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FRONTISPIECE

On 7-8 December 1941 Japanese forces, without any declaration of war, attacked the American base at Pearl Harbour in the Hawaiian Islands and landed on the north-eastern coast of the Malay peninsula. With command of the sea and the air, and the advantages of greatly superior strength on the ground, the Japanese forced their way down the peninsula and confined the British Commonwealth forces on Singapore Island. The last stronghold on the island fell to Japanese assault on 15 February.

8 Australian Division, less one brigade, formed part of the Commonwealth garrison of Malaya, and participated in the fighting practically from first contact until the end of the brief campaign. The picture shows a 25-pounder gun of the divisional artillery in action somewhere on the peninsula.

AUSTRALIAN ARMY JOURNAL

A Periodical Review of Military Literature

Number 129 February, 1960

CONTENTS

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AUSTRALIAN ARMY JOURNAL

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TROPICAL NAVIGATION

BATTLE WING OF THE JUNGLE TRAINING CENTRE

"No—I never bin lost: but once for about three weeks I was kinda puzzled."

—Brigadier Bernard Fergusson.

The Problem

IN many areas of the Tropical Zone foliage restricts visibility to such an extent that it is difficult to relate the ground to the map by normal methods. However, after millions of man-hours in patrolling and movement in South-East Asia in World War II one might assume that all navigational problems had been solved or at least acknowledged. There is a quaint old adage, "We lives and we learns." Of course, the normal countersign is "Not b—— likely!" An examination of Operation Reports reveals the following interesting statements:—

15 Aust Inf Bde Bobdubi—Salamaua Area 1943

"War is an art; much more science must be applied to our fighting in the jungle. A highly developed standard of movement and navigation is necessary for patrolling, attacking and encircling moves by day and night. The maintenance of direction is greatly dependent on navigation, and the necessity for travelling 'blind' in the jungle needs scientific methods to ensure accuracy.

"There is an example of a unit experienced in patrolling in which the following happened. A patrol set out, moved 150 yards south, 250 yards west, then 300 yards north. On return the patrol commander reported that an LMG was sited in such a position that it could enfilade the whole of our position. A second patrol was sent out to attack and discovered that the first patrol had really moved around in a circle and became confused about ground. The LMG was our own."

24 Aust Inf Bn Operation Doublet 30 Jun-6 Aug 43

"Use of the compass was conspicuous by its absence in the early stage of the operation. Officers, though they admitted they were trained in its use, did not use it until pressed to do so. On a few occasions attacks were failures because the officer in command did not know whether he was on the objective or not."

It is well past the time when we should have learned, but it is not too late. It is difficult to relate ground to the map in the Tropical Zone. This only means we must get a system which is simple to apply and gives accurate navigation under difficult conditions. All complications must be eradicated—fighting in

the tropics is complicated enough without making life unnecessarily difficult. The simpler the method one uses to get to the enemy to kill him the more soldiers we will keep alive. Furthermore, tropical warfare imposes great responsibility on junior leaders and private soldiers. In many cases it will be the junior NCO or senior private in an infantry section who will be leading patrols and responsible for navigation. With infiltration a normal activity of tropical warfare, it is necessary for all arms and services to realize that tropical navigation is an integral part of living in the tropics.

Therefore it is necessary to have a simple system of navigation which will give accurate results under difficult conditions.

The system described in Infantry Training, Volume IV, Tactics (Tropical Warfare) Part 1, does not currently satisfy all requirements for operations in the Tropical Zone. This method, in outline, is based on the preparation of a Navigation Data Sheet which contains information of the route to be followed set out as shown in Figure 1.

Whenever possible, a route must be planned from the data obtained from all reliable sources. Planning will save time en route, and save unnecessary hardship by avoiding "bad going." However, in operations, planning may not be possible for the following reasons:

(a) There may be insufficient time to plan the route.
(b) There may not be, at hand, sufficient aids in the form of maps and air photographs from which to plan.
(c) There may be no knowledge of the route to be followed (e.g., the hasty follow-up of withdrawing enemy).

Navigation under these conditions depends on the soldier's ability to:—

(a) Keep direction (it is assumed that a compass is available and the soldier uses it correctly).
(b) Measure distance accurately.
(c) Use a system of navigation capable of operation under conditions of restricted visibility, inadequate maps, lack of time to plan, and no knowledge of the route to be followed. This system is Traversing.

From	To	Magnetic Bearing	Estimated Distance in Yards	Estimated Time in Minutes	Going	Remarks
160742	161742	360	100	45	(a) 500 yards downhill through primary then (b) 200 yards level going through swamp	Track shown in square 1674 probably overgrown

Fig 1. Navigation Data Sheet

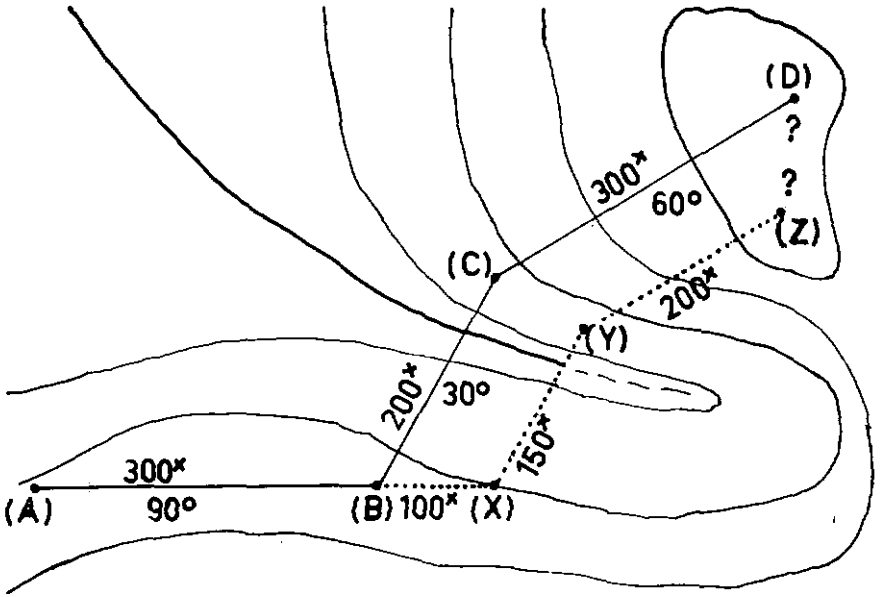

Figure 2

Keeping Direction

Basically this problem has been overcome, as generally the compass has been mastered by trained troops even in difficult country. It is when the combination of keeping direction and measuring distance in rain forest is examined that one sees the real problem in its correct perspective.

In Fig 2 one can see the problem. All bearings are identical in the three legs of the route, and the total distances vary by only 50 yards, 800 yards is the route planned from (A) to (D) via (B) and (C) and 750 yards is the route covered from (A) to (Z) via (X) and (Y). However, the final destination reached (Z) is approximately 88 yards at 202° mag from (D), and a fourth leg of the route would be necessary of 88 yards at 22° mag to arrive at (D) the correct destination.

In student practice at Jungle Training Centre (JTC) the above errors were quite normal with trained soldiers, NCOs and officers. This standard is unacceptable, for many reasons, e.g., fire support in rain forest is difficult enough without sub units requiring the support being unable to navigate accurately. So attention was directed to measuring distance.

Measuring Distance

The methods of measuring distance available to an infantry soldier are usually limited to measuring with a known length of cable (as a unit of measure) or pacing. Pacing will be the normal method, although on special patrols, where a high degree of accurate navigation is necessary, the distance may be measured with a known length of signal cable. In either case allowance must be made for the increased

distance travelled up and down hill in relation to map distance.

Trials have been conducted at JTC to determine how this allowance could be made. In early exercises most navigational errors were caused by gross over-estimation of the distance travelled, as large as 20% in mountainous country. This is unacceptable when so much reliance must be placed on the accuracy of navigation on operations. It was apparent that this over-estimation was caused by not allowing for the additional distance travelled up and down hill and the natural tendency to shorten paces on sloping ground.

Infantry Training, Volume IV, Tactics (Tropical Warfare), Part 1, Figure 35A, sets out in a table the additional paces required for various gradients (Table A). This table was derived from trials conducted at JTC and has been confirmed, as a yardstick, by subsequent trials.

Since it is unlikely that a soldier on patrol would have the details contained in Table A, how does he measure angle of slope or gradient accurately?

If the gradient is not measured accurately, then the measurement of distance is inaccurate.

Gradient	Distance		Paces			
			Uphill		Downhill	
	Map	Ground	Number per 100 Yards	Length Inches	Number per 100 Yards	Length Inches
1½ to 1	100	180	540	12	360	18
1 in 1	100	141	282	18	212	24
1 in 2	100	112	168	24	149	27
1 in 3	100	105	140	27	126	30
1 in 5	100	100	120	30	120	30

Table A—Estimation of Distance

Measuring Angle of Slope

Estimating an angle of slope or gradient is a difficult task, and in open country requires considerable practice. In close country, particularly in rain forest, it is even more difficult and requires more practice and experience than one can normally manage.

The Manual of Map Reading, Air Photo Reading and Field Sketching, Part III, Chap 8, in dealing with relief and height generally, illustrates the means available within the Army for obtaining heights. They are aneroid barometer (for direct height measurement), the Indian clinometer and the Abney level (for relative measurements). These equipments are not available normally for navigating parties, but the suggested improvised level or clinometer (Sec 65) made from a Service protractor, a piece of string and a weight (Figure 3) is a suitable instrument for measuring angles of slope to the accuracy required by navigating parties.

With such an instrument the angle of slope can be measured, and referring to Table A the paces taken can be converted to yards. So by

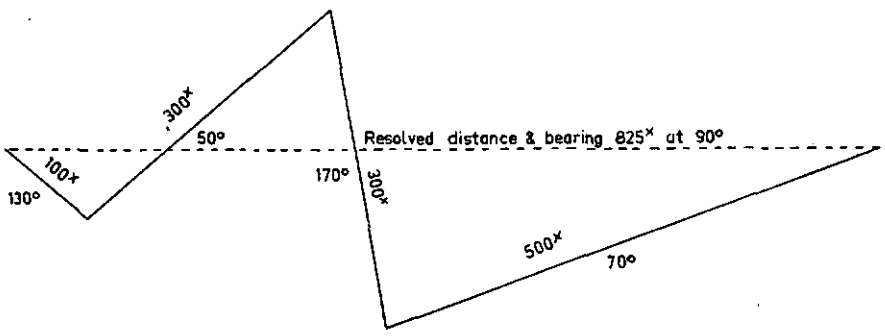

Figure 7

Traversing Without a Map

The traversing procedure may be adopted to obtain accurate navigation in areas where there are no maps. If air photographs are available, and after orientation and calculation of the scale, the route may be plotted as detailed above. Owing to the scale, the resolving method normally will be used.

In the worst case, in areas where there are no maps, air photographs or sketches, a fix on an unknown point may be obtained in relation to the start point (i.e., by bearing and distance) by plotting the route to scale and resolving.

The Answer to the Problem

The use of the Pace Clinometer, *together with pacing, provides* the soldier with a reasonably accurate method of measuring distance. The use of Traversing as a system of navigation will give accurate navigation through unknown country when it has not been possible to plan the route. These provide the answer to the problem of navigation under all conditions prevailing in the Tropical Zone.

ACKNOWLEDGMENT

The photograph reproduced as a frontispiece in the February 1959 issue of "The Australian Army Journal" was provided by the Australian War Memorial, Canberra. It is regretted that through an omission due acknowledgment was not made.

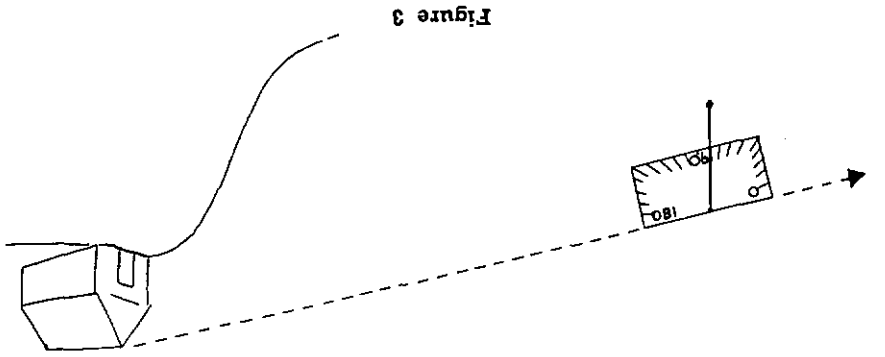

Figure 3

overcoming the problem of measuring the angle of slope one overcomes the main portion of the problem of measuring distance. The full problem of measuring distance is overcome by the navigating party keeping regular pacing in accordance with Table A.

