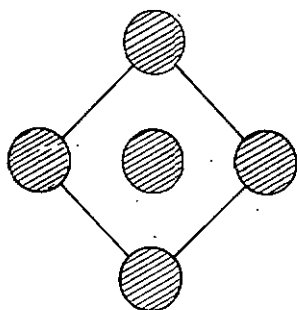
### Introduction

The Pentropic organization raises problems of tactics and employment which will exercise many minds for some time to come. Not the least of these problems are those raised for the Artillery. In a nuclear setting, dispersion will make the concentration of fire more difficult. Furthermore, whilst dispersion may give some protection against nuclear weapons, it raises problems of local protection if it is carried too far. Just how far shall we disperse in this new concept? The answer to this problem is most important to Artillery in order to resolve problems on tactics and equipments.

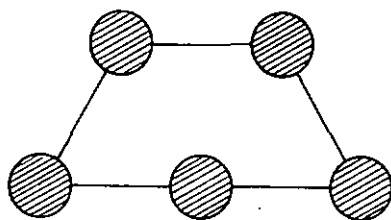
The new organization is aimed at providing a hard-hitting flexible division, capable of fighting a mobile battle in any of the types of terrain found in South-East Asia against an enemy having numerical superiority.

It is likely that our enemy will be well versed in deception and will be highly mobile. If we are strong he will aim to separate us and strike down the separated parts, rather than attack us frontally, even though he may be prepared to accept higher casualty rates than we can afford. Therefore, to counter his tactics we must avoid being pinned down and we must maintain cohesion within units and formations. We must not separate to such a degree that we play into his hands, nor must we adopt such a tight defence that we invite nuclear attack.

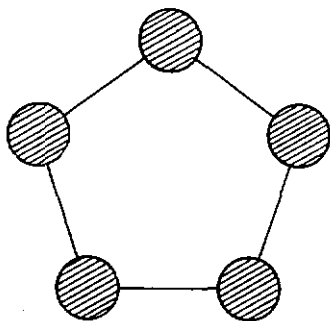
The enemy with his numerical superiority has less need to use nuclear weapons than we have. Therefore, it seems probable that we could become involved in a war in which nuclear weapons would not be used, but in which the enemy would possess nuclear weapons. Our tactics should take this into account,



STAR



TRAPEZIUM

PENTAGON  
Figure 1

and our dispersion should be as great as possible to minimize nuclear effects, but not so great that we can be defeated by conventional means.

This solution assumes that weapons will be used to their maximum ranges. This may not be realistic in practice, but it results in the worst case so far as Artillery is concerned. Furthermore, it is felt that the ground factor can only be considered after the basic concept has been determined. To illustrate this point, assume that a battalion has been deployed in a defensive layout in accordance with current doctrine and with all the latest weapons. No doubt, considerable use would be made of ground to strengthen the position. Now suppose all the latest weapons were replaced by swords and slingshots. Would the layout remain the same? It seems hardly likely, even though the ground would not have changed. Thus it is suggested that ground only affects the layout after the basic concept of weapons effect has been determined. For this reason ground has been eliminated from this study.

#### General Layout

Imagine a cricket field of infinite dimensions. When taking up a defensive position on such a field what layout would a unit or formation adopt? It is suggested that they would adopt the geometrical pattern most suited to their organization. That is a "threes" formation would form a triangle, "fours" would form a quadrilateral, whilst "fives" would adopt a star, trapezium or pentagonal formation. (Fig. 1.)

In the search for the maximum dispersion, the worst case for Artillery

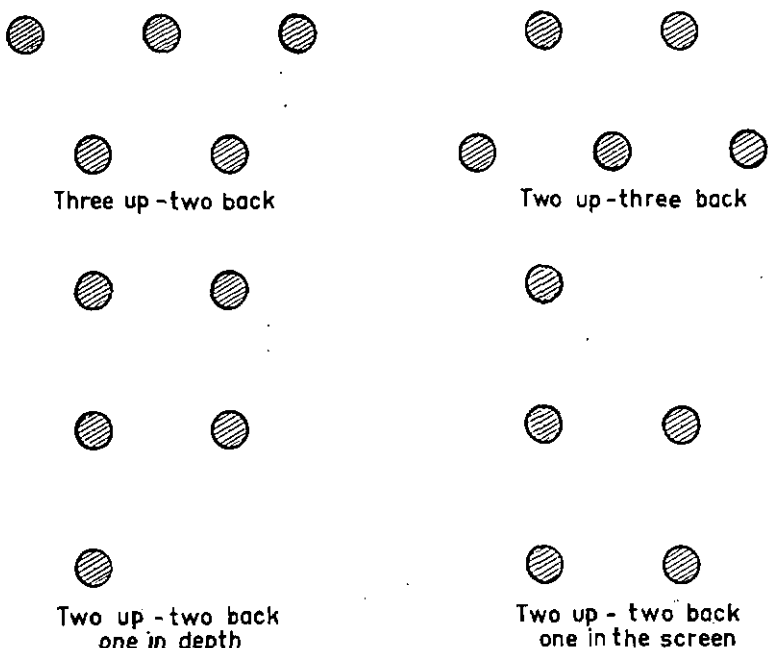


Figure 2

lery, the star is rejected as being not dispersed enough.

The trapezium is the most familiar formation, and results when layouts as shown in Fig. 2 are adopted.

The pentagonal layout results when all-round defence is needed

and, on our cricket field, this is essential. Furthermore, this produces the greatest dispersion, and so is the worst case for Artillery, and therefore has been studied. To determine the greatest size which this pentagon can be, with ground excluded, it is necessary to consider the layout of each infantry element of the division.

KEY TO DIAGRAMS	
PERIMETER	—————
SMALL ARMS	- - - - -
MACHINE GUNS	· · · · ·
MORTARS	∨ ∨ ∨ ∨ ∨
ARTILLERY	" " " " " "
MORTAR POS.	↑ 2
	followed by quantity

Layout of Infantry Section

The section consists of eight men commanded by a corporal. In a defensive layout a section would normally dig a varying number of two- or three-man pits. How far apart would these pits be? The limit to their dispersion, one from



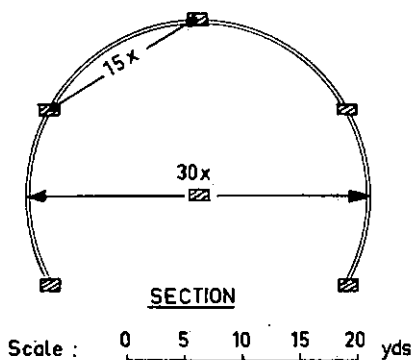
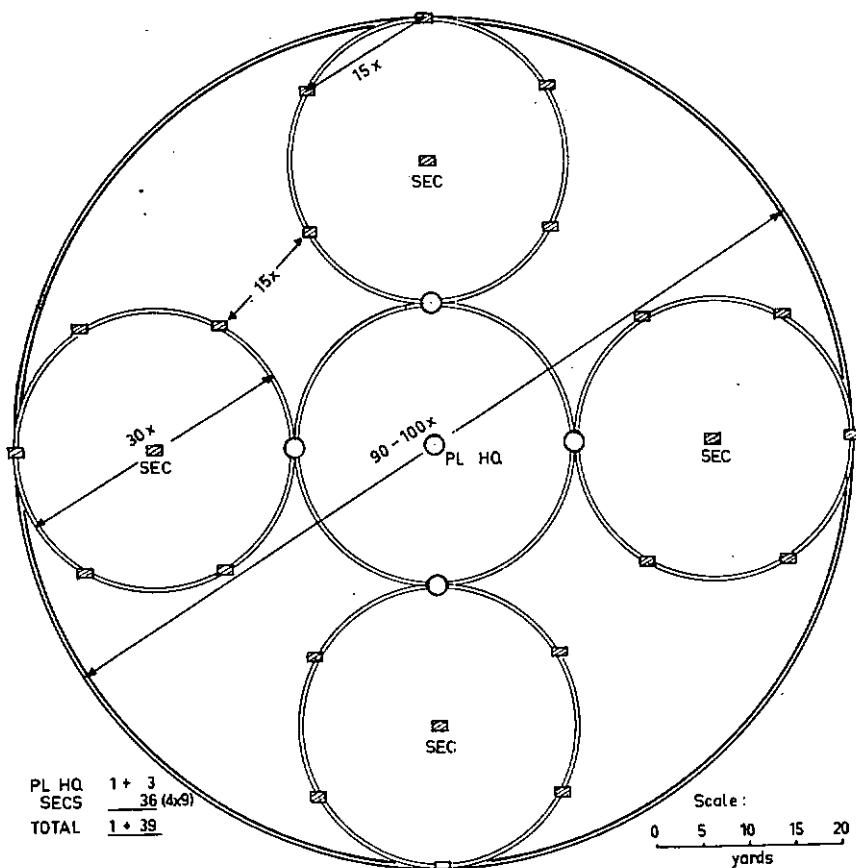


Figure 3

another, is the limit to which the section commander can control his men. It is suggested that about 15 yards between pits would be an average separation. Allowing for alternative pits, the section would appear as shown in Fig. 3.

#### Layout of Infantry Platoon

In the Pentropic division, the platoon consists of a platoon HQ and four sections. The sections would form a quadrilateral, but could not be so far apart as to be



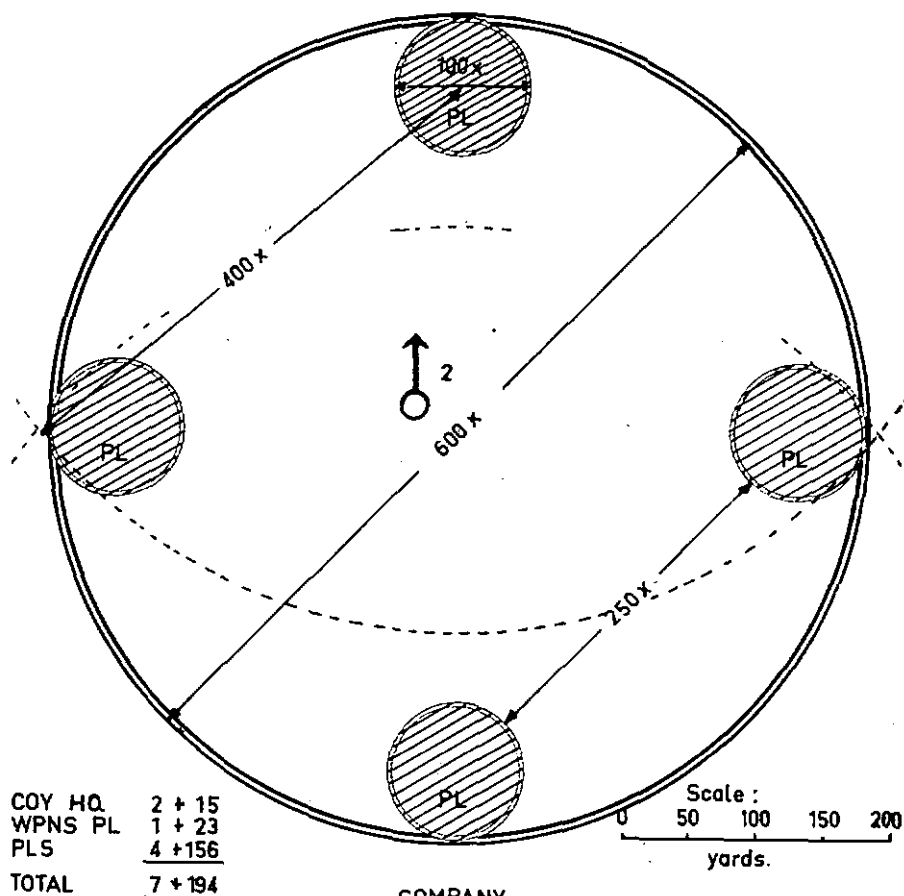
PL HQ	1 + 3
SECS	36 (4x9)
TOTAL	1 + 39

Figure 4

beyond the control of the platoon commander. He must maintain close touch with his sections and must be able to project his personality if he is to fight his platoon successfully. On the other hand, the formation will not be so tight that pits in adjacent sections are closer to each other than are the pits within a section. The suggested platoon layout is therefore as shown in Fig. 4.

**Layout of Rifle Company**

The Rifle Company consists of a headquarters, four rifle platoons and a weapons platoon which includes two mortars. Wireless communication permits greater dispersion than was possible at lower levels. However, dispersion cannot be so great that one platoon is not able to support an adjacent platoon by fire. The layout could be as shown in Fig. 5.



COMPANY

Figure 5

It must be admitted at this stage that there are alternative theories about the area a company should occupy. One is that the area proposed, 600 yards diameter, is not nearly enough and the other that it is too much. However, it is believed that this is the worst case and that dispersion greater than this would be unacceptable, whilst less might be desirable.

**Layout of Infantry Battalion**

There are five rifle companies in the battalion together with support and administrative companies and battalion headquarters. Here the limit to dispersion is the fighting range of the machine-guns, say 1200 yards. Such a limit permits adjacent companies to support each other with machine-gun fire and, at the

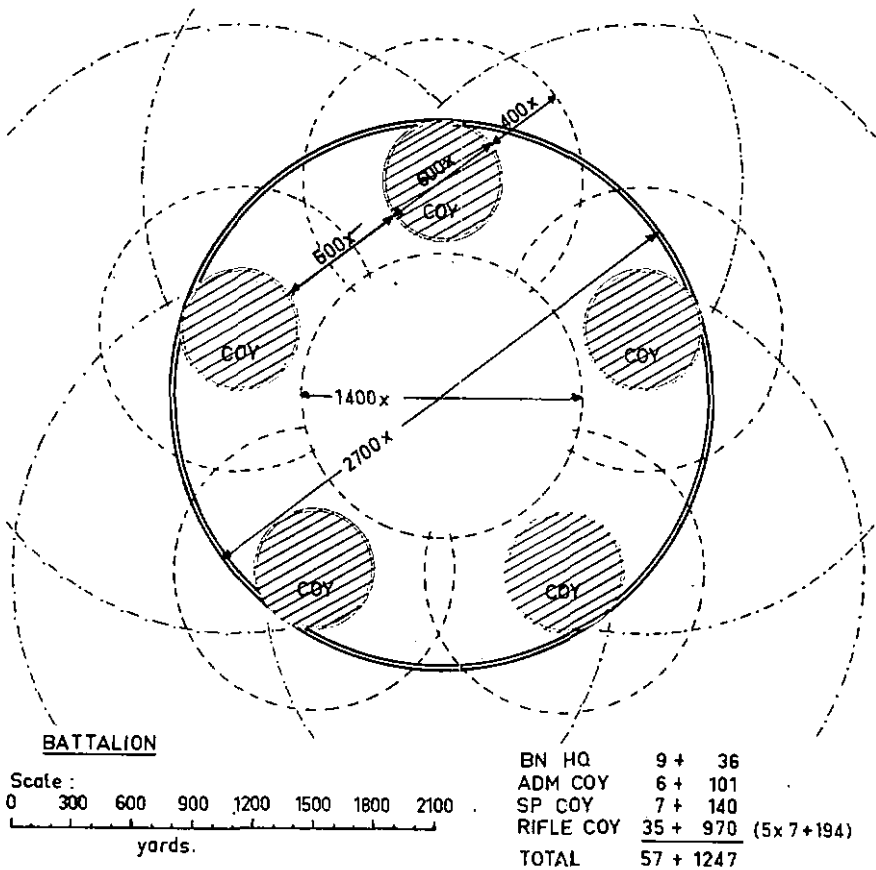


Figure 6

same time, small arms fire to interlock across the gaps. The layout would then be as shown in Fig. 6. If the dispersion is greater than this, then the battalion is being fought as five companies, not as a battalion.

**Layout of Battle Group**

A Battle Group is formed when elements from other arms are added to an Infantry Battalion. It is not expected that the Division will be fought as five Battle Groups; rather it will be fought as a Division when-

ever possible. The case of a Battle Group acting independently is a special one, whilst that of the Division as a whole is the worst one for Artillery.

In relation to the battalions, where would the Artillery be?

Suppose the affiliated Field Regiment, or a part of it, was inside the battalion and one of the companies was being attacked. The Artillery, being in rear of that company, would certainly be subjected to some of the fire intended for the

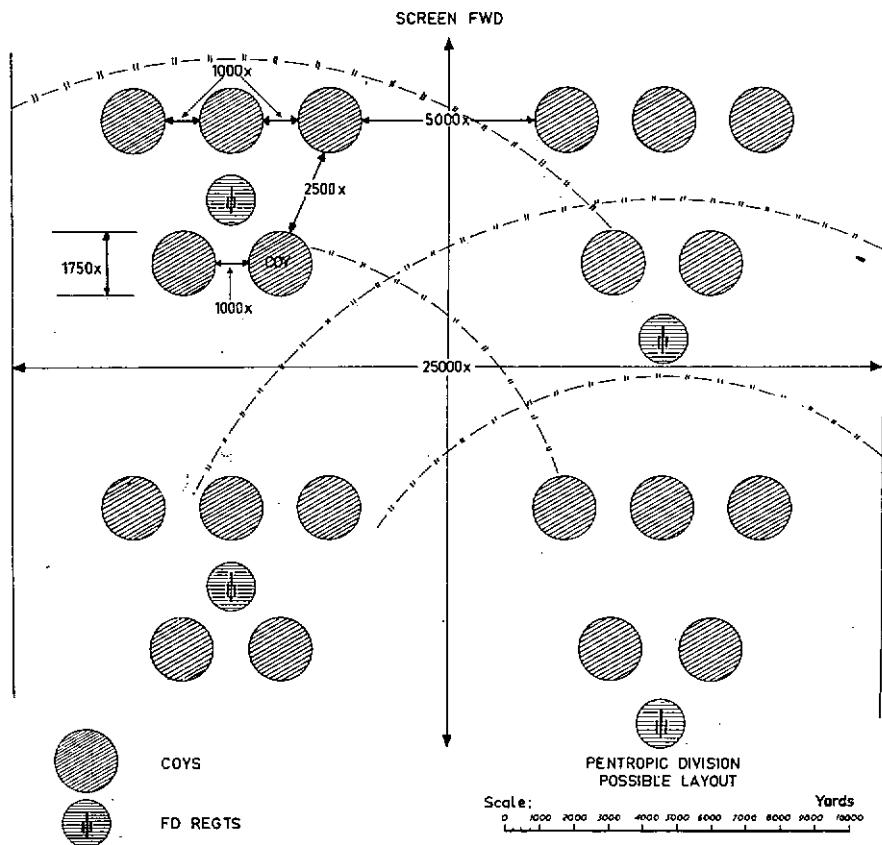


Figure 7

company, and so its ability to support would be impaired at a critical time. If the company were overrun then the Artillery would be in the forefront of the battle and the main task might be to save the guns, not serve them. Suppose now a counter-attack was to be launched to regain the lost company ground. Coming, as it might well do, from the rearmost companies of the battalion, what confusion would result as the attackers wound their way

through gun-pits and command posts and the mesh of telephone cable which joins them. Even if all this were carried out successfully, there is still the case when Artillery fire is required from one position in support of another. This would undoubtedly disturb the peace of any battalion in whose area the guns were situated, not only because of the noise but also because of any retaliatory fire which they might draw. It does seem that the Artil-

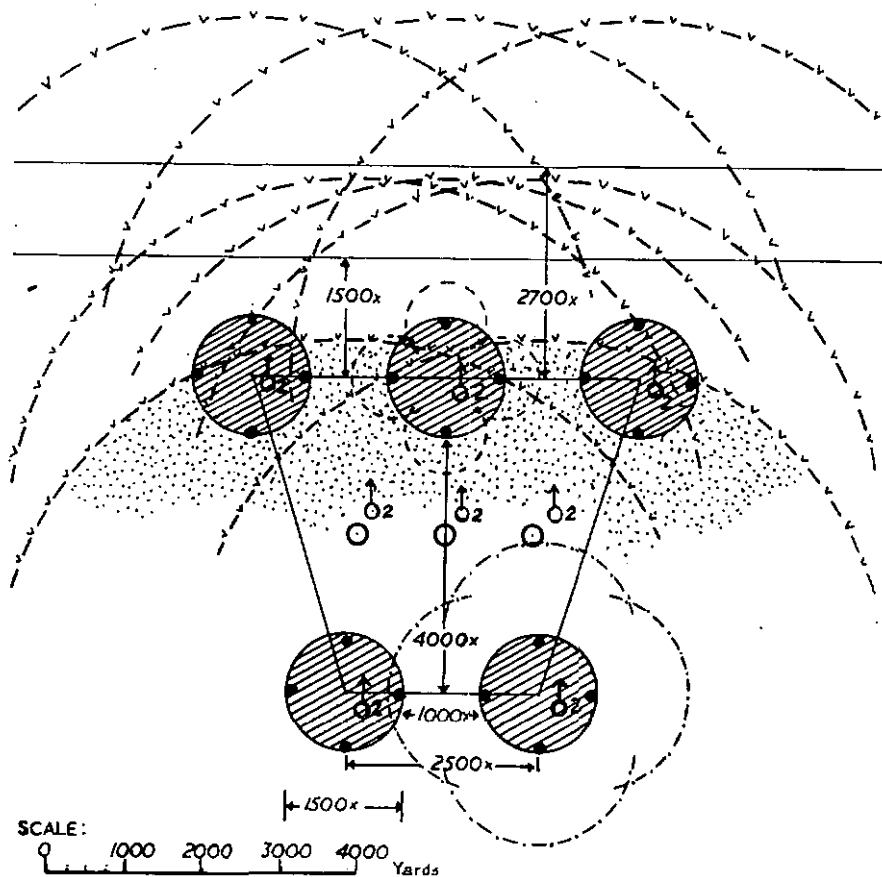


Figure 8

lery should be outside the battalion perimeter.

**Layout of Pentropic Division**

The Pentropic Division consists of five battalions with supporting arms. It has been stressed that Artillery, the only supporting arm considered here, would be outside the battalions, but how far apart might these battalions be? For a guide let us turn to current overseas doctrine concerning deployment under nuclear conditions. When adapted to the Pentropic Division the layout would be something like that shown in Fig. 7.

Notice the dispersion throughout. Each battalion has a frontage of 7250 yards and a depth of 4500

yards. In the consideration it was suggested that the battalion should not be dispersed above 2700 yards diameter. The effect of this dispersion on Artillery is demonstrated in this figure, where, using alternative regimental gun areas, coverages are shown.

Examination of one of these battalions in detail reveals that considerable dispersion is necessary in the company, if it is to occupy 1750 yards. Fig 8 illustrates this.

It can be seen that platoons must be 1000 yards apart if the company is to occupy such an area, unless dispersion in the platoon and/or the section is allowed. This does not seem practicable, having in mind

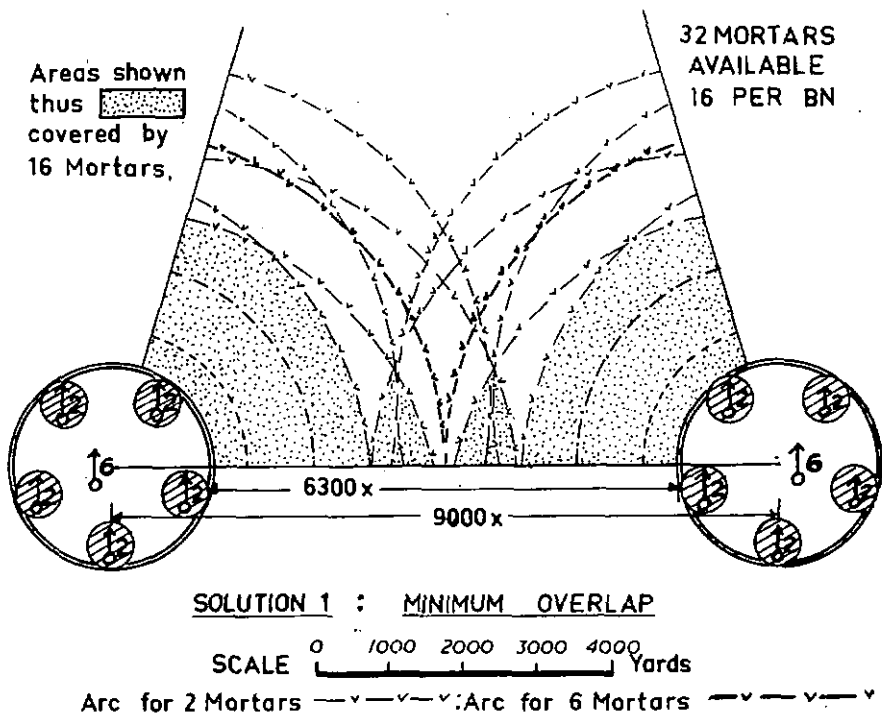


Figure 9

the very personal nature of the command exercised at these levels.

Furthermore, the dispersion of the battalion as a whole seems unacceptable as we are organized. There are two mortars in each company and six in the support company; these are assumed to be sited in pairs in the middle of the battalion. This figure also shows the weapon coverage which would be available with such a layout.