Pace Clinometer

By using the following method:—

(a) Keeping direction by the compass,

(b) Measuring distance by pacing,

(c) Estimating the angle of slope by means of the improvised clinometer, and

(d) Converting the paced distance to yards according to the gradient,

navigation in difficult country is accurate—but is it simple? Of course not! And the standard required is three members of an infantry section to be capable navigators.

To get this simplicity the "practical scientists" of Battle Wing devised the Pace Clinometer. To avoid constant reference to the information contained in Table A it was desirable to construct an *instrument* that contained this information, measured slope, and could be used by a private soldier on patrol under adverse conditions.

Figure 4

From the information contained in *Table A*, a *Graph* (Figure 4) was plotted.

Using the relationship, paces to angle of slope, a Pace Clinometer was constructed (Fig. 5). This was done by covering the metre scales on the reverse side of a Service protractor with white adhesive tape and inscribing the pace graduations opposite the appropriate angle of slope. An indicator of wire (A) was made to fit in a small notch cut in the protractor.

The Pace Clinometer is used in the same manner as the improvised Clinometer, but combines the role of that instrument and Table A into *one simple measurement*. Its use is illustrated in Figure 6.

Tim Toggle sights along the top

Toggle ...
keeps regular), and ...
Y he converts those paces to yards and records the distance in yards.

In using the Pace Clinometer there are four points for care:—

(a) Ensure that indicator A, whether it be wire or a string with a weight, swings freely as a plumbob.
(b) Ensure that the line of sight is taken to a point above ground level equal to the height of the sighter. It is preferable to have another member to sight on—Will Barick fills the role in Figure 6.
(c) Ensure that you sight on to a recognizable landmark so that paces are taken to this point.
(d) Sight again when you reach your landmark.

With the compass and Pace Clinometer navigation is simple and accurate. A considerable number of trials have been conducted at JTC comparing different methods and different prototypes of the Pace Clinometer. With trained soldiers the maximum errors are: Estimation of gradient, pacing and conversion from Table 1—29%; Pace Clinometer and pacing 9%. With considerable practice both errors decrease, but the Pace Clinometer is the simplest and most accurate method for trained soldiers, including those learning tropical navigation.

Once navigation is simplified as above the main problem remaining is how to navigate simply and accurately in rain forest with the restricted visibility, inadequate maps, lack of time to plan and no knowledge of the route to be followed. This system is Traversing.

Sketching ...
necessary to modify ...
provide an accurate means of navigation where the route to be followed cannot be planned. Traversing is simply the process of recording bearings and distances from a known point in order to fix an unknown point.

Traversing with a Map (1:25,000 RF or Larger Scale)

(a) Plot the start point on the map.
(b) Record the bearing and distance of each leg. When measuring distance allow for slope by using the Pace Clinometer.
(c) At a convenient time plot the bearing and distance of each leg on the map and obtain a fix.
(d) Check the fix against the ground to confirm navigation. This should be done at prominent natural features, easily identified on the map, to avoid cumulative error.

Traversing with a Map (1:63,360 RF or Smaller Scale)

With a 1:63,360 or smaller scale map it is impossible to accurately plot each leg (e.g., 100 yards is represented on an inch to the mile map by .057 inches). Under these conditions the procedure outlined below should be adopted:

(a) Plot the start point on the map.
(b) To a convenient scale (1:25,000 or larger) plot the legs on a sheet of notepaper, aligning the protractor with the edge of the page or the ruled lines.
(c) Obtain a fix by plotting the resolved bearing and distance on the map (Figure 7).

PACE CLINOMETER

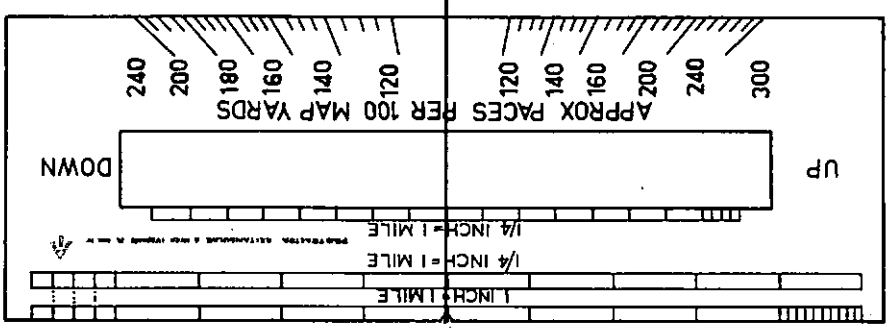

Figure 5

of the Pace Clinometer on to Will Barick's head, noting a landmark (the tree) at Y so that he knows where to pace. He reads the paces per 100 yards direct from the scale opposite the indicator A. (If he wishes he can read the angle of the slope on the protractor side of the Pace Clin-

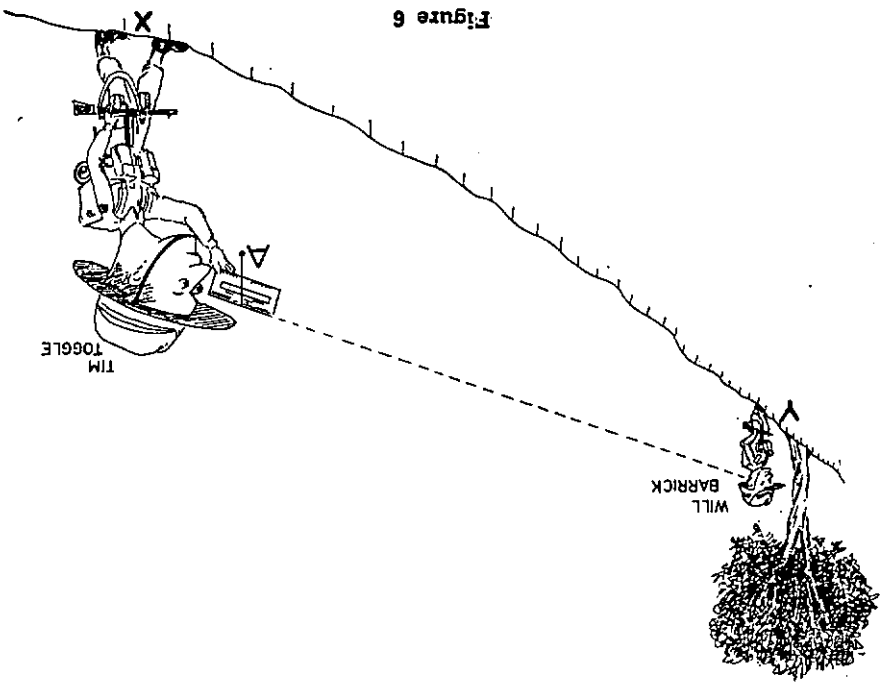

Figure 6

AN AUSTRALIAN TASK FORCE

Major D. M. Butler
Royal Australian Infantry

This article was written before the announcement of the reorganization programme.—Editor.

The Problem

THE missile era has brought many problems to Australia, not the least of which is the difficulty of deciding how her regular forces can best be constituted in order to provide a worthwhile contribution to support her treaty obligations. In the past Australia's contribution was designed to conform to United Kingdom organizational developments because we were committed to the defence of the Commonwealth, and a degree of standardization was essential. Both countries now face entirely different problems and our solution can no longer be one of conformity. It is not enough today to plan on a protracted mobilization and a long period of training in the theatre of operations. Trouble flares so rapidly that only positive and immediate action will ensure its containment. A force must be retained in readiness, and it is the composition of this force which concerns us. Our treaty obligations indicate the width of the problem and, at the same time, point the way to its initial examination. Three facts determine the shape of Australia's contribution, and these will be postulated and then examined in some detail.

Our defence forces must be designed to operate as part of an allied force. It is true that there may be occasions when Australia may have to act alone, but surely only where there is a parity in strength between Australia and her opponent. In the event of Australia being opposed by overwhelming strength the problem becomes one of collective defence. If she is therefore forced to act alone the requirement is basically one of mobility and readiness, which is also a keystone of any contribution to an allied force.

Australia is committed by treaty to contribute to the defence of the free world in the SE Asian theatre. In this theatre the clash of ideologies has been most marked in the post-war years. The area has been plagued with war, revolution and internal unrest. Our forces must be designed, therefore, to cope with internal security duties as well as either total or limited war.

It is already clear that our forces must be maintained in readiness to move at short notice to any point of trouble. There will be no time for the forces to train or to acclimatize for the operation. The problem then becomes one of continually maintaining a high state of fitness

and training in all phases of war, including internal security duties, with frequently rehearsed embarkations to cover all exigencies.

Allied Force

Role for Australia

In any Allied effort the country which assumes the major burden in men and material is also, by right, the one which controls the strategic direction of the effort. Australia must therefore be prepared to accept a role which is not only in keeping with her size, but which also ensures she has accepted her share of the burden. In two world wars Australia, because of the size of our Services, was able to make an impression in every theatre and in nearly every role. In Korea, however, the first of our cold war contributions, our effort was much smaller in relation to the size of the United Nations forces, although at the time it was as much as we could put in the field. The effect of the contribution was dissipated because each service contingent operated in a different area on a different task. Since our future contributions will not be much bigger, it is imperative nationally that care be taken to ensure that there is little or no dissipation of the impact of the Australian contingents.

If it is undesirable to accept minor roles in many spheres, our planning from the outset must clarify the limits of our role. We must fix whether we are to make both strategic and tactical contributions to the allied forces. At first sight it would appear highly desirable to contribute in the strategic sphere to gain international prestige. This is a premise which is completely ill-founded. Economically we could never entertain the provision and maintenance of an ICBM or V bomber force. The high cost of these sophisticated equipments would so restrict the number we could buy as to make our contribution ridiculously small. Again, by the very nature of their complexity, the maintenance forces required would place severe manpower limitations on our already small tactical contribution. Australia must contribute only to the tactical sphere if her contribution is to make a definite impact.

Identity

It is imperative that the force maintains its national identity regardless of its size. A study of the history of the two World Wars and Korea shows just how difficult a task this is, even within the Commonwealth. In a United Nations force the difficulty is increased. It is axiomatic that the larger the contribution the easier the task becomes. However, it does not mean the problem is solved. Since it is easier to deal through normal channels direct to one's own commanders, there is always an urge within Allied high commands to detach portions of our contingents, so placing them under command of the existing formations. If this urge is to be resisted—as it must be—our commanders should be of sufficient rank to deal direct with senior allied commanders. It is also apparent since these questions of policy are so involved and often, unfortunately, so bitter, that the matter must not be left the responsibility of the commander fighting the battle. The practice in the past, in order to achieve this representation, was to appoint a force commander-in-chief who had responsibility only for ad-

ministration. In order to preserve identity and to strengthen our representation today, it is felt the force commander should also have overall operational responsibility incorporated in his directive. This can only be guaranteed if our forces are completely self-contained, and so are freed of dependence on any outside influence within the theatre, and therefore capable of a greater flexibility of tasks.

The Theatre

Operations in South-East Asia present formidable difficulties in the field of mobility and logistics. Our forces must be so designed as to be able to move great distances from Australia, say 5000 miles, and once in the theatre be capable of operating for long periods. In the best case, the difficulty could be greatly eased by pre-stocking of dumps of equipment and stores at strategic bases in the theatre. It is, however, an expensive project in both provision and maintenance, and could only be done at the expense of such forces as are maintained at home. The success of the dumping also depends on the guarantee of the use of the base in time of trouble. The situation today is such that, because of either nuclear damage or a hostile population, any base could become inoperable. Since the same conditions apply to both airfields and ports in the theatre, we must plan and have the capability of mounting and maintaining the force from Australia. This prepares for the worst case, but does not settle the issue, as once in the theatre terrain will place considerable restrictions on tactical mobility.

Strategic Mobility

Undoubtedly the quickest way of moving soldiers 5000 miles is to send them by air. However, if formations and units are to be moved with their equipment and, say, 30 days supplies, air movement is not the complete answer. It would require a large fleet of transport aircraft in readiness, good air fields and a number of staging bases, dependent on the distance travelled and load carried, to be successful. In South-East Asia none of these things are guaranteed, nor could Australia afford to provide and maintain an air fleet of sufficient size. Our forces must therefore be transported by sea, and since ports are not likely to be available, the forces must be capable of operating over open beaches.

Tactical Mobility

All Australian soldiers are aware of the terrain in which we are likely to fight. In such conditions the Army has to develop operations at a speed greater than pedestrian without completely exhausting the men taking part. Today this is more serious than ever because Australia will be unable to commit initially forces as large as she did in the past. The only way smaller forces can succeed is to have greater flexibility and mobility than the enemy.

Force in Readiness

There are a number of requirements which must be met if forces are to be maintained in readiness to move anywhere at any time. Some of these requirements will be presented without elaboration, as, although they are not really within the scope of this paper, they do help to show the state which the force should develop.

(a) A degree of readiness must be decided as a basis for formation

and unit planning. A working figure of fourteen days would appear to be suitable, as it would enable time for the assembling of units by recovering personnel from schools and leave, and for the move to the port of embarkation. Advance parties should be at shorter notice.

(b) Since the force is at such short notice, it must maintain high standards of training. Individuals must be so fit as to operate in the theatre with little acclimatization. Unit and formation training should include all phases of war and internal security undertaken as realistically as possible, mounting and embarkation drills must be evolved and practised at all levels. A force embarkation and mounting must be carried out at least annually followed by an exercise, preferably in company with an allied force.

(c) Units must always be maintained slightly over establishment, so that they will not be seriously inconvenienced by sickness of key personnel at the time of alert.

(d) Equipment must similarly be held to replace items withdrawn from units for any longer than fourteen days.

(e) The force must always maintain 30 days supplies in unit lines ready for embarkation.

The United States Marine Corps

The only other force in the world with a similar problem to ours is the United States Marine Corps. Their solution merits very careful consideration. A Fleet Marine Force has been raised for service with each US Fleet, designed in such a way as to provide the amphibious element of any task force. It is, however, of interest that the Royal Navy have gone part of the way in deciding to station a Royal Marine helicopter carrier east of Suez.

Fleet Marine Force

Ground Elements

The force consists basically of a division composed of—

Three infantry regiments
A pioneer battalion
A medical battalion
An anti-tank battalion
A reconnaissance battalion
Administrative units.

Air Elements

Attached to the Division as an integral part at all times, whether in barracks or on operations, is an Air Wing of fighter squadrons, all-weather squadrons and ground attack squadrons. This wing has two squadrons of C.130 (Hercules) aircraft to ensure its mobility under all conditions. The USMC feel that since they cannot provide all the conventional fire support they require in the Division, it must be supplemented by the use of tactical air support.

The USMC believe that although United States Air Force or United States Navy fighter squadrons can provide close air support if required, they do not do it as well as units which exist and train primarily for the role. Consequently air/ground co-operation is developed to such a high degree by teamwork and training in the USMC that close air support can be provided in all weathers twenty-four hours a day. To further guarantee this close air support

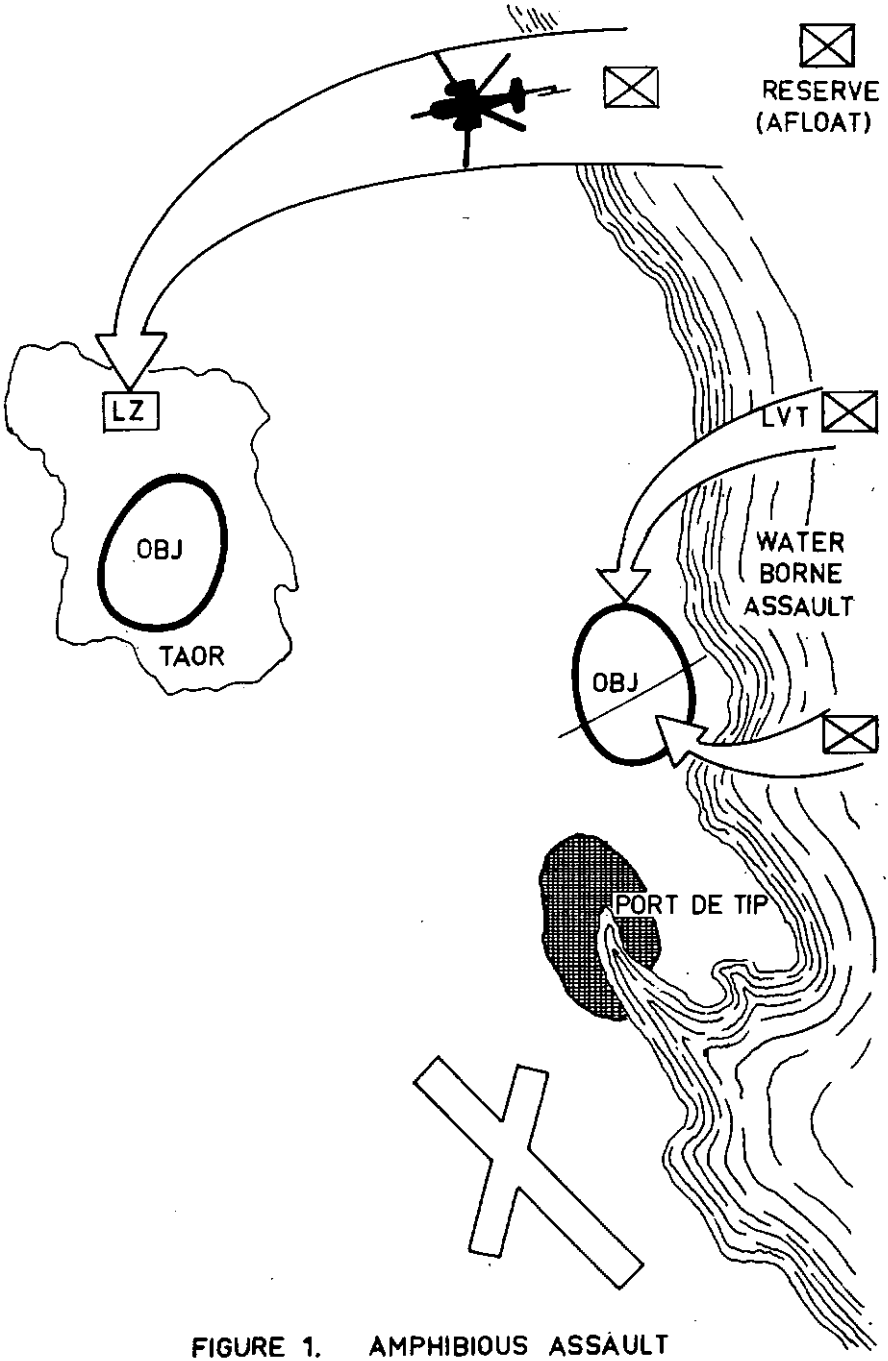

FIGURE 1. AMPHIBIOUS ASSAULT

through all phases of operation, the Marine Air Wing is equipped and trained to operate from Navy carriers until facilities are secured and developed for them ashore. Moreover, in the use of simple close support aircraft with short take-off and landing characteristics, a relatively cheap and versatile form of tactical support is assured.

Strategic Mobility

New types of assault shipping have been developed which are a marked improvement on those developed during World War II. They have not only increased capacity and range but are also capable of maintaining the Fleet's cruising speed, which lessens the anti-submarine problem. What is even more important, each Fleet Marine Force is equipped with this shipping, and exercises continually to improve its technique in combined operations.

Tactical Mobility

The USMC believe emphatically that the helicopter provides the answer to the problem of tactical mobility, as it offers "rapidity of movement, surprise, flexibility and depth of assault. With their vertical rise and descent capability, helicopters may be operated over terrain that precludes use of other conveyances." Some examples of the tasks the USMC would allot helicopter-borne forces are:—

"(a) To attack the principal enemy position in the rear or flanks.
(b) To seize important localities in enemy rear areas.
(c) To isolate enemy defences by seizing critical terrain.
(d) To exploit a tactical success.
(e) To create a diversion, and induce desired hostile reactions.
(f) To conduct raids or deep reconnaissance patrols.
(g) To increase the mobility of the reserve or a counter-attacking unit.
(h) To accomplish rapid redeployment.
(j) To conduct observation."[1]

Obviously to carry out many of these tasks more than a token helicopter force will be required, but it must be able to lift at least an effective fighting element. To move the helicopter force to the theatre and to ensure it takes part in all phases of the operation, the USMC are provided with helicopter carriers. These carriers provide an assaulting force with tremendous advantages. Until now, amphibious forces have always had great difficulty in securing a lodgement against heavy coastal defences, and once ashore developing operations at great speed. The diagrams provide some indication of how these problems can be overcome.

Australian Task Force

The Advantage of a Task Force to Australia

It is well to consider what advantages an amphibious force designed on the lines of the Fleet Marine Force offers Australia. Broadly they are:—

(a) It would guarantee for the first time in war that all Australian forces would operate together in one task force. The effect of this homogeneity of national military effort upon the public and upon the Services is patent to all. There would be no better way of preserving the national identity of our forces.

1. "Helicopter-Borne Operations 1958" USMC Training Publication TIP(EC)2.

(b) It guarantees that our forces would be self-contained and capable of independent action. In so doing we would be relieved of the danger of a burdensome dependence on our allies.

(c) It is capable of developing and sustaining operations anywhere in South-East Asia in the event of total or limited war or internal unrest.

(d) It can be maintained at instant readiness.

(e) It is capable of training in peace with our allies anywhere in South-East Asia.

Can Australia Provide Such a Force?

It is significant that a Fleet Marine Force is almost exactly three times the size of the tactical elements of Australia's Regular Forces, even down to the Hercules aircraft. However, we do not possess the assault and supply shipping, and the helicopters, although the RAN could provide a carrier for conversion to a

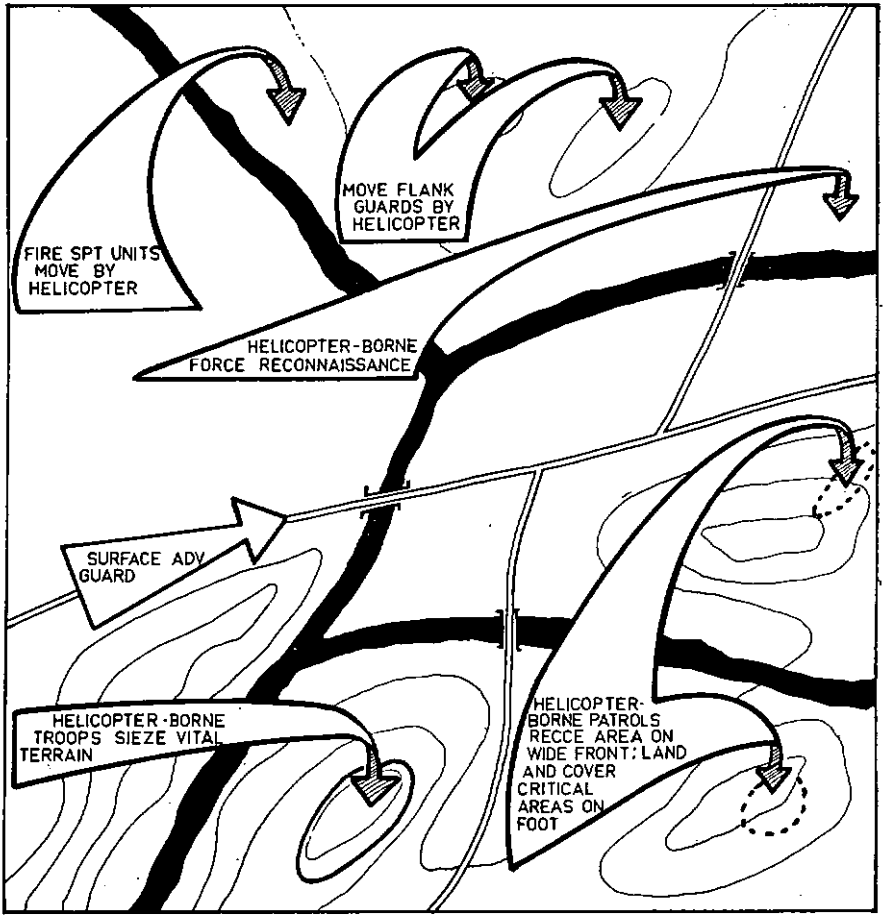

Figure 2. Helicopter employment in movement of security forces

helicopter carrier. Immediately the issue would appear to be one of expense, as the assault shipping, perhaps the most expensive part of the requirement, would cost £20,000,000. Fortunately the concept is so complex that the equipment would have to be phased over a three-year period, which would defray the major burden of the outlay. Sufficient equipment could be povided each year to enable units to work up to a state of efficiency before proceeding to the more difficult formation and, later, force exercises. In such a way, with an outlay of £10,000,000 a year for three years, the force could be equipped with the shipping. This price is within our capacity.

Service Roles

As we do not have the advantage of integrated force already possessed by the USMC, it is important to consider broadly what roles each Service should have in the force. They would be:—

Mounting Phase

RAN. (a) To provide sufficient assault and transport shipping to move the task force anywhere in Asia.
(b) To provide anti-submarine protection in the mounting area.