The small arms fire from adjacent platoons does not cover the intervening gap, the machine-guns barely cover the inter-company

gaps, and the mortar fire is extremely sparse all over. It is suggested that under the conditions of

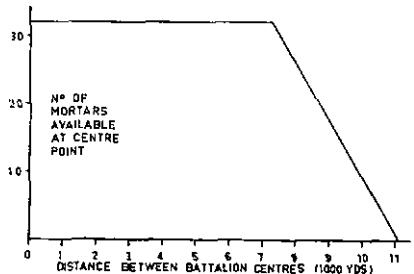


Figure 10

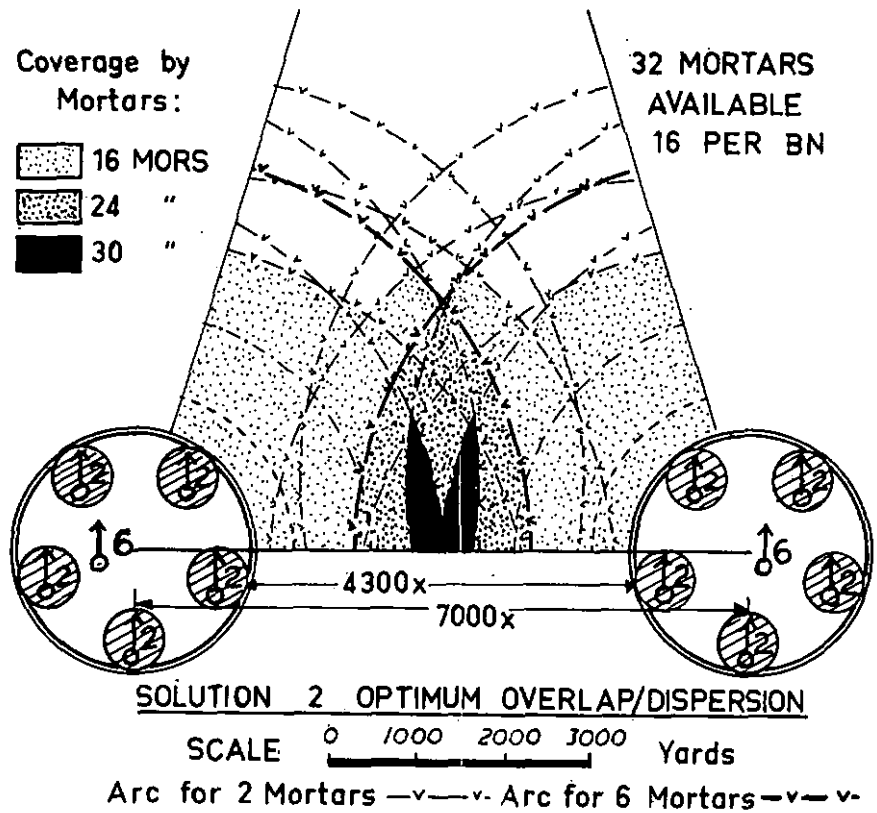


Figure 11

warfare postulated at the beginning, such dispersion is unacceptable, since we could be defeated company by company.

Reverting to the battalion concept deduced above, what should the spacing be? The range of the mortars is taken as 4500 yards for planning. Therefore, let us examine the case of an inter-battalion spacing of

9000 yards. Such a spacing allows the fire from adjacent battalions to meet in the middle of the intervening gap with a small overlap. The effect is shown in Fig. 9, assuming two mortars in each company and six for the weapon platoon in the centre of the battalion.

The shading illustrates the density of mortar fire across the gap,

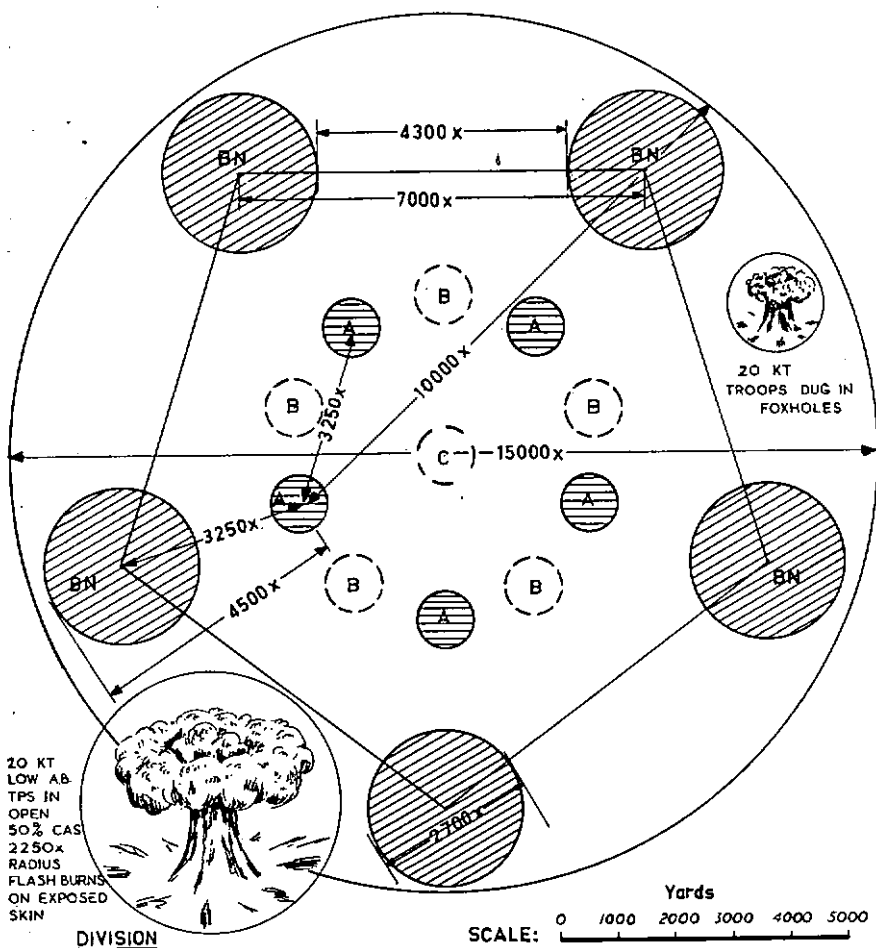


Figure 12



and it can be seen that at the centre of the gap where, if it is to be "held by fire," an increased weight of fire might be expected, there is less fire than anywhere else. This suggests that the inter-battalion spacing chosen, 9000 yards, is too great.

With the same battalion layouts any number of spacings could be attempted until the most suitable one was found. The Artillery aim is to find the greatest spacing between battalion centres, which allows the full weight of fire of all 32 mortars to be brought down on the centre point. Further reduction does not increase the number of mortars available, but it does increase the density of fire by reducing the area to be covered. Therefore, it may be that closer spacing than that proposed is preferred for other reasons. However, in the search for the worst case for Artillery we shall use that separation which just allows all mortars to bear at the centre point. This can be readily deduced from the graph shown as Fig 10.

Using the inter-battalion spacing of 7000 yards, suggested by the graph, the mortar fire coverage is shown in Fig 11.

When this is applied to the division as a whole the divisional layout would be as shown in Fig 12, with the Artillery sited at either A, B, or C.

If the affiliated field regiments are sited at A, in relation to the battalion they support, they can provide the greatest support to that battalion and gain some protection from it. At B the overall dispersion is better, but support is not so good as before and local protection

is more difficult. Concentrating all guns at C is bad dispersion, but local protection could be well organized. Considering these factors, sites A are preferred to either B or C. Each regiment is shown as equidistant from the battalion it supports and adjacent regiments. Any move reduces dispersion, away from the centre brings a regiment nearer to the battalion, towards the centre brings adjacent regiments closer.

For those who prefer it these principles have been applied to one form of trapezium layout, and this is shown in Fig. 13.

The trapezium layout occupies less ground than the pentagon, and so dispersion is less. Even so the effect of a 20KT weapon would be of manageable proportions, particularly if troops are dug in, as they certainly will be as soon as possible after occupying a position.

### Conclusions

It may be argued that these layouts are only suitable for a static defence. However, all defence must be dynamic and aggressive, and it is believed that the principles put forward in this article will hold under such conditions. The defence can move at any time or all the time, but the relationship of units could remain within the limits shown.

Finally, there are two special points to be made.

Firstly, ground. Having made these suggestions about layouts for the Pentropic Division on an infinite cricket field, it is acceptable that they will alter when applied to real situations. However, ground will only permit greater dispersion if it confers an advantage greater

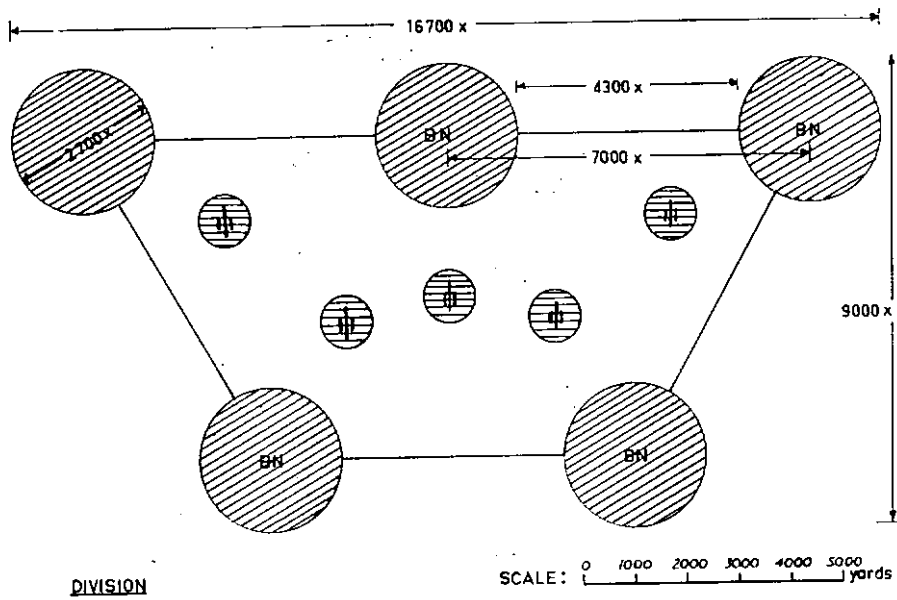


Figure 13

than the loss in fire power which it causes.

Lastly, it must be emphasized again that in this presentation the worst case for the Artillery (i.e., a

pentagonal layout) has been sought and the dispersion may well be less than has been supposed. Under the conditions postulated, it could not be more.

# WEAPONS AND EQUIPMENT

## HOW DO WE GET THEM?

Directorate of Staff Duties, AHQ  
"An' speed a — bullet for  
Pos — terity."

—C. J. Dennis.

A PREVIOUS article has described the types of weapons and equipments to be introduced into the Army in the future. This article will show how new items are developed or bought to meet Arms and Services requirements. It should be clearly understood that the systems will be shown in outline only; it is not possible to give the detail in a short article of this nature.

### Policy

The Army's weapons and equipment policy is formulated by the Weapons and Equipment Policy Committee (WEPC), approved by the Chief of the General Staff, and promulgated in AHQ Weapons and Equipment Policy Statements (WEPS)

These WEPS are prepared by Sponsor Directors; for example, Director of the Royal Armoured Corps for tanks, Engineer-in-Chief for mines; reviewed every two years. It is interesting to note that there are some 58 AHQ WEPS, and their review necessitates consideration at

the rate of two to three at each monthly meeting of the WEPC.

The membership of the WEPC is—

- (a) *Chairman*  
Deputy Chief of the General Staff (DCGS).
- (b) *Members*  
Deputy Adjutant-General (DAG).  
Deputy Quartermaster-General (DQMG).  
Deputy Master General of the Ordnance (DMGO).  
Director of Staff Duties (DSD)  
Director of Weapons Policy (DWP).  
Assistant Secretary (Finance).  
Scientific Adviser to the Military Board (SAMB).
- (c) *In Attendance*  
Deputy Director of Military Operations (DDMO).  
Director of Equipment (DEqpt).  
Sponsor Director.

The Committee:—

- (a) Makes recommendations to the Chief of the General Staff on matters of policy affecting the

weapons, equipment and operational clothing of the Army.

- (b) Reviews periodically, on behalf of the Chief of the General Staff, the implication of research and development as required by AHQ WEPS.
- (c) Makes recommendations to the Military Board as to the items to be included in the Capital Items Programme, and allocates priorities ensuring that all items conform with approved policy.
- (d) Ensures that major operational and administrative implications are further considered before the introduction of items of new equipment.

#### Responsibilities of Branches of AHQ

Very broadly the responsibilities for the equipping of the Army are:—

*General Staff Branch*—Policy co-ordination and administration.

*Master-General of the Ordnance Branch*—Implementation.

Within this broad framework further responsibilities are:—

*Staff Directors*—Policy, procurement, development, inspection, maintenance, and store-holding.

*Scientific Adviser to the Military Board*—To ensure that the weapons and equipment policy is founded on scientific principles.

*Arms and Services Directors*—Responsible to their Branch Heads for the continuous review of policy for the employment, organization, equipment and training of their Arm or Service.

*Sponsor Directors*—Sponsoring weapons and equipment peculiar to their own Corps, and in certain cases common user items.

A general Staff Instruction, giving in detail these responsibilities,

has recently been distributed (AHQ A305-1-846 of 28 Apr 60 refers).

#### The Inception

An idea for a new or improved weapon or equipment may originate from either:—

- (a) A commander in the field; a training establishment; a Branch of AHQ—in fact, any individual or establishment.