RAAF. (a) To assist the RAN in the anti-submarine defence of the mounting area.
(b) To provide reconnaissance and tactical interdiction in the theatre of operations.
(c) Air defence of the mounting area.

In Passage

RAN. (a) Anti-submarine protection of the task force.
(b) Air defence of the task force.

RAAF. (a) Anti-submarine protection of the task force.
(b) Reconnaissance of the theatre of operations.
(c) Tactical interdiction within the theatre.

Assault Phsae

RAN. (a) Anti-submarine protection of the task force.
(b) Air support of the assault.
(c) Air defence of the task force.
(d) Naval gunfire support.

ARMY. Secure a lodgement.

RAAF. (a) Air support of the assault initially from allied Navy carriers and thence ashore from forward strips.
(b) Anti-submarine protection of the task force.
(c) Air reconnaissance.
(d) Tactical interdiction.
(e) Transport support.

Subsequent Phases

RAN. (a) Development of the anchorage.
(b) Provision of re-supply shipping.
(c) Anti-submarine protection of re-supply shipping and the anchorage.

ARMY. (a) Development of the land battle.
(b) Development of base area.

RAAF. (a) Air support to the ground forces.
(b) Transport support.
(c) Air reconnaissance.
(d) Anti-submarine protection.

Headquarters

To co-ordinate the functions of the three Services within the force a Joint Headquarters is obviously required. We know that this headquarters *must have not only* administrative responsibility but also overall tactical responsibility. The commander must be of such rank as to be able to represent not only the force but also the country, as the Theatre-Commander-in-Chief. He will act in many ways as a buffer between our Chiefs of Staff and the Allied Headquarters and between Allied Headquarters and our Landing Force commander. Since the Task Force is amphibious, the commander must be a sailor and, dependent on the degree of authority to be assumed, he should be either a Rear-Admiral or a Vice-Admiral. The Landing Force commander, devoted to the tactical battle once ashore, must be a soldier. His force would be a brigade group and a fighter wing, so that he must be a Brigadier. It should be stressed that his headquarters must also be Joint Headquarters, as every operation ashore will require effort from each Service. It should be remembered there is no part of the future area of operations which is remote from the sea.

Conclusion

Australia's contribution in peace should be an amphibious Task Force composed of:—

(a) An integrated Task Force headquarters with a *Vice-Admiral* as commander.

(b) A naval squadron, developed around the helicopter carrier with such amphibious, headquarters and supply shipping as are required to launch the force against a defended coastline.

(c) A brigade group with an SAS Company attached and with sufficient helicopter lift to carry and maintain the fighting element of one battalion.

(d) A fighter wing, capable of operating off Allied aircraft carriers as well as from forward airstrips, a transport squadron, bomber and reconnaissance squadrons.

The Services have a duty to provide the public with the very best type of defence that is available and, at the same time, to show the people how their money has been spent. It is obvious from steps that have been taken in other countries that integration of the Services is a vexed question. The outcome in most cases has been a dispersion of public money and effort to such a degree as to lose sight of the goal. Australia is in a position to give to the people the force they deserve. Integration of the Services is not necessary, but integration of their roles is the cornerstone of the whole effort if there is to be a true force in readiness. With an amphibious task force the Australian Regular Services can show the nation and our allies that we are prepared effectively to support our treaty obligations.

HOW THE RUSSIANS PUT LUNIK INTO ORBIT

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Translated and adapted from "Polytechnisch Tydschrift No. 39-40".

THE first human originated planet was launched by the Russians on 2 January 1959 at 10.00 GMT with the aid of a three-stage rocket approximately 103 ft in length.

The aim was to land Lunik on the moon and the rocket was equipped with special instruments.

Documented reports (including data about the proposed flight paths) from USSR show that it was meant to hit the moon on a spot along its equator, instead of passing it at a distance of some 2175 miles, as subsequently divulged.

In the simple guiding system (see Fig 1), a perforated card catered for the programmed course steering, while the fine steering was carried out by a directed radio beam. With this set-up the Russians managed to come inside 3 degrees of their target. They were also capable of ending the burning of the 3rd stage to an accuracy of 0.1 second, when the Lunik reached an escape speed of 6.941 miles per second. According to Russian space scientists, the missing of the moon was attributable more to the strong magnetic fields than to the ending of the third stage burning. The near-miss, however, indicates that all systems functioned inside the tolerable margins.

The designed launching vehicle, CH-10, weighed 160 tons (metric) and had an initial thrust force of 300 tons. The vehicle was similar to the vehicles used for the launching of the three Sputniks.

Launching took place at 47 degrees lat. North and 62° 32′ long. East, approximately NE of the Aral Sea on the border of European Russia.

At first, Lunik had a southerly course, and later veered off in an easterly direction. The launching angle amounted to 71 degrees from the horizontal.

For this shot to the moon all non-essential equipment was removed from the Russian vehicle. There was not even a device for destruction during flight. The instruments which remained on board consisted of apparatus for the measuring of magnetic fields, cosmic radiation, micrometeorites, corpuscular radiation and temperatures. Four radio transmitters signalled the collected information back to earth. A fifth transmitter was built-in as a reserve transmitter.

Lunik could boast at least two important innovations. For the first time the whole of the electronic equipment in a rocket was built up

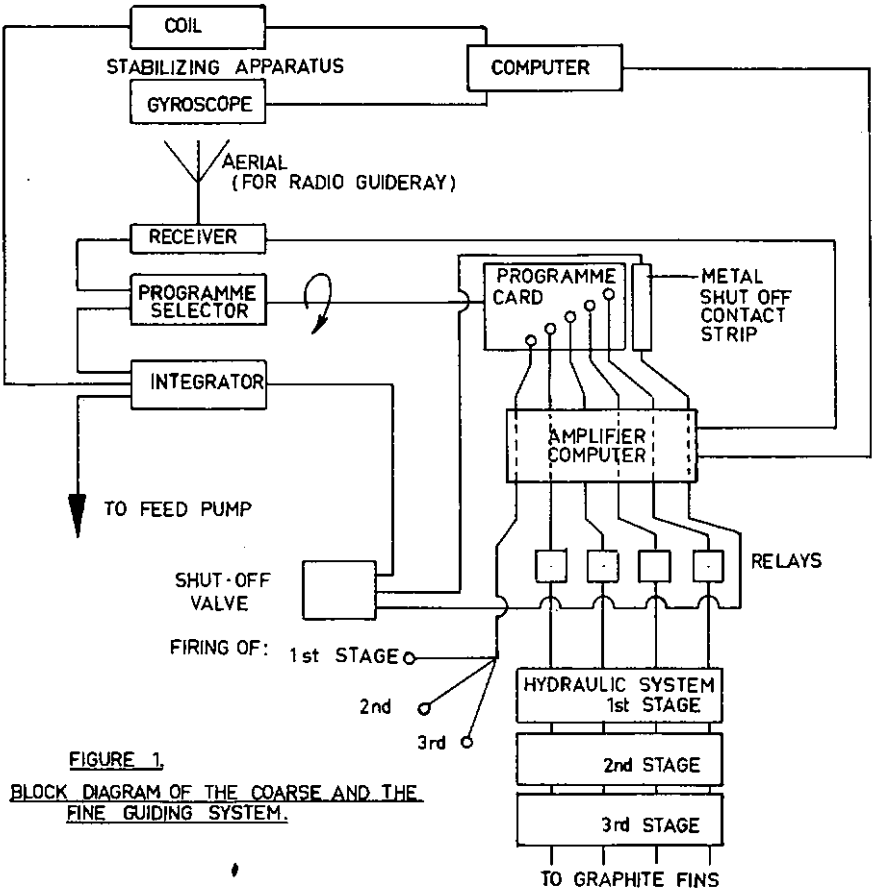


FIGURE 1.
BLOCK DIAGRAM OF THE COARSE AND THE FINE GUIDING SYSTEM.

of transistors, while use was also made of printed circuits.

Propulsion

The launching vehicle consisted of a three-stage rocket. The first stage was a modified T-3A ICBM (Intercontinental Ballistic Missile). The second stage consisted of a modified T-2 IRBM (Intermediate Range Ballistic Missile). The third stage was specially designed for the space voyage. Lunik's first stage was also equipped with two GOLEM-3 rockets (a surface to air missile with solid fuel). The former Sputniks did not use this extra propulsive force.

The initial thrust of the first stage was divided in such a way as to allow the T-3A rocket to produce 220 tons thrust plus 40 tons for each of the two Golem rockets. These two boosters using solid fuel were thrown off at a height of 6496 ft.

The motor of the first stage used liquid fuel which was used up 80 seconds after launching. Just as in the other two stages, the fuel used

was a mixture of carburetted hydrogen with an addition of boron and liquid oxygen in a ratio of 2.4 to 1.

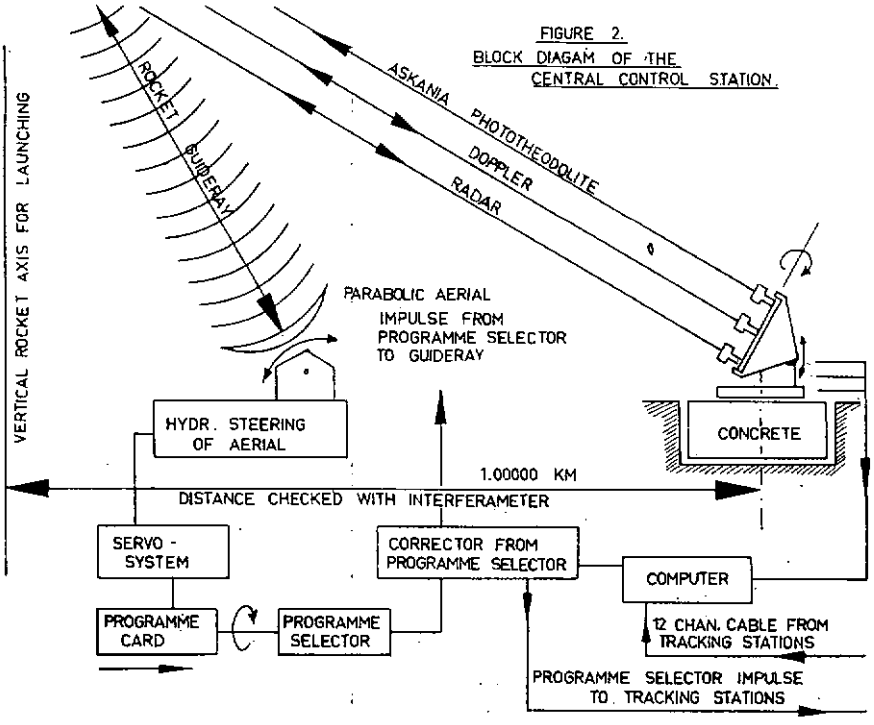
The firing of the second stage was initiated by the burning out of the first stage. The separation of the first stage from the remainder took place after the engine of the second stage was working at full thrust. The speed of the vehicle after the burning out of the first stage was 0.994 miles per second.

The burning time of the second stage was 55 seconds with a thrust of 185 tons. The motor weighed, inclusive of 43 tons of fuel, 51 tons, and had to be adapted to the special fuel combination. Normally the T-2 motor uses a mixture of alcohol and liquid oxygen. The speed after the burning out of the second stage was 3.356 miles per second.

The motor of the third stage delivered a thrust of 45 tons and burned for 50 seconds. At the end of these 50 seconds the vehicle speed was 6.941 miles per second, and this speed was sufficient to escape the earth's gravitation field.

The thrust during the second and third stage burning delivered enough reserve force to impart to the vehicle a rotational speed about the longitudinal axis of some 60 revolutions per minute. This rotation was obtained by graphite fins, and was necessary in order to obtain the required stability. (In present USA

FIGURE 2.
BLOCK DIAGAM OF THE CENTRAL CONTROL STATION.



practice, rotation is obtained by means of Vernier rockets.)

Guiding and Control

The guiding apparatus was partly in the third stage of Lunik and partly on the ground in the control centre, which was at exactly 1.00000 milometer distance (checked with an interferometer) from the launching pad.

The guiding system can be indicated by the expression "Time Guiding." The ideal flight path was programmed on a perforated aluminium card, which was driven by an electronic quartz programme selector (see Figs 1, 2 and 3). Both card and programme selector were built into the rocket. A perforated iridium card (of the same form and with identical commands as the card in the rocket) on the ground, regulated the movements of a parabolic aerial catering for the required fine steering of the Lunik. This aerial provided the radio beam with which the Lunik was being guided. The electronic programme selector in the rocket was synchronized by impulses with the identical programme selector on the ground.

The accurate guiding was taken care of by a radio beam of 12 cm. wavelength and a power output of 5 kW emitted by a parabolic aerial. The guiding signals, emitted by the hydraulically operated aerial, originated from a digital computer similar to the IBM 704.

Variations of ambient temperature, wind, pressure and humidity were corrected manually in a "worm wheel" computer.

Temperature variations, which could alter the aerial reflector, were

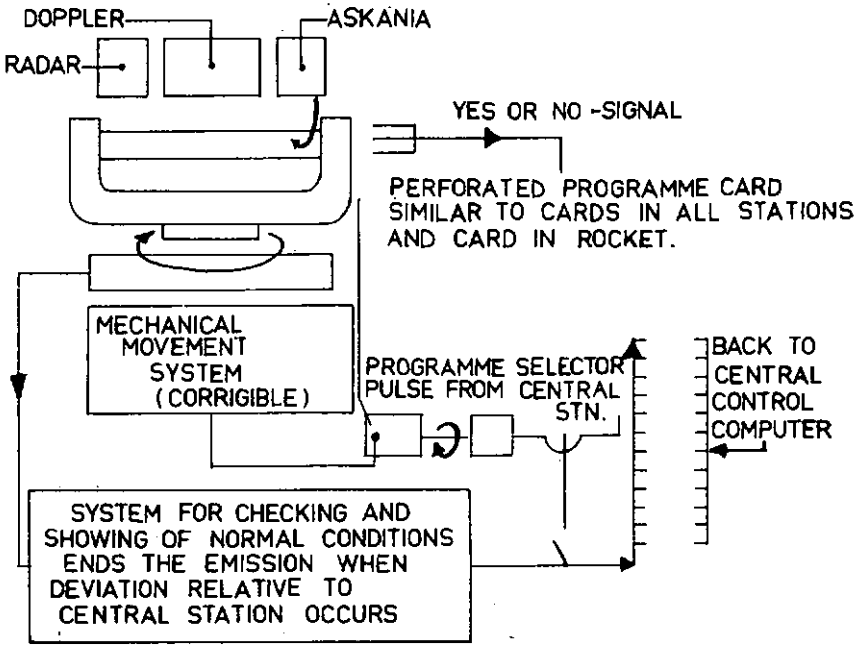


FIGURE 3. BLOCK DIAGRAM OF TRACKING STATION.

measured with thermo-couples. The thermo tensions originating thus could be fed to a computer which by means of hydraulic cylinders effected the necessary corrections, thus ensuring that the correct focal point of the aerial was maintained.

Three gyroscopes, hydraulically damped, one in each of the three stages of Lunik, influenced the stabilization apparatus for the control of the rotations about the x-, y-, and z- axes. (See Fig 4). Gravitational influences upon the vehicle were compensated by the gyrocsope system.

Magnetic influences which tend to rotate the rocket about its longitudinal axis or about a transversal axis were corrected with two induction coils. A third induction coil directly coupled to an integrator took care of the careful control of the acceleration of the vehicle by regulating the pressure of the fuel fed into the combustion chamber.

The efficiency of the Soviet guiding system can be attributed, as some experts hold, to this combination of gyroscopes and induction coils. They ensured that the three axes of the vehicle remained in the correct angular relation to a predetermined path, while the radio beam guidance kept the centre of gravity in the prescribed path.

Steering impulses produced by gyroscopes or induction coils were transmitted via an airborne computer to an amplifier and a second computer coupled to the programme regulator working with a perforated programme card. By means of relays these impulses were converted to hydro mechanical movements, which altered the position of the four graphite fins on the end of the rocket exhaust.

Corrective impulses, emitted by the ground to projectile radio beam, were received by a receiver and transposed to an integrator via the programme selector. Correction signals thus obtained were transmitted to the amplified/computer and to the rocket fins via the hydro-mechanical system.

As with the former Sputniks, the Russians preferred the graphite fins working on the thrust jet rather than the heavier and more difficult-to-handle bracket hung machines as used by the US space people.

Instrumentation

A spherical instrument compartment in the nose cone of the third stage contained mainly the same instruments as in the last Sputnik.

The magnetometer instrument had two tasks, namely to measure the strength of magnetic fields and the measurements of the intensity and intensity variation of cosmic rays as met by the planet.

Of a two-compartment Geiger-Muller counter one compartment was used to register the photons in the cosmic rays at the same time as the second compartment determined the radioactivity of the moon. Together both compartments determined the partition of the heavy neuclei caused by cosmic radition.

A sodium spectral analyzer was designed to determine and measure the components of interplanetary dust.

A micrometeorite-erosion meter measured the corpuscular radiation and the micrometeorite particles.

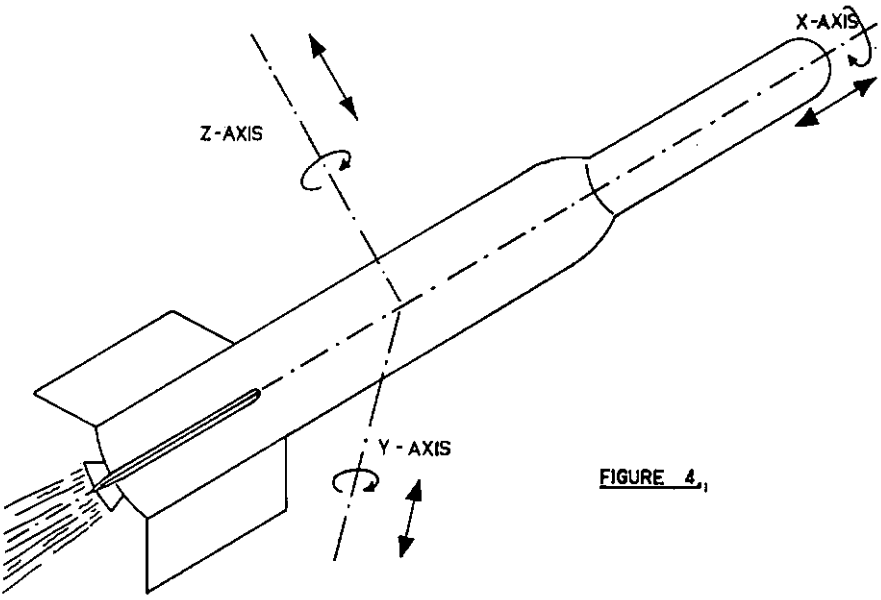


FIGURE 4.

The temperature of the rocket skin and the temperature in the instrument compartment were registered and measured with conventional thermo couples. It is now known that the temperature in the instrument compartment varied between 15°C. and 20°C.

In order to reduce the useful rocket load and to make the carriage of five (5) transmitters (each with an input of 6 watt and an average output power of 1 watt) possible, the Soviets slashed instrument weights.

Four transmitters made the emission of recorded information back to earth possible during flight. The four frequencies which were made known were 19.993 mc, 19.995 mc, 19.998 mc and 183.6 mc. The mutual coupling was arranged in such a way that in case one of the transmitters developed a defect, its frequency would be taken over by another transmitter. The fifth transmitter was kept in reserve and could in an emergency emit the information on the four chosen frequencies. The information collected by the instruments of the planet had to be transmitted to earth by all transmitters at the same time.

The transmitters began to transmit 10 minutes before zero-hour, and were mutually coupled by a magnetic de-coupling system arranged in such a way that should a transmitter defect arise before the burning out of the last stage, the fuel supply would be switched off, allowing the rocket to leave its path. The reason was that the Soviets apparently did not like to have a Lunik flying through space silently.

The Tracking of Lunik

Lunik was tracked by 13 installations equipped with doppler, radar and phototheodolite instruments.

An installation was located in the control centre, the other 12 in the

tracking stations connected by telegraph to the control centre. Data from all installations were collected and fed to a digital computer.

All trackers could rotate about their vertical and horizontal axes and were mounted in an ordinary tubular frame. The whole system was supported on a concrete base cast in the ground.

The doppler instrument was of conventional design and used a parabolic reflector radar worked on a wavelength of 12 cm and used a shield aerial of approximately 9.84 ft in diameter.

The theodolite used to measure the angles worked on the Askania principle.

The Launching

The Russians claim that the launching took place at the correct time. As the time of firing approached the following took place:

Sixty minutes before firing, the electronic apparatus in the main control station and the 12 tracking stations were switched on and checked.

At the same time all rocket instruments were checked on the launching pad.

Ten seconds before firing the nitrogen-driven gyroscopes were started up.

At 5 seconds before launching the following conditions had to be satisfied:—

1. The gyroscopes had to be at full speed.
2. The first stage rocket turbine had to have reached full revolutions.
3. The rocket motor working on liquid fuel had to deliver the total thrust of 220 tons.

Where any of these three conditions were not satisfied, an automatic action would cut in and prevent the firing, at zero hour, by means of the firing switch.

Between minus 10 seconds and minus 5 seconds it was possible to block the launching by manual cut-out if anyone in the firing bunker discovered a defect either visually or from the switchboard instruments.

At minus 5 seconds[1] the fuel tanks were full, and this fact was transmitted to the computer in the main control station.

The external fuel supply and the fuel supply from fuel tanks to the first stage were then simultaneously and automatically switched off and on respectively.

At zero hour, and under normal conditions, the two Golem rockets were fired by the firing switch and by releasing the anchors Lunik was launched.

1. The timing is not in agreement with the data and conditions in the previous paragraph.

RECOMMENDED READING

IN publishing Recommended Reading List No. 2, the members of the AHQ Advisory Group on Military Literature think it advisable to repeat that the fact that a book is recommended does not imply official approval of the author's views or interpretations. It signifies simply that the recommended book contains a thoughtful presentation of facts and analyses viewpoints which merit the attention of military officers.

It may well be that some of our readers are aware of books which in their opinion should have been included in these lists. Readers holding this opinion are invited to communicate their ideas to the Editor, giving the title of the book, the publisher's name and a brief synopsis or review of the contents. The Advisory Group will be grateful for assistance of this nature.

Recommended Reading List No. 2, January 1960

AUSTRALIA AND THE UNITED NATIONS, by Norman Harper and David Sissons. (Manhattan Publishing Company, New York, USA.)

With the aid of study groups convened by the Australian Institute of International Affairs, Professor Norman Harper and Mr. David Sissons have reviewed Australian public opinion as it is reflected in diplomatic acts, in Parliament, newspapers and public opinion polls. The authors trace Australia's search for security in the post-war world, her relationship with the United Nations, and the development of the ANZUS and SEATO pacts. The book provides the background material for an intelligent interpretation and understanding of day-to-day news.

NEHRU: A POLITICAL BIOGRAPHY, by Michael Brecher. (Oxford University Press, UK.)

Of all the countries of Asia which burst into nationhood after World War II, India has given the greatest distinction to the inherited forms of parliamentary democracy. While other Asian countries have turned to Communism, monarchy, "guided democracy" or military rule, India has persevered through the first decade with the democratic experiment. Mr. Nehru has been at once the inspiration and the guide of the Indian people in their search for stable government. Perusal of this book should lead to an appreciation of India's problems, both domestic and international, and her efforts to solve

them. It is certainly the most authoritative biography of one of the most important men in Asia so far published.

THE SECRET NAME, by Lin Yutang. (William Heinemann Ltd., 317 Collins Street, Melbourne.)

The author presents a forceful, easy-to-read analysis of Communism in action, both in its effects on the Russian people and in the challenge it poses for the Western world. This book contains much information of value to officers preparing material for lectures, group discussions, etc, on Communism.

WAR AND PEACE IN THE SPACE AGE, by Lieutenant-General J. M. Gavin, US Army. (Hutchinson & Co., London, and Angus and Robertson, Sydney and Melbourne.)

A provocative review of scientific developments and their possible influence in the civil and military spheres. Recommended by the Scientific Adviser to the Military Board.

WAR AND THE SOVIET UNION, by Herbert S. Dinerstein. (Sweet and Maxwell Ltd., London.)

In 1955 the military leaders of the Soviet Union came to the conclusion that any future war in which they might become engaged would differ radically from any war of the past. This conclusion brought about a revolution in Soviet military thought. In analyzing the implications of this revolution, the author, an authority on Russia, presents a clear-cut picture of the lines along which Soviet military leaders are planning and working.

SHOOT TO KILL, by Richard Miers. (Faber and Faber, 24 Russell Square, London.)

An account of the experiences of the 1st Battalion, The South Wales Borderers, in the war against the Communist terrorists in Malaya. The author, who was the Commanding Officer, tells his story in a straightforward, soldierly manner which holds the reader's interest throughout. The experiences of this unit closely parallel those of Australian battalions serving in the same theatre.

THE LAST BLUE SEA, by David Forrest. (William Heinemann Ltd., 317 Collins Street, Melbourne.)