Or

- (b) Advances in science or technology with possible military applications. These may be suggested by the Scientific Adviser to the Military Board, the Army Design Establishment or other military or civilian organization.

#### The Basis — AHQ WEPS

The basic document that governs a weapon or equipment is the AHQ WEPS. It is well, therefore, to explain its purpose and preparation.

The purpose of Statements is to promulgate current equipment policy to ensure a common basis for planning and procurement. They express current tactical and technical thinking, and suggest a solution, in terms of weapons, equipments and weapons systems, which will best meet the requirement.

Therefore when complete they provide:—

- (a) Guidance to Australian research, development and procurement agencies in meeting Army requirements for operational equipments.
- (b) A basis for Australian Army participation in standardization discussions on weapons and equipment matters. This is important because our present policy calls for compatibility

and where possible standardization with the United States.

### The Form

A Policy Statement is an expression of, and the proposals for, a solution to a military problem. It is prepared in three parts—

The Requirement,  
The Proposed Solution,  
Outline Military Characteristics.

It may be necessary to prepare detailed Military Characteristics, but only if research or development action is required to be taken in Australia.

### The Requirement

This part will contain—

- (a) A statement of the requirement.
- (b) A brief background of how the requirement evolved, including tactical and technical setting. This is prepared in conjunction with operational and tactical planning staffs, and technical and scientific advisers.
- (c) Reference to what has been done or used previously to meet the requirement.
- (d) A statement of the limitations of existing equipments, if any, including an indication of their expected service life.
- (e) The conception of an idea that something substantially better could be done in the future, showing the disadvantages of the old in the light of modern development techniques.
- (f) A statement that a solution to the requirement is feasible. Sources of scientific and technical opinion which have been consulted should be stated.

### The Proposed Solution

This proposes the solution to the

problems outlined in the first part. It will contain statements:—

- (a) On the interim solution; the concept of employment (how, where and by whom); and the period or year of introduction into service.
- (b) Dealing with the research required to achieve a solution for the long-term requirement.
- (c) Of the intention to retain existing equipments for the interim period or the substitute envisaged.
- (d) Of the need for complementary training equipment.

### Outline Military Characteristics

The purpose of Outline Military Characteristics is to state briefly the essential characteristics of those weapons and equipments proposed in the previous parts. They constitute the basis for either purchase of suitable equipments or research or development action. This part will include:—

- (a) Performance—operational, mechanical, electrical, etc.
- (b) Physical Characteristics—size, weight, etc.
- (c) Accessories.
- (d) Air portability.
- (e) Climatic range.
- (f) Storage.
- (g) Maintenance.
- (h) Standardization.

And other characteristics.

Reference to particular equipments in service here or overseas may be made in Military Characteristics, provided that such reference is intended to be illustrative only, and will not affect the ultimate choice to meet the stated characteristics. This is important, otherwise there is a temptation, and con-

sequent danger of succumbing, to write the characteristics to fit a particular item the sponsor wants.

So the Military Characteristics should be confined to a statement of what is required, e.g. range, mobility, limiting dimensions or weight. How these are to be met is arrived at after study of available items or after development action has been completed and expressed in technical specifications.

This applies equally to outline and detailed Military Characteristics. The latter, as mentioned earlier, are only required if research or development work is required.

By this time it should be clear that no weapon or equipment can be chosen and introduced unless there is a policy statement to support it. In particular, characteristics for each equipment are necessary before any development work can be started. This is frequently overlooked and delays in our weapons and equipment programme will invariably result. In simple terms—how on earth can you set about getting an item unless you know what you want?

#### Hardware

We are now at the stage when the sponsor and other users of an equipment are, we hope, satisfied they know what is required, and the WEPC and ultimately the Chief of the General Staff have endorsed the Policy Statement. How do we now get the hardware? The best illustration is obviously a weapon currently under development—the replacement for our old friend the 9 mm Owen machine carbine, the "Owen Gun."

The sponsor Director for this

weapon is the Director of Infantry. Therefore it is included in his AHQ WEPS No. 9, Armament of the Infantry. In fact, there is an Annex to the WEPS that gives the Military Characteristics for the machine carbine. The Requirement states, "There is a requirement for a lightened improved version of the Owen Machine Carbine for close-quarter fighting."

And the characteristics include that it will—

- Fire standard NATO 9mm ammunition,
- Be fitted with an aperture sight to 100 yards,
- Not exceed 6½ lb. in weight, and so on.

#### The Sponsor Moves

The next move is made by the Sponsor Director. He can get his new carbine by recommending—

- One—The purchase of some existing weapon available from overseas.
- Two—The manufacture of the weapon in Australia to overseas design specifications.
- Three—The development and manufacture of the weapon in Australia to Australian design.

We will take examples of these in turn.

#### Buying from Overseas

The Sponsor Director now draws up a shopping list.

He gets together information on all existing machine carbines in service overseas, available from armaments manufacturers—and from a letter he remembers receiving from some agent in Australia on the weapon to beat all weapons available from a manufacturing plant in some suburban backyard.

Most of this information is included in a wealth of information constantly being sent by our Staffs and Missions overseas and distributed to him and other sponsors.

He will now want more detailed information on particular weapons, so our overseas representatives will be asked to get this for him.

Having evaluated all this information, he may find that one, two or more weapons may meet his characteristics. He then asks the Director of Staff Duties to authorize the purchase of samples for trial and, if the weapons and money to buy them are available, the Director of Ordnance Requirements will be asked to get them.

When they are received they will be subjected to technical and user trials. If, as a result of these trials, one weapon meets the Military Characteristics, the Sponsor Director may decide to recommend to the WEPC the purchase of the weapon in quantity to equip the Army.

The WEPC then may accept the requirement for the weapon and decide to include it on the Capital Items Programme for purchase or manufacture in Australia. The Military Board, or in certain cases where heavy capital expenditure is involved, the Department of Defence, or even Cabinet, may approve the introduction into service.

#### **Manufacture to Overseas Specifications**

The decision whether to buy an item from overseas or manufacture it to overseas specifications is mainly a matter of economics, although the time when the weapon or equipment is required in service frequently influences the decision.

If only a small number of a particular item is required, the cost of tooling up for production may be so costly in itself that this, added to production costs, may result in each item being far more expensive than one bought overseas.

An example is the American M60 general purpose machine gun. Tooling up to make this weapon would probably cost hundreds of thousands of pounds, which must be added to the cost of short production run of the small number required. The result is a final cost of several times the purchase price in America. Economically, therefore, it is preferable to add to an American production run of, say, a few thousand machine guns, an additional number to meet a comparatively small Australian requirement. This was in fact done.

In addition, the tooling-up process takes many months, and as the weapon was required to be in service quickly, this further influenced the decision to buy overseas.

An example of manufacture of an item to an overseas specification is the Rifle 7.62mm L1A1. In this case many thousands are required, and therefore local production becomes an economical proposition. In fact, the local model is comparable in price to that produced overseas.

A further example of economical Australian manufacture to overseas design is ammunition, for which there is ample production potential in Australia.

#### **Australian Development and Production**

This, naturally, is a more lengthy process. Although it is convenient

to divide design and development procedure into a number of stages, in practice they are not always clearly marked. Frequently action in two or more may be going on concurrently, and should be if, as a result, time can be saved. Broadly the stages are—

Inception.

The requirement—Preparation of AHQ WEPS.

Initiation—AHQ Development List Part 2.

Design study.

Priority—AHQ Development List Part 1.

Liaison—Progress Conferences.

Development—Mock-up, Pilot Model, Prototype.

Agreement to design.

User trials.

Acceptance.

Troop trials.

Introduction into service.

These stages are shown diagrammatically in Figure 1.

Inception and the Requirement have already been dealt with previously. The subsequent stages will be explained.

**Initiation—AHQ Development List Part 2**

Each proposed project for design and development is first discussed by the Sponsor Director with GS Branch (DSD/DWP), the Scientific Adviser to the Military Board (SMB), MGO Branch (D Eqpt/DOS), Army Design Establishment (ADE), and other interested Directors. In addition, he can approach other technical sources such as universities and industry.

As a result of these discussions, and if the project is found to be feasible, the Sponsor Director will

prepare detailed AHQ Military Characteristics. He will then ask DSD/DWP to approve the project for inclusion in the AHQ Development List Part 2. If approved, this will indicate that the project is awaiting design study.

### Design Study

This will show how the idea can be put into practice, together with any alternatives, and their advantages and disadvantages. During this stage further discussions will take place between the Sponsor and other Arms and Service Directors, D Eqpt, DOS, SAMB, and the establishment responsible for the design study.

The design study report together with a financial estimate and proposed timetable will be shown as a Plan and Programme. This will usually be prepared by ADE in conjunction with MGO Branch and then considered by DSD/DWP and the Sponsor Director.

If the project design study shows that some change in the WEPS is indicated, this will be referred to the WEPC for a decision. No further development action can take place until this decision is taken.