The author served as an AIF volunteer in a militia battalion in the early New Guinea campaigns. In this novel he gives a vivid, exciting and accurate account of jungle warfare as experienced by the fighting infantryman. It is, perhaps, the best account of jungle fighting produced by an Australian author, and is full of valuable lessons for all regimental officers.

TURN OF THE TIDE and TRIUMPH IN THE WEST, by Arthur Bryant. (Collins, London.)

These two books are based on the diaries and autobiographical notes of Field Marshal the Viscount Alanbrooke, who was Chief of the Imperial General Staff during the second half of World War II. They are neither pure history nor purely personal memoirs. Alanbrooke's own story is set in a matrix provided by Arthur Bryant, the noted historian. This gives the narrative an historical balance that no mere personal observations could have, while the personal observations make it more gripping than mere impersonal history.

These two volumes give a dramatic though objectively calm account of the higher direction of the war, including the conflict of opinions

which often occurred between the Western Allies. They constitute an authoritative presentation of the British view of the second half of World War II.

LOST VICTORIES, by Field Marshal Erich von Manstein. (Methuen, London.)

Field Marshal von Manstein evolved the plan for the highly successful German blitzkreig in France in 1940. Later he commanded an army group on the Eastern Front. This book is an authoritative account of the war in Russia, and includes informative studies of the German high command and its conduct of the war.

UNOFFICIAL HISTORY, by Field Marshal Sir William Slim. (Cassells, London.)

Intensely interesting and instructive stories of soldiers and soldiering in many parts of the world by a distinguished soldier and writer.

IN FLANDERS FIELDS, by Leon Wolff. (Longmans, London.)

This book is a military "shocker" which cannot help but stir soldiers and statesmen alike to an awareness of the immense responsibilities they carry in war. It is a brilliantly written narrative of a long-drawn-out battle in World War I, a battle which for tens of thousands of British Commonwealth soldiers reached the heights of human tragedy.

The battle of Passchendaele stands as one of the great tragedies of British military history. Its story should be read, not to condemn the unintelligent stubbornness of the men who brought it about, but with a view to strengthening our capacity and will to see every situation as it is and not as we would like it to be.

The most important thing about a commander is the effect he has on morale.

—Field-Marshal Sir William Slim.

Strategic Review

STRONG MAN OF INDIA

Reprinted from the December 1959 issue of An Cosantoir, Eire

IN all the twelve-year period since August 1947, when India exchanged her status from subjection in the Empire to equality in the Commonwealth, it is doubtful if so many significant events affecting the young state have occurred as did in the current year. In the brief span of nine months major crises have loomed in her foreign affairs, in her internal government and in her economy — and the repercussions from any one may affect the future not alone of India but of South-East Asia.

Since her emergence as a partner in the British Commonwealth Prime Minister Nehru has pursued a firm line of non-alliance with either power bloc, though his neutralism has appeared at times to be slanted somewhat towards the Communist powers. In order to build up the new freedom into a self-sufficient entity it was necessary to avoid international entanglements and to remain outside the Cold War, partly because of the cost of the defensive steps that would automatically follow alignment with a major power, but mainly because an uncommitted India would probably benefit more from eager suitors in both East and West; her struggling economy would benefit from alternative injections of Soviet, British and American capital.

Peaceful Co-Existence

It may perhaps be an injustice to Mr. Nehru to suggest that his proposed policy of Panch Shila (peaceful co-existence) is not a conviction or that it is dictated solely by material motives, but a study of his diplomacy in recent years tends to show that his policy is not entirely disinterested and that he is no blind follower of Gandhi. Undoubtedly his eagerness to cultivate the friendship of the Republic of China at all costs appears to be an example of the practical implementation of his tenets. In spite of the Chinese invasion of Tibet in 1950 and of her ruthless suppression of the Tibetan rising this year, the Indian Prime Minister has refrained from condemnation and, even when China implied that the rising was being directed from India, reiterated his offers of friendship. On the other hand, however, he pointedly condemned the British-French action in Suez and the landing of British and American troops in the Lebanon in 1958, and has been consistently opposed to the South-East Asia Treaty Organization (SEATO), which he claims has added to the insecurity of that region and has extended the area of the Cold War.

Opposition to SEATO

This difference in attitudes towards China and the West is inexplicable only if one ignores the facts and attributes to Mr. Nehru a naivete in foreign affairs that he belies in other fields. His opposition to SEATO is based on a certain distrust of the West and the natural fear that South-East Asia will fall victim for the second time to Western imperialism—this time in the guise of military protection. Primarily, however, the root of his objection is the access of strength that SEATO will bring to Pakistan. This was emphasized by his reaction to the U.S.-Pakistan agreement signed in March of this year. In spite of U.S. Government assurances that the agreement was limited to cover cases of aggression by Communist countries, it was suggested that the agreement would encourage Pakistani aggressiveness and increase tension between India and Pakistan on the difficult minority problem in Kashmir.

With regard to Communist China Mr. Nehru has had no illusions; he has always been aware of its expansionist tendencies, and his main object has been to placate her for as long as possible, but at least until the Indian economy is on its feet. He is conscious that India is, by virtue of its large population, its size and its resources, the only Asian power that is potentially strong and influential enough by itself to counter China in S.E. Asia, and that India controls the Indian Ocean, which is the last remaining power vacuum in the world and vital to the West.

Chinese Claims

In spite of Chinese accusations in recent months and their ironical branding of India as imperialist, their

recent incursions into Indian territory must have come as a considerable shock to the Indian Government. This, and the Chinese claim to some 40,000 square miles of Indian territory, have been a blow to those who persistently followed the policy of placation. The reason for the limited aggression has been difficult to fathom; it may have been in the nature of a reprisal against India for her acceptance of Tibetan refugees and her strong anti-Communist action in the state of Kerala. It may also have had some connection with the talks between Eisenhower and Khrushchev, or again it may have been the beginning of an effort to enlist the border states of Bhutan, Sikkim and Nepal into a Communist-controlled federation—an effort that may have been halted, if not reversed, by unfavourable reaction on the part of the U.S.S.R..

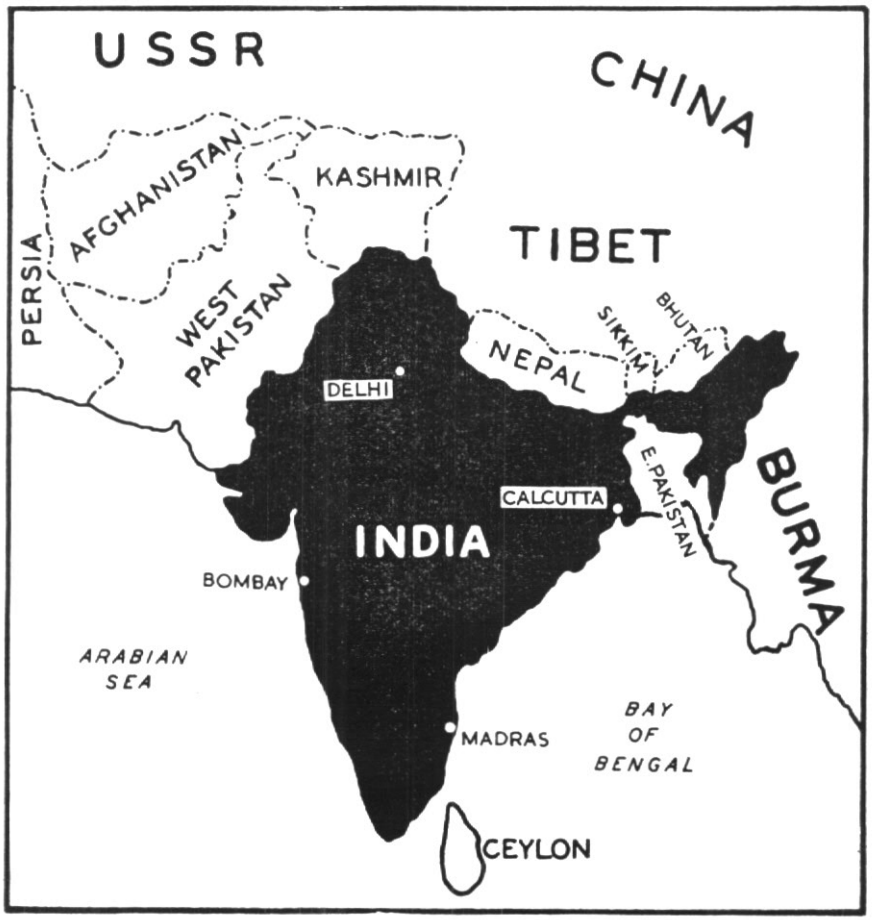
Whatever the reason it is clear that peaceful co-existence—to be workable—requires the adherence of both parties, and that it has now been made meaningless by Chinese

action. The Right Wing party in India urged an ultimatum with military action to follow if ignored; it accused the Government of wilful underestimation of the situation, of pursuing a policy of peace at any price and of failing to appreciate Chinese designs in S.E. Asia.

Mr. Nehru's public reaction was one of studied moderation—laced with characteristic acidity. Although insistent on the controversial McMahon Line as the boundary, he was reasonable about its exact location and, as to the barren Ladakh border, he is not prepared to "find quarrel in a straw"; but on the major problems of Bhutan, Sikkim and Nepal, and on the threat of force, he will fight.

Common Frontier

There is no immediate military follow-up by China, for she has lost the goodwill of all non-Communist Indians, and the Indian Government are now looking to the defences along the border and becoming more amenable to the mutual defence "feelers" from Pakistan. With China, India shares a common frontier for 1800



miles, most of which runs over the Himalayas. Further east, and most vulnerable, lie the three independent kingdoms of Nepal, Sikkim and Bhutan, whose security India has repeatedly guaranteed. The northern border has never been seen as a possible source of danger in Indian defence thinking; in fact, it was considered impracticable to attempt to fortify it. In addition, because of the tension between India and Pakistan, the bulk of the Indian forces has been aligned along the Pakistan-Kashmir frontier, with its back to China.

In any event, India's armed forces and equipment are infinitely inferior to those of China, and for aid she must rely on the West. Her gamble with neutralism has left her isolated, and in the event of further Chinese aggression Western intervention must await her call for help. Her attitude to the democracies hardly merits what Hungary failed to receive; the response to such an appeal may depend entirely on the value placed by the West on a free India. However, a current rapprochement between Mr. Nehru and President Ayub Khan of Pakistan, on mutual defence and other problems, may provide India with a valuable ally, for Pakistan is strongly linked to the West in defensive alliances through SEATO and the Central Treaty Organization (CENTO).

Diminishing Popularity

While Prime Minister Nehru still dominates Indian politics his popularity in the country may have waned somewhat recently. Dissatisfaction within his Congress Party over maladministration and nepotism this year caused a breakaway of thirty members and the formation of a new party opposed to state control of industry and commerce—a policy calculated to acquire real support. But, to the Prime Minister, the danger to India comes from the Communist Party. A quarter of a million strong, it controls one of the three main trade unions and holds key positions in the others. It exploits the smallest disaffection in each of the fourteen Indian states and represents the major threat to national unity and independence.

Communist Party

Communism in India, as elsewhere, has its roots in the educated unemployed. So far it is an urban movement, a loose federation of regional units with the real power residing in non-Hindi-speaking regions which have a vested interest in exploiting the language question. The Communists were given the same democratic rights as other parties, and in the 1957 elections they polled ten per cent. of the 112 million votes cast. The elections were fought on the reorganization of states (to be carried out on linguistic lines). The Constitution provides that the North Hindi language will become the official Union language in 1965, but this is being resisted in regions where Hindi is not spoken, and the Communists exploited the "nationalistic" outlook of each region. They expanded and secured representation in every state legislature, in addition to gaining complete control of the state of Kerala.

In the latter state they overreached themselves on, inter alia, the question of education and a revolt broke out. The Communists refused Mr. Nehru's suggestion to hold elections and, eventually and very reluctantly, he invoked the Consti-

tution and the Upper House of Parliament, by a two-thirds majority, assumed the prerogatives of the state of Kerala.

Mr. Nehru is fanatically determined on the question of unity; and educated opinion generally is demanding more centralization. At present the Congress Party has maintained its power in all the state legislatures except Kerala, but what has happened in Kerala may happen elsewhere, and nationalism may be obtained only at the expense of democracy.

Economic Crisis

India's third crisis—and perhaps her major one—is economic. Her second Five-Year Plan commenced in April 1956, on a strong note of optimism. The first Five-Year Plan had produced eleven million tons of food and seven million bales of cotton over target, and organized industrial production rose by more than fifty per cent. The second plan placed considerable emphasis on controls and aimed to increase the national income by twenty-five per cent in the five years. More than fifty per cent. of the financial investment was earmarked for steel, cement, machinery, transport and communications, all designed to develop the economy on a sound industrial basis.

Now, with two more years to run, the strain imposed by the plan on India's reserve of foreign exchange has produced a crisis. The foreign exchange gap in the first Five-Year Plan was seven million rupees (the rupee is worth about 1/6), but the situation became acute in 1958, and credits totalling $350 million were arranged to cover her foreign exchange needs up to March of this year. It is estimated that a further $650 million will be required up to March, 1961, to complete the projects which form the core of the plan.

Actual progress has been retarded by restrictions arising out of the shortage of foreign exchange; the rate of industrial expansion was slower in 1957 than in previous years. In 1958 output in some industries declined, but increases were shown in others, and the steel programme, aiming at six million tons by 1960, proceeded according to schedule, and in spite of the difficulties great strides were made.

During 1957-58 one hundred and forty-seven miles of railway lines were opened to traffic, while four hundred and eleven miles of new track were under construction. More than 300,000 kilowatts of generating capacity were added between 1956 and 1958, and over 6000 villages were electrified. A new Atomic Energy Commission was set up in March 1958, to replace the original commission and a greatly expanded programme was visualized. India is to produce all the basic materials required for the utilization of atomic energy and will build a series of atomic power stations. By 1960 it is estimated she will have over 1000 nuclear scientists and engineers and she has large reserves of nuclear fuel.

Agriculture

Unfortunately on the other side of the ledger is the question of agricultural production. In a country the primary resources of which are land, rain and man-power, it is unfortunate that the useful elements of all three are not very evenly distributed. The success of the crop

depends on a good monsoon period (except where there is a considerable irrigation). A rural population of 250 millions depends on 1250 million acres, with resulting small holdings and uneconomic methods of production. There is no relief from this situation, since emigration is almost negligible. In 1958 when a drought affected the crops the supply position became difficult, and it was necessary to import over three and a half million tons of grain. This year, despite a record crop, the imports will be the same. Food riots have already taken place in Calcutta. All this is to a great extent due to the fact that agriculture has been neglected in the second Five-Year Plan.

A rapid increase in food production is essential to the success of the economic programme, if not of India's whole political future. At present she produces sixty-two million tons of food grains per year for a population of 360 millions. By 1966 the population will have reached 480 millions and at least 110 million tons will be required. Mr. Nehru realizes that only co-operative farming and new methods can solve the problem, and in spite of local opposition he is determined to press on with experiments.

Unity's Obstacles

Indian is so deeply divided by linguistic, religious and class differences that eventual unity appears to be but a wishful thought. Yet Mr. Nehru hopes to achieve complete unity and economic independence by 1966. On the basis of population figures India ranks in manpower with China. Both these nations are struggling towards self-sufficiency but on different lines, and, whether willingly or not, India is being weighed in the balance against her Communist neighbour. Her success or failure in her attempt to carry out a rapid process of industrialization within a democratic framework, and at the same time to feed her growing population, will have an important influence in South-East Asia. She faces many problems: (1) the aggressiveness of her competitor, Communist China; (2) the growing influence of the Communist Party; (3) the lack of foreign exchange; (4) unemployment; and (5) the spectre of famine.

Mr. Nehru is playing for high stakes; he knows that success may mean political hegemony in South-East Asia and, more important still, a strong, centrally-directed India with a great economic future. Failure means anarchy or Communism.

BODY ARMOUR

HOW IT WORKED

Captain Roger W. Little, Medical Service Corps, US Army

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THE suggestion to add eight pounds to the basic load of the rifleman probably would not be received by him with wild acclaim. However, when those eight pounds conceivably could increase his prospects of battlefield survival, the proposal deserves a second look.

The eight pounds in question is the weight of the nylon armoured vest—by the end of the Korean War a standard item of equipment. Strangely—it seems now—the armoured vest initially was a dud on the military market. It was rejected originally as too cumbersome, inadequately protective, and "psychologically" undesirable. Yet a cautiously accepted experiment brought forward one of the most treasured possessions of the rifleman in Korea.

How did it work? The answer has been available in medical literature for over four years. The results were reported in full by Lieutenant-Colonel Robert Holmes, Medical Corps, in the Journal of the American Medical Association in August, 1954. However, they have not been published for the use of the commanders and combat men who are most intimately concerned with their use. This article attempts to bring together these data and thoughts about the armoured vest, and to project its place in future combat.

Related Questions

There are three related questions as to how well the vest worked. First, how did it stand up against enemy fire, and did it accomplish the job for which it was designed? These are questions of efficiency. Second, how effective was the vest in keeping men in the fight and winning the battle—for this, after all, is the final measure of any new combat development? And third, what more can be done, besides inventing new equipment, to save the lives of combat men?

The vest was efficient. In the data reported by Colonel Holmes, a total of 184 vests were examined carefully after being worn during a test period. Each vest had been hit by an average of four shell fragments, two small arms missiles, and four additional objects which could not be classified.

What happened to the shell fragments? More than three of every four—76 per cent—were stopped by the vest, and possibly fatal or serious wounds prevented. Even the one fragment of every four that did get through had to pass through a for-

midable barrier at a considerable cost in velocity and probable impact effect. Result: no wound at all, or a less serious wound than would have been expected without the vest.

Small arms missiles were not as easily stopped. In fact, the ratio of defeated (stopped) to penetrating missiles was almost exactly the reverse of shell fragments. Out of every four small arms missiles, one was stopped by the vest while the remaining three passed on through. It can be assumed, however, that the vest affected even the perforating small arms missiles in the same way as it did the shell fragments from artillery, mortars, and grenades —presenting a strong, impact-absorbing barrier before the missile reached human tissue.

From the viewpoint of efficiency, then, and in answer to the question of how well the vest resisted enemy missiles, body armour passed the test. Its success is measured by a record of stopping 68 per cent. of all missiles (three times as many shell fragments as small arms missiles), while slowing down 32 per cent.

Ultimate Test

The next question was one of effectiveness. The ultimate test of any equipment development is the contribution that it makes toward winning the battle. In the medical mission this means the degree to which it helps to conserve fighting strength. For this answer it is necessary to go back to the original medical statistics which were used to justify adoption of the vest. Detailed studies had been made earlier of types of wounds, the body regions in which wounds had been sustained, and the types and characteristics of the wounding missiles.

First, it was known that three of every four wounds (or 75 per cent) were caused by shell fragments rather than small arms fire. Thus wounding was more likely to result from being in the wrong place at the wrong time, rather than of being shot at by an aimed weapon. Chance played a major part in the combat wounds caused by shell fragments. If these chances could be brought under control or reduced in effect, a fundamental step in wound prevention would have been taken. It would follow that while stopping shell fragments, anything used as a barrier would have the side—or incidental—effect of slowing down or absorbing a major proportion of the impact of even small arms missiles.

A second critical factor was revealed through an examination of casualty statistics. Seventy per cent of the wounds from shell fragments only "penetrated" the body, rather than "perforating" it and passing all the way through. That is, at the time of impact, the missile must have been travelling at such a low rate of speed that the body tissues could absorb the shock (although often with severe damage) and retain the missile. This finding indicated that if the body itself could stop seven out of every 10 wounding missiles, the degree of protection required in a protective garment was smaller than had been anticipated. The combat soldier could be well-protected (although not completely) against his most random and undiscriminating enemy —the flying fragments—at only a

slight cost in weight and reduced mobility. However, the loss of mobility would be more than offset by the number and condition of men left to be mobile.

The final determinant in the design of the armoured vest was drawn from studies indicating the most vulnerable body regions. It was clear that the thorax or chest, and abdomen, were the areas of the body most exposed (excluding the head, the only body area previously protected). Of every 100 men hit, it could be predicted that 41 would incur wounds in these areas. More important, however, from the viewpoint of battlefield mortality, the thorax and trunk were the areas in which almost half (46 per cent) of all fatal wounds occurred, either when killed in action or after the wounded had reached hospitals. Thus from the viewpoint of vulnerability to wounding, and survival after wounding, the thorax and abdomen were the most important areas to be considered for protection.

With these facts in mind, the specifications for the vest were then established. It should stop primarily shell fragments that would, without armour, penetrate the body but not pass through in the region of the thorax and abdomen. And this it did.

Armoured Vest

Test Results

When the test period was completed and the results surveyed, the findings were as follows. Of every 100 men who were previously killed or died because of wounds, 46 would have been wounded in the thorax or abdomen. When the same number of men wore the vest only 32 incurred fatal wounds in that area; a net saving of life—14 men.

The known effect of the vest was slightly less among the wounded in action, because those who might have been wounded by missiles which were completely stopped by the vest never were countable. Of the original 100 men, 30 would have been wounded in the unprotected area without the vest. With the vest only 20 were wounded, a net saving of 10 men.

These results are enough to give every combat man a big chunk of confidence. But there is another side to the evidence, one that should be examined with equal care and

understood by all who use or deal with the armoured vest.

Qualifying Considerations

First, the vest does not make the combat man invulnerable to enemy fire, even in the protected body areas. Well over half of those wearing body armour incurred multiple wounds, including some wounds in unprotected areas. There was little change in the frequency with which men were wounded by small arms fire when wearing the vest as compared with those not wearing it. The vest did not change the relative proportions of killed in action to wounded in action (one to four), a ratio that has remained stable since the Civil War. The implication is clear: the vest is a good thing to have, but it is no substitute for good cover and concealment.

Second, the vest was not intended to be equally effective against all missiles. It worked best against shell fragments—as was expected. Against small arms missiles its most important effect was to establish a delaying and velocity-reducing barrier. Legends of supermen demolishing enemy machinegun nests while protected by the vest probably have little basis in fact. Machine-gun bullets will penetrate the vest, especially at close range. The circulation of such legends is likely to cause more trouble than create confidence. No more should be expected of the vest than is built into it. It did reduce the chances of incurring a fatal or severe wound in the most vulnerable region of the body.

Third, the psychological value of the vest can be overestimated. In most cases it will assure the soldier that his chances of being killed or seriously wounded have been reduced. But it is doubtful that it will have a "tonic effect," and make the passive soldier more aggressive. It was designed to fit the normal risks of battle. If wearing it is used as a justification for increasing the risks of combat, it may have precisely the reverse effect. Troops will become increasingly "wound sensitive." Then the odds against safety will be considered more frequently than the simple capacity of the armour to stop some types of missiles.

Proponents of the view that the vest will act as a tonic may point to the contrast between body regions in which wounds were incurred before and after body armour. Statistics show that there are relatively more extremity wounds with armour. But this is purely a statistical artifact. Wounds in the protected regions—chest and abdomen—declined by 11 per cent. This 11 per cent has merely been reallocated to upper extremities (increased three per cent) and lower extremities (increased eight per cent). That is, if 100 wounded are counted, and those who would have been wounded in the protected regions are no longer among them, their share of the percentage will go to the other categories. So this, at least, is not evidence that the vest-clad soldier was more aggressive.

Acceptability

Finally, as a culture object, the armoured vest will tend to take on the meanings associated with the period in which it was introduced. In Korea this was, of course, a stabilized defensive warfare in relatively open although mountainous

terrain. It is yet to be determined how men will react to an added eight-pound load (which holds heat) in situations calling for long marches, prolonged attacks, or in jungle warfare against sniper fire (to which the vest is highly vulnerable) and high temperatures. Will it be discarded with the gas mask and the entrenching tool? Only this much is certain: it will be used or neglected in the degree to which combat men understand its purpose and limitations. It should not be oversold.

The results of the vest are most clearly evident in studies of groups rather than of individual instances —which is the perspective most persons use in making their judgments. Of several men who are committed to combat, it can be said with certainty that more will incur only such wounds that can be evacuated to a hospital or treated at a forward medical echelon. If they still are in such a condition that they can be evacuated to a hospital, their chances are 98 out of 100 of surviving. Military medicine now has approached the limits of what can be done with the wounded after they are delivered to medical personnel. Improvements and additions of armour to other body regions will only help to prevent wounds.

There is still a danger that the armoured vest will be thought of as a new gadget which promises an ideal and simple solution to a complex problem. The greatest loss in human life in warfare still occurs on the battlefield, including both those who are killed in action immediately, and those who die of wounds before adequate medical care can reach them. Although less than World War II, the battlefield mortality rate was higher in the Korean conflict than in World War I. The number of wounded men by both shell fragments and small arms missiles is increasing. This situation will have even more serious implications when considered from the expected tactical disposition of nuclear warfare.