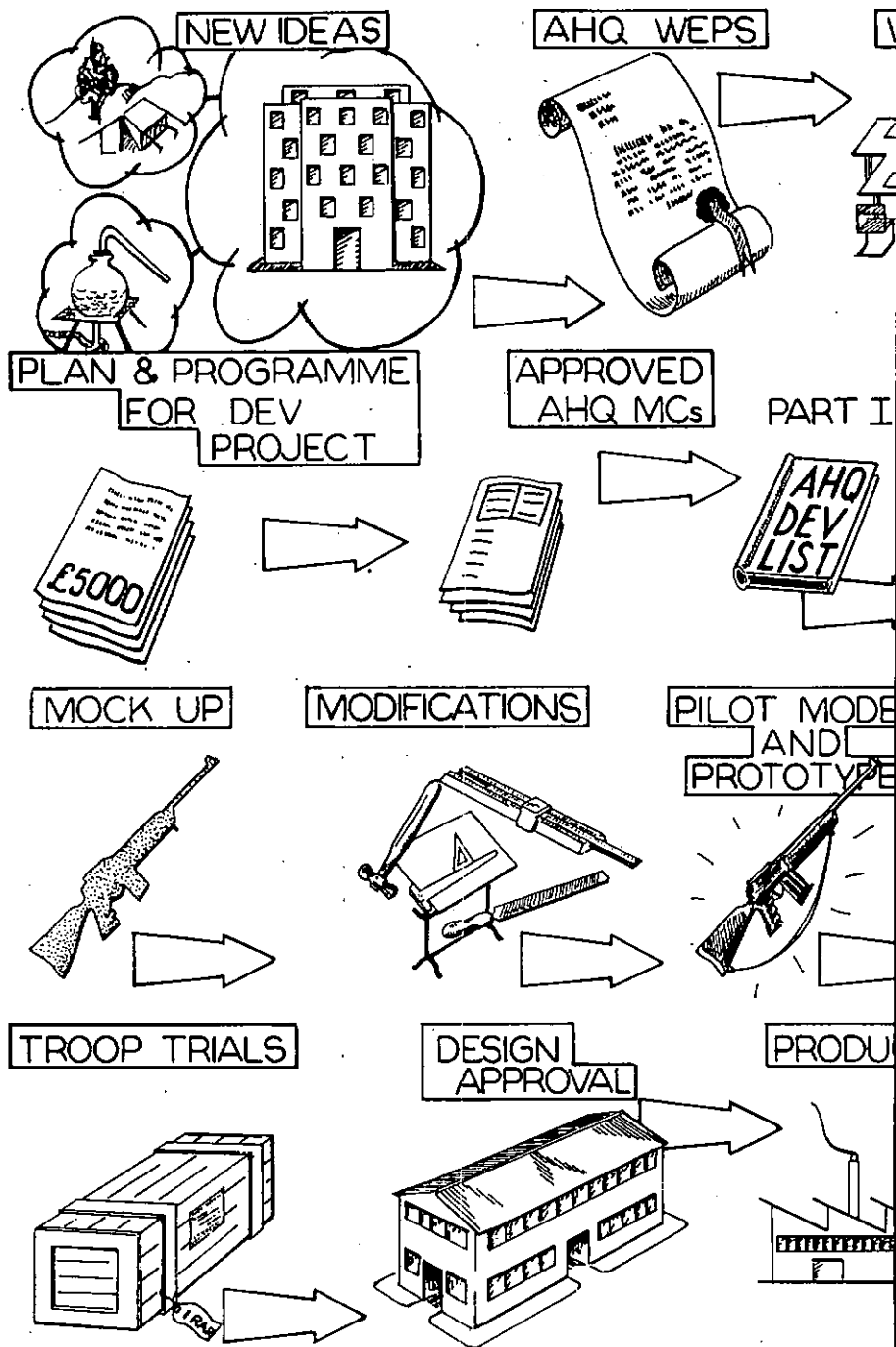
**Priority—AHQ Development List**

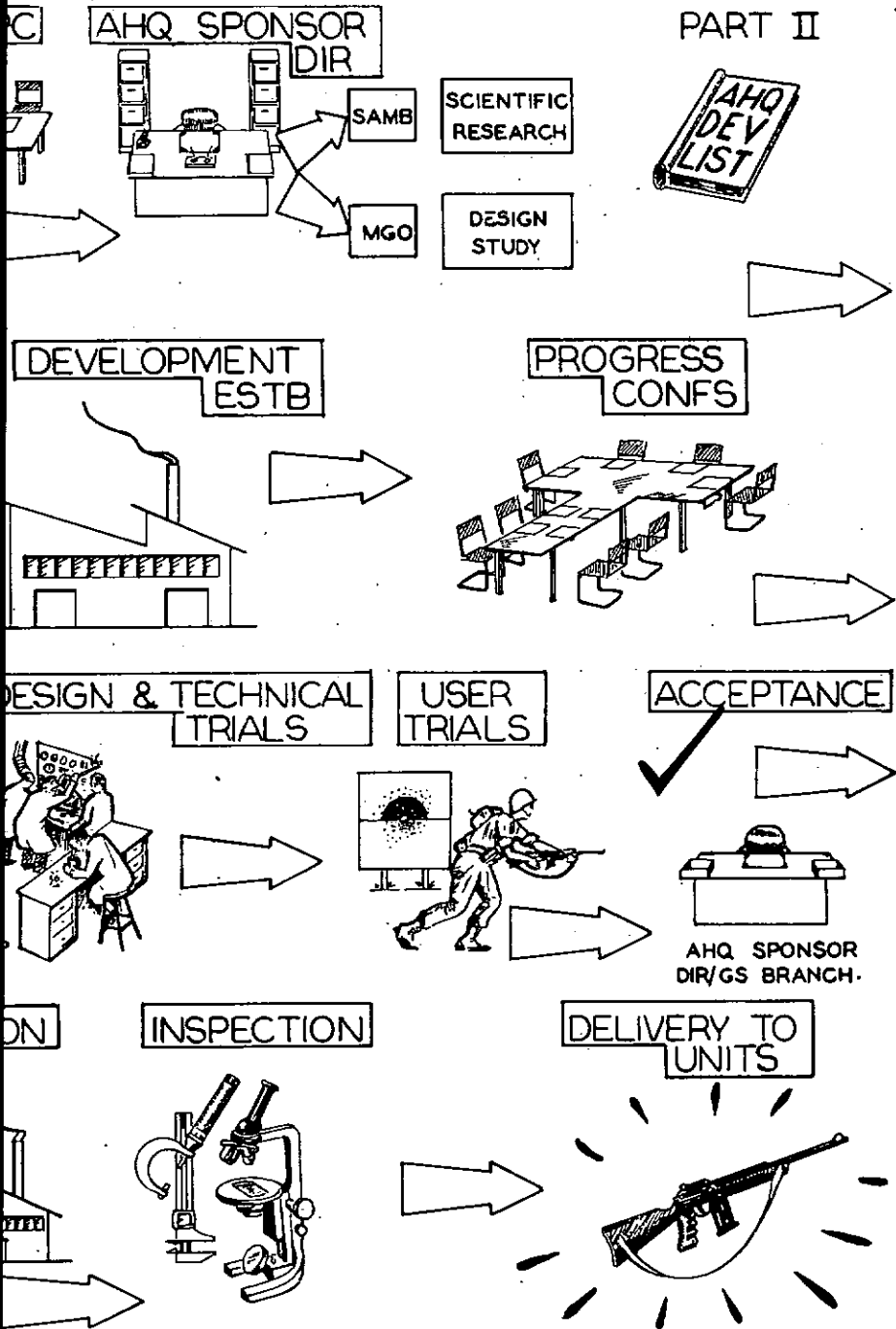
### Part 1

If the Plan and Programme is acceptable to DSD/DWP and the Sponsor Director, the priority to be given to the development of the project will be decided by DSD/DWP. The priority given will depend upon—

- The Operational Need.
- Degree of improvement expected over the existing item.
- Holdings and useful life of existing item.







- Effect on associated equipment in service.
- Finance available.

Having allotted a priority, the project is transferred to the AHQ Development List Part 1. This gives MGO Branch the authority to proceed with arrangements for development to meet the Military Characteristics.

#### **Liaison — Progress Conferences**

Once development has started, the efforts of everyone connected with the project must be directed towards completing the programme as quickly as possible—this means that close liaison and co-operation must be maintained by the Sponsor Director, GS Branch, MGO Branch, and ADE or other development establishment.

The Sponsor Director must follow the project through from beginning to end to ensure that it is meeting his requirements. At the same time MGO will report on any characteristics that may have an adverse effect on cost, simplicity, maintenance, storage and so on. During the whole development period Military Characteristics will be reviewed; any decision to relax a characteristic will be made by GS Branch in consultation with the Sponsor, if an Arms Director, or the Sponsor Branch.

Progress conferences attended by DSD/DWP, the Sponsor and other interested Directors, D Eqpt, ADE and development establishments, and Department of Supply representatives are arranged at regular intervals by MGO Branch.

This liaison is all-important if the project is to be brought to a successful conclusion quickly. There

are many examples of projects being allowed to progress to a late stage only to find that the Sponsor then wishes to alter some basic element of design. This can only happen if either some person or persons have not watched the project carefully during all stages of development, or for some operational or other reason the military characteristics should be amended.

Sufficient to say that any move to alter radically the design at a late stage can only lead to at the best a long delay in the programme or, at the worst, the abandonment of the project and the necessity to start the long process all over again. Either results in wasted expenditure of money and skilled designers' and developers' time and effort.

The solution lies in the ability of Sponsors and their advisers to be quite certain of what is required before work starts, and then continually watch development progress.

#### **Development Stages**

The Sponsor Director, in consultation with other interested Directors, will be asked to give agreement to the design at the three development stages—

#### **Mock-up**

This is the presentation of a clear proposal in the form of a full-scale model of the design. It may be made of any material depending upon the item, and will not usually, in the case of a weapon for instance, be a working model. On the other hand, it will show the main physical characteristics: for instance, for a weapon the configuration, position of sights, change lever, magazine, gunners' seat and so on; for a

vehicle, the overall shape and size, height of tray, wheelbase, ground clearance, driving position; for a wireless set the size, position of dials and controls and aerial arrangements.

The inspection by the Sponsor, DSD/DWP and others interested should be detailed, for at this stage major modifications can be made and included in any required subsequent mock-ups. All viewers should be in possession of and thoroughly conversant with the WEPS governing the equipment and the Military Characteristics. These should be examined and details checked on the mock-up. Any required relaxation of the Military Characteristics may be decided at the inspection. On occasions, however, and if non-conformity with the WEPS is involved, further study and possible submission to the WEPC for decision may be necessary. It may occur if either the sponsor has failed to state his requirements in sufficient detail, or the designer has misinterpreted the requirements. This is, of course, a serious matter, because considerable re-work may be necessary, leading to delay.

#### **Pilot Model**

When the mock-up has been accepted by the sponsor and users, the next stage is the production of the pilot model—a working model. It will enable sponsor and users to physically operate the weapon or equipment. Does it drive or fire efficiently? Does it handle to the satisfaction of the operator? If clothing, is it comfortable and functional?

The examination of the pilot

model should be concerned with the basic efficiency of the item in relation to the operational techniques envisaged, and the technical acceptability of components. Technical trials are usually conducted on the pilot model.

#### **Prototype**

The pilot model having been accepted, the prototype is produced. This should be the final example of the item before quantity production. It should incorporate all the modifications suggested by sponsor and users, and will be in appearance and performance close to the final equipment.

It is upon the prototype that user trials are conducted. There should be few modifications as a result of these trials. Any major modifications are likely to involve heavy expenditure, and a severe loss of time.

#### **Production Model**

After the sponsor and users have completed their trials and the item is accepted as satisfying the Military Characteristics, production drawings and specifications are prepared. Usually a relatively small quantity is made to test production conditions and to confirm the drawings and specifications. The pattern is then sealed.

#### **Agreement to Design**

At each of these stages of development, those responsible for the weapon or equipment must be certain that all aspects of the introduction of the item into service have been considered—

- General Staff Branch must be satisfied that the weapon or equipment conforms with AHQ

policy, i.e., that it meets the requirements of the AHQ WEPS.

- The Sponsor Director must be satisfied that his Military Characteristics are being met and the item is acceptable to all users.
- MGO Branch must be satisfied that the development is not creating avoidable maintenance, or storage difficulties.
- DEME or other maintenance authority must be satisfied that the item can be maintained in service without undue dislocation of existing facilities.

### Time

It might be as well here to say something about this valuable commodity.

It is true to say that the time needed for an idea in the mind to be transferred to a drawing board, and thence to a piece of identifiable equipment in the hands of troops must always be reckoned in years. For weapons and equipment that develop from those already in service, typical timings from the approval of an AHQ WEPS to acceptance into service might well be:—

Simple equipment (e.g., clothing) . . . . .	4 years
Minor equipment (e.g., small arms) . . . . .	6 years
Major equipment (e.g., tanks) . . . . .	9 years

If research has to be done before a firm requirement can be written or development can begin, the time is unpredictable. And purchase of even simple items like web equipment may not be possible under 12 to 18 months.

These timings always appear absurdly long to the soldier waiting for his equipment. But there are

few, if any, short cuts that can assist in shortening the time. In war time, because finance is not always such a critical factor, and more effort can be put into purely military projects, time can be shortened appreciably. But in peace time, with limited finance and development manpower, any speeding up is usually impracticable and limited to concurrent action in two or more stages, as mentioned previously.

However, a substantial element of urgency must permeate the entire Army system for development and procurement. Limitations in funds, material failures, accidents, and human error will inevitably cause delays. But such delays must be held to a minimum. Above all, delays attributable to faults in administration, organization or energy must be eliminated.

### Trials

On paper, of course, any weapon or equipment should be, when produced, satisfactory to the sponsor and user. Unhappily, this is not always so. Consequently it is necessary to conduct trials to make certain that requirements have been met in practice as well as in theory.

If best use is to be made of trials, it is most important that their significance is understood in relation to the rest of the development cycle, and that the special requirements for the satisfactory running of trials are understood.

It is quite useless to give one or two individuals or one unit an item of equipment and simply ask them to give it a trial. This merely results in an opinion of one or more soldiers as to its performance, suitability and so on. An opinion may be valuable, but certainly does not

meet the requirements of a trials report.

For example, we might have developed a new boot. To give it to one or two individuals (by pairs of boots of course) to try would not help us much. One might have web feet and be 4 feet 9 inches high, a sort of human frog; another seven feet tall with corns. Boots, being a common user item, must be tried by subjects from all arms and services and in all conditions of use. Therefore the trials directive must be carefully prepared using expert advice, and the report, with any conclusions reached by trial individuals or units, evaluated by experts.

In the Army the Scientific Adviser to the Military Board is responsible for the approval of the design of all user trials of weapons and equipment; monitors all major user trials and, where necessary, analyzes the results of trials and reports for the validity of conclusions. Consequently the Scientific Advisers' Office is always consulted in the preparation of trials. We have spent some time on general aspects of trials, but this is necessary if everyone is to understand why careful control is exercised over user trials in particular. Opinions are not always based on firm foundations—being frequently related to individual experience in one particular field. Scientific evaluation also has its limitations, but will usually result in an end item more closely satisfying the military requirement.

#### **Types of Trial**

There are three types of trial—  
Technical,  
User,  
Troop.

#### **Technical Trials**

These are arranged by MGO Branch (D Eqpt/DOS), and are conducted by such agencies as the Army Design Establishment, Defence Standards Laboratories, or other research and development organizations. The aim of these trials is to evaluate the item to see whether it meets the requirements of, for example, climatic conditions, endurance, firing rate, durability and so on. These require skilled technicians and specialised equipment.

#### **User Trials**

These provide the Sponsor and users with the first opportunity to try out the new equipment. User trials are usually carried out on prototypes, although there are occasions when modified user trials are held in conjunction with technical trials.

The aim of these trials is to give the Sponsor and users early experience of the new equipment which will assist him in deciding whether it is suitable for acceptance into service. Consequently in any development programme sufficient prototypes must be produced to ensure that all necessary trials can take place. Similarly, if technical trials are also required on prototypes, it is important that, to save time, sufficient prototypes are available to allow all trials to be done concurrently.

User trials are also conducted on equipments being considered for purchase from overseas for adoption into service.

#### **Troop Trials**

These trials are done by field units in Australia and overseas,

using pre-production equipments or the first of the production run. The aim of troop trials is to test models of the new equipment, which are as fully representative of production models as possible, in the hands of troops.

Modifications considered necessary as a result of troop trials can seldom be incorporated into the first production models, but may be phased into later production.

### Into Service

At this stage we have followed the new item up to the stage when it is accepted for introduction into service. All that remains is to purchase the item in the required quantity. The following paragraphs outline the procedure to be followed before both new and existing deficiencies ultimately appear on an authorized ordering list.