Other Methods

What can be done besides gadgeteering? The task of caring for the wounded is stretching the capacity of the medical personnel. Lieutenant-Colonel Douglas Lindsay, Medical Corps, when with the Army Medical Service Board, stated that almost one out of every four men left on the battlefield as killed in action could be saved by more efficient forward medical service organization and training. He contended that many men who are listed as "killed in action" are not killed instantly. The evidence indicates that their deaths are caused by wounds in the trunk or extremities, which need not have been fatal except that the aid man was not present or was rushed with other casualties. Meanwhile, the wounded man or his buddies lacked the training to apply some immediate emergency medical care. If this one man in every four is to be saved, the individual soldier must learn much of the aid man's current knowledge, and be able to use it quickly. The aid man must learn more of the techniques of the unit surgeon: the demands on his knowledge, skill, and ingenuity are being vastly increased.

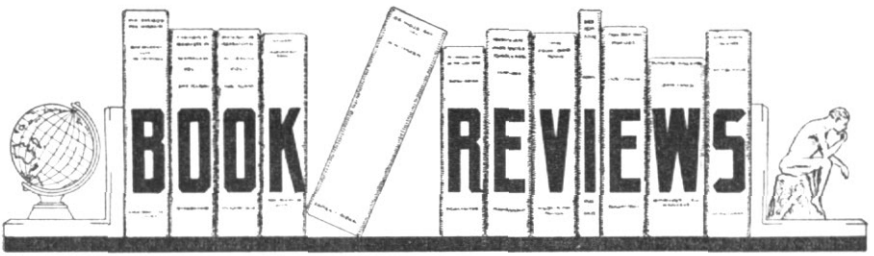
Finally, commanders must become increasingly aware of the

medical aspects of the fight. Traditionally, the subject of the killed and wounded has been a delicate one, so fraught with moral and emotional implications that it has been considered largely a medical problem. This can no longer be so. The medical aspect of every fight will be a crucial one in survival as well as victory. Replacements will be more difficult to obtain. The unit surgeon and his teams of aid men will be recognized for what they have long been: a primary motivating symbol for the combat man, indicating the best that medical science has to offer to the most forward echelons. In the past their skills have been spread too thin; now and in the future everyone must share the task of saving the dying and of evacuating the wounded.

This may do more than any "gadget" for the solidarity of the combat echelon. There is no man more important than the rifleman's buddy. There are few limits on what they will do for one another. And there is no measure for the motivation that is generated when both know that if one is knocked out everything possible will be done to save him—by buddies, the medical service, and the commander himself. This knowledge may provide a bigger and more lasting piece of armour than the eight-pound nylon vest. Both are essentials in conserving the fighting strength.

The Army is capable of conquering without destroying, of defending without reducing the defended land to radioactive waste. The physical presence of armed men on the ground can exert more effective and lasting control than the threat of megatons of fire power that will never be used.

—US Army Information Digest.



THE CHARM OF MAMBAS, by George Brendon (William Heinemann Ltd, 317 Collins Street, Melbourne).

While there is nothing of military value to be learnt from this book—a story of a company of African troops in the World War II Burma campaign—the reader may find in it a partial explanation of the ferment in Africa. Actually the mythical, but quite credible, operation described is merely a backdrop against which the author develops his theme—the conflicts and tensions between the European officers and the troops, among the officers themselves, and between the Africans of different tribal and educational backgrounds.

If Mr. Brendon's officers typify the manner in which Europeans have customarily treated Africans, we need search no further for a reason why the African is now clamouring to get rid of the white man. It is hard to believe, however, that all European officers of African troops were of the appallingly low quality of these unworthy bearers of the Sovereign's commission. From the sadistic company commander to the junior subaltern there is not a savoury character among them, and only one barely competent commander. In fact, there is only one decent and competent officer in the whole story, and he makes but a momentary appearance to ring down the curtain.

Although his European characters are mostly disreputable, one suspects that the attitudes towards Africans which Mr. Brendon depicts in them are no more than exaggerations of general attitudes which have now culminated in boiling resentment throughout Africa. The author shows clearly enough how the impact of such attitudes can be played upon to stir up hatred and turmoil.

Mr. Brendon shows considerable skill in presenting ideas and events from different points of view. His tale would have been more convincing, however, if he had relied less on the art of the caricaturist in drawing his characters. One or two ordinary, decent folk would have been a great help.

—E.G.K.

THE MILITARY LEGACY OF THE CIVIL WAR: THE EUROPEAN INHERITANCE, by Jay Luvaas. (The University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illincis, USA.)

In this scholarly book the author does not set out to demonstrate that the tactical lessons of the American Civil War are applicable to the modern battlefield. What he does set out to do, and does brilliantly, is to show that in failing to heed the lessons of this war soldiers of the period 1870-1918 fell into many avoidable and costly errors. That

so many European soldiers failed to learn much from the struggle in the New World is surprising, because nearly all European armies sent teams of observers to report on the fighting.

In analyzing the reports and writings of these observers the author shows that in nearly all cases they confined their observations within too narrow limits. Most of them were sent with a specific charter to observe the operation of new weapons and equipment, e.g., the new rifled artillery. While they answered the questions asked of them in considerable detail, few of them went on to discover the consequential effect on strategy, tactics and logistics. And those who did make the attempt wrote with the evident intention of not saying anything that might brand them as original thinkers, and thus perhaps jeopardise their chances of promotion in an age when original thinking was not considered a military virtue in junior officers. In fact, until Liddell Hart and J. F. C. Fuller "rediscovered" the Civil War after World War 1, most students seem to have used it to confirm accepted doctrine rather than to discover new information which might lead to modifications in that doctrine.

This fear of being credited with an independent, enquiring mind is strikingly shown in the reports and deductions about the employment of cavalry. Both sides employed cavalry chiefly as mounted infantry; shock action seldom occurred. The real reason for this was the great volume of fire produced by the new breech-loading rifles. Yet the observers and their superiors sought other reasons—the nature of the terrain, the quality of the leadership and the low state of training of the troops. There were exceptions to this interpretation, notably in England, but they were voices crying in the wilderness until nearly fifty years later the South African War demonstrated the soundness of their arguments.

Similarly, while nearly all observers noted the extensive use of entrenchments, few of them appreciated their tactical employment, and nearly all of them considered that they would "have a detrimental effect on the offensive spirit."

In Great Britain scant attention was paid to the American Civil War until Captain (later Colonel) G. F. R. Henderson published his first book, *The Campaign of Fredericksburg,* in 1866. Henderson later became Professor of History and Military Art at the Staff College, where he included many of his deductions from the American conflict in his teachings. In the days when Britain's power rested upon the unchallenged supremacy of the Royal Navy and a small long-service regular army, Henderson was years ahead of his time in foreseeing the nation in arms —the huge hastily-raised armies that struggled for mastery in World War 1. From his studies of the American Civil War, Henderson taught that in the armies of the future the quality of junior leadership would be crucial, and that the ability to use the spade intelligently and effectively would be as important as the ability to shoot. While he exercised a very great influence on the development of British military thought, his teaching, as events were to prove, was not sufficiently accepted by those who were to lead Britain's armies in World War 1.

In the 1920's British military

thinkers of an independent turn of mind were searching for an alternative to the dreadful, trench-bound slaughter of 1914-18. Outstanding among them were J. F. C. Fuller and Liddell Hart. Both believed that while mechanization would provide the means of breaking the trench stalemate, a new doctrine for the employment of the armies of the future would have to be evolved. Both began their search for theory wth an exhaustive examination of military history, and both learnt much from a study of the American Civil War. In Sherman, Liddell Hart discovered a general who "had found both a state of immobility prevailing and a way to overcome it." The study he wrote of Sherman's campaigns was to have a profound influence on the course of World War II. Like so many prophets, Liddell Hart went unheeded in his own country, but the great German panzer leaders of the war have acknowledged that in his writings they found the inspiration for their armoured *blitzkrieg* which met with such astonishing success in 1940-41.

Thus, while the American Civil War had little effect on European military thought before World War I, its methodical study by active, enquiring minds profoundly influenced the course of events in World War II. When the author produces his second volume in the series — *The American Inheritance*—we may find that its study influenced the course of events in the later stages as strongly as in the earlier—though in the opposite direction.

Military technology is experiencing such rapid and revolutionary changes that most of the lessons of even the last war seem outdated. Nevertheless the American Civil War remains a rich field for the military student of the broad aspects of strategy and command, and of the art of leadership in war. Perhaps no other war has such an extensive literature, certainly not in the English language. There is still a very great deal to be learnt about war from a wise selection of this literature, particularly in the fields of leadership, of improvization and of the motives and actions of men and women under the stress of mortal conflict.

This is not a book for the casual reader. It presupposes at least a broad knowledge of the war as a whole, and it does not attempt to draw any direct deductions. It treats exclusively of the deductions drawn by others, and, in the light of subsequent experience, it points up the dangers of superficial thinking and slavish acceptance of conventional ideas. It is a book for the soldier who regards his calling as a vocation and a profession, rather than merely as a livelihood.

—E.G.K.

THE TEMPLE OF THE GOLDEN PAVILION, by Yukio Mishima. (Martin Secker and Warburg Ltd. and William Heinemann Ltd, 317 Collins Street, Melbourne.)

The author is described as the "golden boy" of Japanese literature. An earlier book, "The Sound of Waves," dealing with the simple but ordered life of hard-working fishermen and their hardier womenfolk who dive naked for abalone, presented characters whose purposes and motives were completely understandable to Western readers, and at the same time was an idyllic love

story. Love of a kind is the theme of this book, too, but it is an involuted tortured self love. Written in the first person, it purports to be the life story of a young acolyte in an ancient and beautiful Zen Buddhist temple, whose rituals have been performed unchanged for 500 years. War and suicide are the background, for the action of the book commences with the war, but one seeks in vain in this descendant of a priestly caste for any sense of identification with the desperate world of the banzai charge and the kamikazi.

War did mean to this introvert the possibility that the temple might be burnt in an air raid, and fire and destruction hover on the fringe of consciousness right through the book. A born stutterer, he lacked the easy command of words which would have released his tension; not surprisingly, he was sexually impotent as well. The Temple which had dominated his early life with its challenging beauty became obsessively associated with all that oppressed him. Defeat in war meant nothing but a little less in the rice bowl and a final return to the unchanging eternal Buddhist ritual. Sponsored to the university, he nevertheless skipped classes, and in an effort to inject his empty life with meaning, weltered in petty and sordid crimes, seeking at the same time to abase his superior, the master of the temple.

Compulsive as it may have been because of the weight of ancestral custom, the reader feels that discipline and supervision in a Western sense might have forced him to put both mind and body to better use. "I did not have the slightest feeling of accomplishing anything by actually putting my hands to it." The only actor on the scene who appeared capable of normal compassion and understanding committed suicide. The young acolyte stayed on at the university, indulging in little but his own bitter and twisted self-communings.

"Yet since everything at this university was based on the Buddhist doctrine of mercy, there was no such thing as failure, and I was allowed to advance in the regular courses." Since there was so little compulsion in his external life, his internal compulsions were allowed to reach demonic proportions. The Golden Pavilion became the emblem of everything which seemed to thwart him in his aimless existence, and the one overt act of his life was to set it on fire.

"I must do the deed simply because it was so futile." Characteristically, though dedicating himself to suicide, he felt a "clear consciousness of having been refused" when he failed to batter his way into a particular room of his choice. Having achieved in his twisted consciousness this final step to self-enlightenment, he wanted to live! What for?

The book is a fictional re-creation of an incident which actually occurred in 1950, when the ancient Zen Temple of Kinkakuji, in Kyoto, built as a retreat by an embattled Shogun of the 14th century, was burnt to the ground by an embittered student.

One feels that the drive and conviction which led to its building in the first place is lacking in the ritual-bound inheritors portrayed in the book. But in their own tribute to their immemorial past, the Japanese have completely rebuilt this national monument, again sur-

mounted by its golden phoenix, symbol of rebirth through fire. The rebuilders, actuated by a piety we can but admire, have a drive reminiscent of its original builder, the 14th century shogun. But it is in a new direction. The shadowy life of hereditary priests and acolytes is remote from the teeming mills and shipyards, which are more the emblem of the new Japan. Obstinately determined to live, and to live well, despite defeat and the looming shadow of Red China and Russia, this is the Japan we would prefer to hear about and which still awaits a native interpreter. For this is the Japan we have to reckon with, deal with and understand.

—*WO C. M. D. Flinn, AEC.*

COMPETITION FOR AUTHORS

The Board of Review has awarded first places and prizes of £5 for the best original articles published in the December and January issues to:—

December—"On the Issue of Orders," by Captain H. B. Chamberlain.

January—"Afghanistan — Dangerous Neutral," by Staff-Sergeant P. G. Gittins, RAE.