### Three-year Programme

After Cabinet discussions on the Strategic Basis and Composition of the Forces have been completed, financial allocations for the Services for a three-year period are announced. Allocations for the second and third year of the period are subject to variation by Cabinet after consideration of draft Estimates submissions in each of those years.

Funds allocated to the Army for any one year are absorbed to maintain the existing organization in pay, allowances, rations, etc, to maintain existing assets of buildings and equipment, and to provide new accommodation and modern equipment. These maintenance requirements are first charge against the allocation, and the remaining funds are then available for new

works and modern equipment, usually of the order of 20 per cent.

At the commencement of any Three-year Programme a financial commitment already exists. This is the amount of money still unpaid on orders placed during previous Programmes and on which deliveries have not been completed. The total of these unpaid accounts is the outstanding liability at that date. Due to the long production lead time the time gap between ordering and actual delivery, for many items of modern equipment and ammunition the outstanding liability at the commencement of the Programme may require payments to be made in each year of the new Programme and even in years beyond the Programme.

To determine the funds available for expenditure on new orders for capital equipment in each year of the Programme it is necessary to make two calculations:—

- (a) From the annual Army allotment for each year deduct the anticipated expenditure for maintenance and for works in each of these years. The balances resulting are the gross amounts available in each year.
- (b) From these gross amounts deduct the amount of outstanding liabilities payable in each year of the Programme.

The balances obtained from (b) represent the amounts available for expenditure on new orders in each year of the Programme at this stage. It can be seen, however, that the amounts available in the second and third year will be influenced by any orders placed in the first year which produce expenditure in either of the following years.

When the amounts available for expenditure on new orders are determined, an equipment procurement programme is then drawn up by General Staff Branch in conjunction with the procurement Branches, namely the Adjutant-General, Quartermaster-General and Master-General of the Ordnance Branches. As equipment procurement is controlled by both authorization and expenditure, it is appropriate at this stage to define these terms.

*Authorization*—Term used to denote the value of orders placed or to be placed. Once an order for equipment is placed by a procurement Branch on the procurement agency, namely the Department of Supply, local firm or agent, or Australian High Commissioner abroad for overseas orders, funds are automatically earmarked for the full value of the order. The amount of funds earmarked for each order is known as the authorization, and the value of all orders placed, or to be placed, in any one year is the total authorization. Total authorizations are subject to Government approval.

*Expenditure*—the actual payments made in settlement for any authorization. The payments may be made either in the year of ordering or spread over a number of years.

It can be seen therefore that an authorization placed in any one year may well incur expenditure over several years.

### Capital Items Programme

The Capital Items Programme is the equipment ordering list for any one year of the Programme. Before compilation of the Capital Items Programme can commence it is neces-

sary to determine the equipment deficiencies of the forces to be maintained. These calculations are completed by the procurement Branches, which calculate the entitlements for the forces and offset against them quantities of serviceable equipment held or already on order. The resultant deficiency lists are then costed and forwarded to General Staff Branch, together with an estimated pattern of expenditure.

The deficiency lists are reviewed by General Staff Branch, and any special requirements not already listed as deficiencies, for example proposed new equipments not recorded on Equipment Tables, are included at this stage, and compilation of the Capital Items Programme can then be commenced.

As a first stage it is necessary to list all items which are readily available from production or other sources, and which would produce expenditure within the current year if ordered. A second list is then compiled of items which, because of production lead times, must be ordered within the current Capital Items Programme to permit introduction into service within a reasonable period. Operational requirements are then considered, and procurement priorities allotted based on current plans. Both these lists are then reviewed in the light of the Government industrial philosophy, which is the determining factor in deciding whether the order will be placed with local production or procurement sought from overseas. Some items may be readily available from overseas production at a relatively low cost, but it may well be in the best interests of the Services to place the order



with local Government Departments or manufacturers who are prepared to set up tooling and so guarantee a local manufacturing potential in time of war.

Finally financial limitations are examined and an authorization ceiling determined at a level which will—

- (a) Achieve expenditure in the current year of the funds available.
- (b) Ensure that liabilities in subsequent years resulting from authorizations placed in the current year, together with outstanding liabilities already incurred in those years from orders placed prior to the current Capital Items Programme do not exceed in total the amounts previously determined as available for expenditure in each year.

A draft Capital Items Programme is then prepared and, after consideration by the WEPC, approved by the Military Board, and ordering starts.

It will be of interest to know that this Programme usually lists some 400 items in any one year. This no doubt looks a very small figure. No doubt, also, the figure of £9.6 mil-

lion available for capital equipment purchases looks large to those of us who think in terms of next week's grocery bill.

To get our sense of proportion right we should look at the costs of these items.

Your new rifle is still costing some two and a half million pounds a year. How about some ammunition for the new 105mm field gun? A reasonable amount costs us three million pounds. Add a half-dozen vehicles, some bridging, a covey of helicopters and four landing ships, and there is not much left for little Willie's new boots.

#### Finale

By this time everyone will be saying, "With all this rigmarole it is a wonder we ever get any equipment at all." To the uninitiated, a reasonable remark.

However, having started with a quotation from that great Australian poet C. J. Dennis, we might conclude with another from his pen—

"Said the King, jokingly,  
Why how provokingly  
Weird; but we have the gun."

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New weapons are useful in that they add to the repertoire of killing, but, be they tank or tomahawk, weapons are only weapons after all. Wars are fought with weapons, but they are won by men . . . It was the spirit of the Lord, COURAGE, that came mightily upon Samson at Lehi which gained the victory—not the jawbone of an ass.

—General George S. Patton, US Army.

# Strategic Review

## SHIPPING

### AND

## STRATEGY

Reprinted from the December 1959 Issue *An Cosantoir*, Eire

WORLD War II, it is often said, was won not on the battlefields of Europe and the Pacific, but in the workshops of Detroit. Since tactics has been defined as the control of military means on the battlefield and strategy as the distribution of military means to fulfil political ends, this is another way of saying that in World War II tactics had less influence on the final result than strategy.

This is not necessarily true for all wars. Nowadays the enormous destructive power and highly efficient delivery systems of nuclear weapons place a premium on tactical surprise. The nation which wins the first battle with a knockout nuclear blow stands a good chance of winning the entire war. Strategic concepts such as "total mobilization," "conscription of industry" and "economic war" seem slightly old-fashioned.

Nevertheless, a study of military history reveals few instances where the strategically inferior side was able to achieve ultimate victory by exploiting tactical success. At present it is not certain that one knockout blow could win a war against an alert, determined opponent—and it is the universal hope that

this uncertainty may never be resolved. What is certain is that it would be the height of folly for a nation to put all its eggs in one basket—to gamble its security on the knockout blow or the balance of terror—and neglect the strategy necessary for a long war.

#### Surprise and Movement

Strategy fulfils its purpose by using the elements of surprise and movement. Surprise is psychological and depends on a calculation of the factors which are likely to affect the will of the enemy. Mobility is physical, and depends on a calculation of the factors of time, topography and transport capacity. It is with an aspect of transport capacity that this article is concerned.

By transport capacity is meant the means by which men and munitions are moved and the measure or quantity in which they can be moved. As a means, air transport has obvious advantages for strategy. It is fast, flexible and comfortable (an important consideration when troops have to travel long distances and arrive battle-worthy). For the foreseeable future, however, air transport alone will be unable to move strategic resources in sufficient volume. Air transport suffers from

another, less obvious, defect. Speed is the most expensive item in transport economics. The demands of war may postpone but they cannot do away entirely with economic considerations. Investment in aircraft speed, elaborate research, huge engines, longer runways, and complicated guidance systems divert scarce resources away from more direct military effort and might not give a commensurate return.

### Surface Transport

Surface transport is slower and less flexible. On land it is tied to roads and railways, but ships can move and hide in the vast spaces of the ocean. The slowness of sea transport, too, is more apparent than real. The SS "United States" can move two fully-equipped divisions to the Middle East as quickly as the combined military and civil airlift of the USA. The over-riding advantage of sea transport is the volume or measure of strategic resources which it can handle and which, for the present at any rate, far exceeds that of any other means of transport. Merchant shipping is, and will probably remain for a considerable time, the principal handmaiden of strategy.

This important role of merchant shipping was clearly seen about the middle of the 19th century, when the concept of the "nation in arms" and the experiences of the American Civil War gave an indication of what future wars might be like. Up to then government action was principally confined to maritime law, the welfare of maritime labour and safety at sea. The industrial revolution, her insular position and maritime traditions all gave Britain an immense early lead in merchant

tonnage, but even here certain steamship lines were subsidized for postal and admiralty purposes. State aid in other countries took various forms, such as the reservation of certain types of trade to the national flag and shipbuilding bounties.

### Subsidized Building

State aid was seen at its clearest on the North Atlantic passenger route. The large, fast, ocean liner best suited to this type of traffic was also particularly suited to conversion into a troopship or armed cruiser. The size and cost of these vessels became so large that their construction could only be undertaken with substantial government subsidies and a consequential government lien on their use in wartime. This was the case with the *Bremen* and *Europe* of Germany, the *Normandie* of France and the *Queen* class of the UK. The SS *United States*, which at present holds the Blue Riband of the Atlantic, was launched in 1952 to the specification of the US Navy to facilitate her rapid conversion to a troop-carrier in the event of war.

At the outbreak of World War I Britain was easily the first mercantile nation, and her navy ruled the waves. The possibility that shipping might limit strategy was, therefore, not at first considered. German submarines and wartime consumption soon changed all that. As the duration of the war came to depend on the weight of men and munitions which the opposing sides could throw into it, the sea-lane from North America to the United Kingdom and the Western Front became one of the most critical battlefields. Under the twin pressures of enemy action and abnormally

heavy traffic the complex, haphazard, *laissez faire* system of shipping control broke down. By 1917 it had been replaced by a centralized Ministry of Shipping with wide powers.

#### Past Experience

When a new war loomed on the horizon in 1939 the experiences of World War I as regards the interrelation of strategy and shipping were available to the British and Americans. The problems of 1940, however, were more complex than those of 1915. The volume of traffic was as big but ports which had been almost immune from attack in World War I were now subject to heavy aerial bombing. The Japanese raid on Pearl Harbour shifted the demands on shipping to an entirely new plane. Almost all the major countries were then involved in the war, and every continent was engulfed in or directly threatened by hostilities. The Allied war effort depended upon the availability of ships to carry the soldiers, the weapons and the essential supplies to the four corners of the earth.

#### Problems Tackled

The problem was dealt with under four main heads by an Anglo-American Shipping Adjustment Board. Firstly, reduction of losses by better protection of merchant shipping; secondly, increased supply of new ships; thirdly, reduced time in ports and undergoing repairs; and lastly, better allocation of shipping among competing demands so that best use was made of available tonnage.

Shipping defence is the province of naval tactics and weaponry. The most obvious approach after trying to reduce the losses was to make them good. Ships, however, take

a long time to build and shipyards even longer. The demand was for big, fast ships which took longer to construct and the new building programme had to compete with repair and naval work. New ships were not coming into service in satisfactory numbers until 1943, when the immense American resources began to be felt.

#### Port Facilities

Delays in ports and undergoing repairs caused a decline of two-fifths in the fertility of Allied shipping during 1941. In that year not lack of ships but lack of port facilities most limited the British war effort. By then, however, vigorous measures in the complex technical field of port organization and inland transport had shown the way to solving this problem. Attempts to increase the effectiveness of the merchant fleet by reducing the time ships were immobilized under repair met with less success. This problem, like that of new construction, was only fully solved at war's end by the enormous American shipbuilding and repairing capacity.

#### Increasing Capacity

The allocation of shipping was governed first of all by military requirements and then by the needs of the civilian sector on the basis of a statistical computation of stocks and needs. Various steps were taken to increase the capacity of available tonnage. The reduction of facilities for exercise and other amenities increased the accommodation on troopships by nearly one-third. Here length of journey was an important factor, and it was not possible to reduce the standards of accommodation for a journey around the Cape to the same level as those on the

North Atlantic. Still bigger economies were made in the use of cargo space, by boxing and dismantling vehicles and dehydrating foods such as milk and eggs.

As World War II climbed to its peak in mid-1944 the demands on shipping made by the European re-entry, Pacific island-hopping, Russian supply, and aid to conquered territories, became immense. The shipping planners could claim, however, that in no case were the requirements of strategy seriously curtailed by a shortage of ships.

This account of shipping and strategy has been illustrated entirely from the war effort of Britain and America. This is because the way a nation makes war depends to a large extent on its geographical position. In World Wars I and II the Central Powers under the leadership of Germany were thus committed to a strategy which emphasized land forces.

#### Strategic Contrast

If there is to be another world war the strategic contrast between the two sides will be even more marked. The Sino-Russian Empire is huge and largely cut off from the sea. None other so patently deserves the title of land power. On the other hand, the NATO powers and their allies are widely separated by sea, strung out on external lines right around the perimeter of the Sino-Soviet heartland. In the face of these geographical facts it is clear that strategic mobility will lean more than ever on transport capacity. So that the military resources of the world may be used to the full, a forecast of the part the various means of transport will play in strategy is important. What follows

is an estimate of the role of shipping in future global strategy.

#### Statistics

Current shipping statistics are revealing. Between 1948 and 1958 the world merchant fleet grew from 73m tons to 114m tons, an increase of more than 56%. (The 1939 figure was 62m tons.) On at least two occasions when normal economic forces might have brought a reduction in new tonnage, international crises—Korea and Suez—lifted freight rates to the skies and ships and shipyards multiplied. As of now there is a shipping slump; 7½% of the world fleet is laid up; there is an obvious surplus of shipyard capacity, but ships continue to be launched. This may have important economic repercussions, since shipping is often regarded as the bell-wether of the economy, but from the strategic viewpoint it is an unmitigated blessing. A shortage of ships, as in 1914 and 1939, seems unlikely to recur.

Available tonnage is not the only criterion of adequate shipping, as the history of WW II shows. Equally important is an accurate computation of means and ends so that ships do not sail half-empty or with cargoes not vital to the war effort. This calls for government control and a complex administrative organization. Since 1945, government concern with production, wages, trade balances and other economic phenomena, has resulted in the production of statistical data and the development of administrative organs which, after some adaptation, are readily suited to such computation. Shipping control in a future war will be quicker off the mark, smoother in operation and more efficient.

### Assembly Aspect

Demand for tonnage is unlikely to be as high as in World War II. The industrialization of the underdeveloped countries of Afro-Asia largely obviates the necessity for the transport of fully assembled vehicles, and weapons on shipboard. These equipments can now be shipped fully knocked down and assembled at their destination, with a saving of up to 50% in cargo space. The expanding network of oil pipelines has already had an effect on the demand for tanker tonnage. In the foreseeable future the bulk of oil supplies may be moved by this method.

The experiences of the Berlin blockade, when 2½m people were supplied by air for 11 months, is a pointer to the capabilities of air transport eleven years later. This is not to say that air transport will take the place of sea transport in the foreseeable future. Far from it. Nevertheless, bottlenecks in the supply of scarce strategic resources, such as machine tools or rare metals, are not likely to be caused by lack of transport capacity.

This estimate has considered the supply, the utilization and the demand for tonnage. In a strategic as opposed to a purely economic forecast, however, the overriding consideration must be the possible effects of enemy action.

### Soviet Submarines

The formidable Russian submarine fleet is well publicized. It seems probable, however, that in a future war merchant shipping will be only a secondary target for this

force. Its primary mission will be to attack strategic targets with submarine-launched ballistic missiles. In this connection also, the ASW (anti-submarine warfare) measures of the Anglo-American block may have been underestimated. Nuclear depth charges, homing torpedoes, better organization of convoys and faster ships give the merchant fleet at least as good a chance of reaching port as it has ever had in war.

Unfortunately, precisely here is the Achilles heel of merchant shipping. The United Kingdom and western Europe are highly developed maritime areas, yet it was found in the last war that, in practice, supplies were channelled through a few main entry ports such as the Thames, the Mersey and Antwerp. In the underdeveloped areas of the Middle East and South-East Asia this concentration on a few ports was, for obvious reasons, still greater.

Since then the economic advantages of bigger ships and large-scale dockside installations have made this trend even more marked. In a future war such concentrations would invite complete annihilation from missile-firing submarines, lurking within easy reach. It is a trend which must, therefore, be avoided at all costs if the advantages accruing from sufficient tonnage, adequate ocean defence and good organization are not to be nullified.

### Review of Techniques

The technical and economic difficulties involved in a dispersal of

port facilities are so complex that such a scheme would be hardly worth undertaking. A better approach to the problem might lie in a complete review of unloading techniques. Cargoes such as oil and grain are already unshipped by a pipeline system. During the last war a theoretical plan was developed for the handling of other commodities, including men, by this system and for their transport through the pipe many miles from the port of entry. Nuclear-powered ships, seldom putting into port for refuelling and discharging their cargoes by pipeline at any deep water wharf, are a possible means

of overcoming the port concentration impasse.

#### Future Strategy

Whatever technical innovations the next war may bring, it is clear that shipping will still play a major part in transport capacity and, therefore, in strategy. As to what that strategy may be, the words of Marshal Zhukov, Soviet Minister of Defence at the time of the Communist 20th Party Congress in February, 1956, are of interest:

*"In a future war the struggle at sea will be of even greater importance than it was in the last war."*

—R.A.H.

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#### COMPETITION FOR AUTHORS

The Board of Review has awarded first and second prizes in the Annual Competition for authors for the financial year 1959-60 to:—

Colonel M. P. O'Hare, OBE, for "The Pattern of War in South-East Asia," AAJ No. 124, £30.

Lieutenant-Colonel A. Green for "Military Autarky," AAH No. 126, £10.

# CMF RECRUITING AND SERVICE

Major W. F. Sorsby  
Royal Australian Signals

A NUMBER of articles has appeared recently in the "Army Journal" concerning themselves ostensibly with CMF recruiting, but, in fact, concerning themselves with CMF conditions of service in general and the motivation of the individual soldier. These articles, some from an altruistic and some from a harshly practical viewpoint, have examined the symptoms but none has diagnosed the sickness. Without defining the sickness it is impossible to offer a cure.

A recent survey carried out in regard to enlistments in the Regular Army disclosed that, after a period of service, the greatest factors against the soldier's inclination to "soldier on" were:—

- (a) No sense of achievement.
- (b) Lack of opportunity for advancement.
- (c) The adverse opinion of the Army held by family and friends.

These factors are applicable to the CMF in an even more marked degree than to the ARA. These are the symptoms. The disease is "lack of purpose." It must therefore follow that to recruit a member of the CMF—and to hold him once he has enlisted—the elimination of these three symptoms must be basic.

It is the aim of this paper to endeavour to produce a plan which will minimise the effects of these

adverse factors and which will produce—and hold—CMF recruits, providing, of course, that it receives the widest publicity and vigorous implementation by ARA cadres.

## **No Sense of Achievement/Lack of Opportunity for Advancement**

For all practical purposes in this study we can disregard the recruit who joins the CMF for altruistic or patriotic motives—he will stay anyway. The vast majority are concerned with personal gain—either financial, social or educational. All depend to a large extent on personal advancement, which, to the average recruit or soldier, is synonymous with achievement.

To enable the soldier to readily assess his progress and to maintain his sense of purpose he should be presented with a pattern of service that shows a logical progression through a series of easily identifiable steps to his goal. He should be quite clear both as to his own responsibility to the service and the responsibility of the service to him.

At present there appear to be two major obstacles to advancement in the CMF. These are:—

- (a) Retarded advancement caused by restrictions imposed by unit establishments. This will probably be increasingly important after the current reorganization.
- (b) Retarded advancement due to



occupation of available postings for long periods, often by "time servers." The current 3-year restriction applicable to OCs does not apply to other postings.

Distasteful as the idea may be, it is doubtful whether the CMF will ever reach a standard of training that will allow it to be committed, as an entity, to active operations within at least three months of M day. Three months was accepted during the Second World War as the minimum period required to produce the basically trained soldier. Since this period has already been estimated as the shortest time before the administrative machinery can launch a CMF force, it seems reasonable that this period could also be used for training.

It follows therefore that given skilled, highly trained and capable CMF officers and NCOs, a capable basic fighting unit could be produced at the end of three months. The peace requirement of the CMF therefore is probably "Chiefs," not "Indians." However, it will be impossible to achieve the high standard of CMF officer and NCO required as a basis for rapid expansion unless they have troops to handle and thus:

- (a) Gain experience.
- (b) Provide a pool of potential "reinforcements" for the wastage which must inevitably occur in the officer/NCO pool.

The problem is to reconcile the requirement for a highly skilled cadre capable of very rapid expansion and the requirement for privates to provide experience and replacement for the skilled element. A compromise between these opposing requirements may be achieved by the following scheme:—

- (a) All CMF personnel are enlisted for a specific and mandatory period of service.
- (b) This specific period of service is directly associated with rank and qualification.
- (c) Restrictions of officer/NCO vacancies imposed by the establishment should be ignored.
- (d) Institution of a Special Reserve (CMF) (differing in purpose and conditions of service from the present special reserve).

The system of enlistment would operate in the following manner (Note—Periods of time involved have not been accurately assessed and are used for illustrative purposes only):—

(a) *Enlistment*

Is for an initial probationary period of 6 months. The minimum issues of clothing, etc, are made to enable the recruit to attend parades and complete basic training.

During this period training is directed to qualify the recruit for some kind of Test of Elementary Training. Those qualifying in this test receive an increase in pay from "recruit" to "trained soldier" pay and are given full issue of clothing and equipment.

Those failing to qualify are discharged.

(b) *Second Period of Service*

Those qualifying after the initial probationary period are enlisted for a further two years. During this time training is designed to qualify the soldier to the rank of Corporal and/or where applicable as a tradesman. At the end of this period a promotion examination is

held for qualification to the rank of Corporal.

Those qualifying are promoted and paid immediately irrespective of unit establishment or vacancies. Those failing to qualify are placed on the Special Reserve (CMF) for a period of three years, during which their only obligation is to attend one 14-day camp of continuous training per annum.

(c) *Third Period of Service*

Those promoted to the rank of corporal are enlisted for a further two years, during which the training cycle is designed for qualification to the rank of sergeant and/or to Class 2 trade grouping. At the end of the period those who qualify are promoted immediately irrespective of establishment or vacancies. Those who fail are placed on the Special Reserve (CMF) for the same period and with the same obligations as for the trained soldier, but in the rank of corporal.

(d) *Fourth Period of Service*

Those promoted to the rank of sergeant are enlisted for a further two years (to qualify for first appointment) or one year (to qualify for warrant rank), and a similar system is followed as in (b) and (c) above.

A similar system would apply up to and including the rank of Major. After one period in this rank the officer is placed on the reserve as outlined until selected for promotion to lieutenant-colonel.

To enable this pattern of service to function the following must obtain:—

(a) Every CMF recruit must be made fully aware of:—

- (i) His obligations.
- (ii) The obligations of the service to him should he satisfactorily achieve each stage of training.
- (iii) The inevitable result of failure to qualify.

All recruiting publicity should be based on these three unchangeable factors. Here is a clear purpose for a part-time military career.

(b) No officer or soldier is allowed to serve actively more than one specified period for rank. Failure to qualify must mean automatic transfer to the Special Reserve or discharge (for recruits only). This will ensure that

- (i) A large floating population in any one rank will not accrue.
- (ii) The continual turnover will provide a constant "revitalising" keenness in a unit—and key jobs are handed round with greater experience for more people as a result.

(c) Apart from the system of transfer to the Reserve "by failure," strict age limits should be placed on each rank, if necessary by Corps as age requirements will obviously differ in combatant and non-combatant corps.

(d) In order that this system can operate effectively a specific training year must be laid down, e.g., from 1 Jul-30 Jun or any other convenient period chosen to conform with recruiting statistics (it should commence just after the peak recruiting period for the CMF). Any specific period in rank should be by

training years (except for the probationary period, which can only be one year). If a recruit enlists on 1 Sep when the training year has commenced at 30 June his probationary period in fact will be 9 months to the end of the training year. Such a system will ensure that all soldiers are "in step" with the training cycle from the completion of their probationary period.

- (e) All examinations for qualification to rank must be carried out centrally under HQ Comd supervision to ensure uniformity and a high standard.
- (f) There is no bar to "accelerated" promotion if by additional work and study a soldier can qualify for his next rank in less than the accepted time. However, this does not give him accumulated "extra" time to qualify for his next further rank, the maximum period in each rank being quite inflexible.

This system of course is not compatible with the requirement for specialised tradesmen in certain arms and services. Once again, distasteful as it may be, the CMF system as established is incapable, in the training time available, of producing qualified tradesmen in the more technical trades. The best that can be expected under the present system is to adapt experience and skill obtained in civil life to Army requirements, or to develop skill gained in pursuit of a hobby to a useful level. This is not providing sufficient numbers of the necessary calibre of tradesman required. A similar system to that envisaged for officer/NCO training could well be

instituted for the training of tradesmen. Essentials of this system would be:—

- (a) The organization of selected training depots (occupied by Signal, EME units, etc) as CMF Trade Training Centres.
- (b) A system of enlistment, related with trade qualification, as previously described in relation to rank.
- (c) Payment for trade qualification based on a system similar to the "star grading" system as applied to the ARA.
- (d) Recognition by civil bodies of qualifications gained in these centres. Many young tradesmen are obliged in the terms of their apprenticeship to carry out further studies in their own time; these could well be carried out under Army instruction if the scheme were properly organized and policed.
- (e) A further factor which would assist the success of such a trade training scheme, though not essential to it, would be the establishment of "hobbies" rooms where potential tradesmen under competent supervision may use Army equipments for their own purposes. (Incidentally a publicity campaign based on "turn your hobby to profit" might be of some value.)
- (f) On completion of all or part trade qualifications the soldier is either:—
  - (i) Transferred to the Special Reserve (CMF) for a specified period, with a responsibility to attend camps of continuous training, or
  - (ii) Begins qualification for promotion.

(g) Quite clearly any soldier with sufficient enthusiasm and time can, if he so desires, carry out both trade and promotion training simultaneously. As with the ARA in technical corps, trade qualification should be allied to promotion requirements.

It is most important that, if either scheme is to work successfully, the following prerequisites are fulfilled:—

- (a) ARA Cadres with CMF units must be made large enough to enable the Training Depot to be open 7 days a week if necessary without undue "overtime" and dislocation of the regular soldier's domestic life.
- (b) ARA Cadres should be professionally qualified to advise and instruct the CMF. The practice of posting inexperienced subalterns as adjutant-quartermasters should cease, and if possible this appointment should be discarded for ever. The appointment of a training officer and an administrative officer is the ideal. It is seldom, in practice, that one officer is equally capable (or even interested) in both.
- (c) ARA Cadres should be changed and reposted every three years without fail in order to ensure:
  - (i) Staleness does not occur.
  - (ii) ARA Cadres are continuously returning to active units to gain up-to-date knowledge and experience.
- (d) CMF depots should cease to be the "havens of rest" as they occasionally become as a result of tardiness in reposting of ARA personnel. Only the most en-

thusiastic cadre staff can make any system work.

#### The Adverse Opinion of the Army Held by Relatives and Friends

However, successful as such a scheme could be, it is unlikely to hold the soldier to his CMF service if his family and friends are either overtly or covertly hostile to the Army in general, and there is no doubt that "the military" are not favourably regarded by the civil population. The Army must therefore actively seek to improve civil opinion.

Basic to any campaign to gain active civil support is a re-appraisal of current attitude in regard to public relations policy. At present and for many years Army public relations have been purely defensive. They are largely silent except to answer criticism. This is not good enough. We must aggressively court public opinion to gain active support. Public Relations/Recruiting publicity should be in close co-ordination and should be based on opportunities and conditions of service which are material rather than appealing to altruistic or patriotic feelings. Above all, such publicity should:—

- (a) Have local flavour and application. Centralized publicity should be associated with local interest despite the increase in expense.
- (b) Avoid being misleading even by accident. Advertisements showing equipments the soldier will rarely, if ever, see, or alluding to things that are rare as commonplace causes disillusionment.

It may even be pertinent to question the whole attitude of both the Army and the public to recruiting.

Traditionally, recruiting propaganda has been an appeal in some way or other, occasionally almost desperate. On the assumption that "something for nothing" or "gain with little effort" is not valued highly, perhaps a new approach should make it quite clear that those failing to qualify at any stage will be placed on the Reserve and that the Army will retain only the very best. *Anything difficult to gain or retain or which is somewhat exclusive is regarded highly.*

As an ancillary to any campaign of "selective" recruiting and to ensure public consciousness of the Army as an integral part of national and daily life, all the normal aids to recruiting should be used in full. Some of these are well known, but are still useful and therefore worthy of repetition:—

- (a) Initiation of an "Army Day" or "Army Week" as used by the US Army, with "open days" at units, social and sporting functions, etc.
- (b) The organization of "semi-official, social, sporting and pseudo-military clubs, with local branches and chapters, again as used by the US Army.
- (c) The use of traditional methods of recruiting in an energetic manner, including use of regimental bands in the same general way as in the British Army, not only as an adjunct to parades but as a public relations asset in themselves.

Advertising and public relations are merely different aspects of the overall problem of "selling" the Army, and should therefore be closely integrated.

Naturally units must also seek to gain local support. Training Depots must provide a social focal

point of interest for parents, wives and friends. Success in achieving this aim is largely dependent on the personalities involved. This subject is a somewhat hackneyed one and will not be discussed further in this paper.

### Conclusion

There are, of course, many other aspects of this problem and many other schemes that might be considered as aids to CMF recruiting and re-enlistment. These include such ideas as, for example:—

- (a) "Try before you buy" schemes, where recruits attend parades before being enlisted.
- (b) Bounty schemes payable either to ARA or CMF members as a reward for the introduction of recruits who give a satisfactory period of service.

Valuable as these ideas may be, the most important aspect of all is to provide "a sense of purpose."

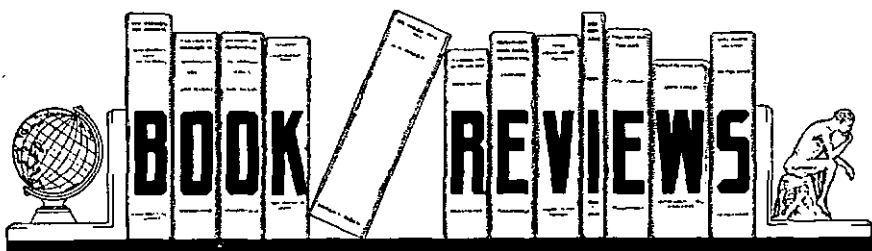
To give this sense of purpose, CMF service should provide:—

- (a) A clear avenue of personal gain, either financial, social or educational.
- (b) A logical and progressive career so phased as to maintain interest.
- (c) A clear set of obligations of the individual to the Service, and the Service to the individual.
- (d) A sound and co-ordinated publicity campaign based on the conditions of service.

Above all, the system should make quite and irrevocably clear that "Only the best can belong," the remainder will inevitably be "also rans."

Of course, all this will cost money . . .

"Ah well!! . . . back to the drawing board!!



**THE SPANISH PIMPERNEL**, by C. E. Lucas Phillips. (William Heinemann Ltd, 317 Collins Street, Melbourne.)

Few episodes of modern history have been more generally misunderstood and misrepresented than the Spanish Civil War of 1936-39. At the time superficial and biased press reports, subsequently supported by the work of many writers who allowed their idealism to warp their judgment, created an entirely false impression of the nature of the conflict and the characteristics of the contestants. Even today the Spanish Government is generally represented in the popular press of the English-speaking world as a Fascist gang which overthrew the legitimate Government of Spain with the active assistance of Hitler and Mussolini. The impression created in the public mind and in the minds of parliamentarians by this totally false view is still so strong that any suggestion of integrating Spain into the Western defence system produces an unfavourable reaction. This is unfortunate, to say the least, for Western European defence badly needs the depth that only Spain can give it.

The Republican Government of Spain may have been legitimate, but legitimacy cannot justify the atrocious manner in which it exercised

authority. No doubt it contained elements actuated by the finest ideals, but real power lay in the hands of Anarchists and Communists, whose chief aim, as evidenced by their actions, was to ruthlessly destroy the culture and the liberty so painfully built up over the centuries.

Long before Franco appeared upon the scene, indeed long before his name was known outside Spanish military circles, life for anyone who disagreed with the Republican "Government" had become not only intolerable but extremely precarious. Armed mobs, which the "Government" made no effort to suppress, roamed the streets of the principal cities, looting, burning, raping and killing. In a period of four months in Madrid alone there were 3300 assassinations, while 171 churches, 69 clubs, 10 newspaper offices and 284 other buildings were looted and burnt. When the Opposition Deputy Calvo Sotelo revealed these figures in the Cortes (Parliament), Dolores Ibarurri, later to be glamourised in the world's press as *La Passionaria*, shook her fist at him and declared: "You have made your last speech." He had. Two days later he was publicly murdered by the "Government's" Assault Guards.

It was against this reign of terror that a section of the Spanish Army, led by General Franco, revolted.

Although their numbers were initially very small, the insurgents rapidly gained in strength, and would undoubtedly have overthrown the "Government" and restored order in a few months but for the assistance sent by Russia and many misguided Europeans ignorant of the true state of affairs. It was the notorious International Brigades which saved Madrid and did most of the "Government's" fighting throughout the war, not the People's Militia, which devoted itself mainly to the much safer and more profitable task of maintaining the terror in the back areas.

When Franco raised the standard of revolt in the south the reign of terror throughout "Government"-held Spain was intensified. Men, women and children were seized in the street or in their homes and shot out of hand or thrown into prison. From prison they were collected by night and taken away to be machine-gunned to death in a convenient quarry or deep road cutting. It is estimated that some 69,000 people were slaughtered in this way in Madrid alone in the first few months of the war.

That is the background against which Mr. Phillips tells the story of an Englishman, Captain E. C. Lance, DSO, who was working in Spain with an Anglo-Spanish engineering firm when the troubles began. Responding to an appeal for help from some friends, Lance rescued and transported to safety a Spaniard marked for death. From that moment he was a dedicated man. With no interest whatever in Spanish politics, he devoted himself to snatching victims from the firing squads and leading them to the safety of any British ship he could

find in the harbours of Alicante or Valencia. Each rescue was at once a breathless adventure, a model of careful planning and an epic of daring effrontery. Altogether he saved nearly 100 people from certain execution before the foolish indiscretion of one of the rescued people betrayed him.

Arrested by the Assault Guards, Lance was given the full Communist treatment, but steadily refused to incriminate those who had helped him in his work of mercy. Moved from prison to prison down a steeply descending scale of brutality and degradation, and daily expecting to be marched to the execution pit, he managed to maintain his spirit and his integrity. In the closing days of the war his release was secured by the British authorities.

THE SPANISH PIMPERNEL is not a novel. It is a factual account of events that actually happened, told with the great narrative skill which Mr. Phillips displayed in his earlier works. It is good entertainment, a tale of high adventure, of tense situations, that holds the interest from beginning to end. The terrible background to Lance's exploits serves to correct to some extent the erroneous, commonly held view of the Spanish Civil War, and stands as a warning of what happens when the forces of Communism gain control of a country.

—E.G.K.

YEAR BOOK OF THE COMMONWEALTH OF AUSTRALIA, No. 45, 1959. (Commonwealth Bureau of Census and Statistics, Canberra, A.C.T.)

The Commonwealth Statistician (S. R. Carver) and his publisher,

the Government Printer at Canberra, are unlikely to be interested in this review as a means of increasing the sales of their most recent Year Book; nor will they be over-concerned with any criticism as to the literary worth of this rather massive tome. Why should they?—the book has a value which is incalculable by ordinary standards.

For my money the Commonwealth Year Book represents the best ten shillings worth (plus postage) of reading material available in this country.

I have been absorbing my copy in measured doses for several months, yet it seems I shall not exhaust the potential for new, unread corners in the twelve hundred pages (plus) which lie between the covers, before No. 46 is issued.

Here is a story of Australia, and of Australians, in the greatest detail.

Take your pick: Discovery, Colonization and Federation of Australia; Physiography; Government; Land Tenure and Settlement; The Territories; Manufacturing Industry; Population; Vital Statistics; Transport and Communications; Defence; Repatriation and Welfare Services,

to quote only twelve of the thirty-one chapters.

You name it and there it is!

There is a General Index which runs to twenty-four pages, and there are graphs and tabulated data to satisfy the most demanding perfectionist.

Let's take a look at one or two interesting facts from the vast reservoir of information—a few grains of sand from a whole beach.

Are you interested in record rain-falls which have occurred within a twenty-four hour period? Queenslanders can boast: 35.71 inches at Crohamhurst on 3 Feb 1893; whereas the South Australians should hang their heads with a record of only 8.10 inches at Ardrossan on 18 Feb 1946, as the record for that State. Sydney tops the capital cities with an annual average of 47.20 inches over a period of 99 years, with Adelaide at the bottom of the list with an average of 21.04 inches over a 119-year period.

If you are one of the perennial NSW versus Victoria combatants, your unresolved arguments can be settled by reference to this book. Here are a few items to stimulate your interest:—

Item	NSW	Victoria	Year
Factories . . . . .	21,838	16,232	1956-57
Land under irrigated culture (acres) . . . . .	695,365	1,001,800	1957-58
Population increase . . . . .	72,153	68,012	1957
Cost of Parliamentary Government . . . . .	65,189	70,284	1958
(State) per head of pop. . . . .	4/3	4/6	1956-57
Government Railways:—			
Gross Revenue (£'000) . . . . .	74,433	35,954	1957-58
Working Expenses (£'000) . . . . .	72,534	38,174	1957-58



This "review" could quickly develop into a condensation of the Year Book; it does that to you, by enticing the would-be sampler into chapter after chapter.

The final note—in despondency: Some of our land is missing!! A Corrigendum issued with the Year Book states that, following a revision of Local Government Areas in Queensland, the area of Queens-

land has been determined as 667,000 square miles—a reduction of 3500 square miles. The total area of Australia was therefore reduced from 2,974,581 to 2,971,081 square miles.

Let's hope the current National Mapping programme will pick it up in some other place!

—Major R. Vardanega, RAASC.

### COMPETITION FOR AUTHORS

The members of the Board of Review for the year 1960-61 are:—

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