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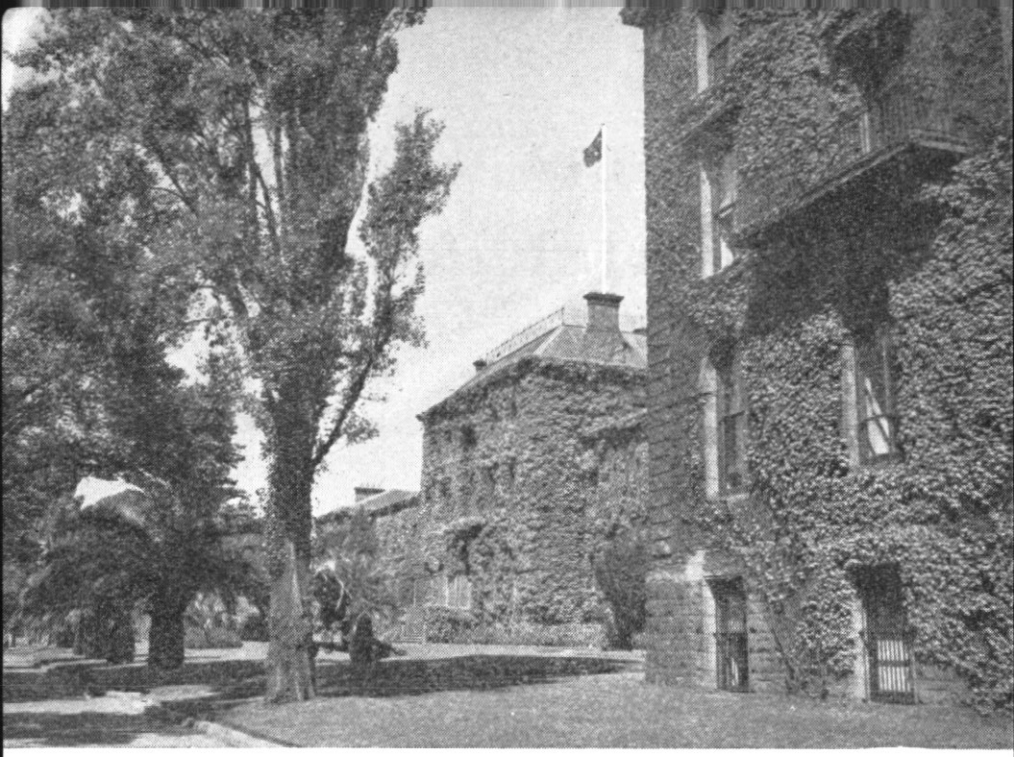

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AUSTRALIAN ARMY JOURNAL

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ATOMIC WARFARE

Post-Explosion — Protection and Decontamination

Lieutenant G. L. Jenkinson,
Royal Australian Engineers.

MUCH has been written in relation to the problems associated with defence against atomic attack and the effects and capabilities of atomic weapons. However, the information to date has mainly dealt with the characteristics of this new explosive during and immediately following the unleashing of its tremendous energy. Little has been brought to the notice of the serving soldier of what hazards in the form of residual radioactivity prevail after that, and how they can best be countered and avoided. It is essential that the modern soldier be taught to understand the results of this new, mysterious and somewhat terrifying weapon and learn how to protect himself against its after-effects. It is my intention to deal with some of the aspects associated with the problems of radioactivity following an atomic attack.

Immediately following the explosion there takes place what is known as the "fall out"—the coming to earth by the law of gravity, and under the direction of prevailing winds, of minute particles of dust, etc., which have been sucked up in the turbulent action creating the mushroom cloud. These particles have been subject to exposure to a fission action (that is, the unleashing of energy by use of radioactive elements) and are known as fission products. When they fall to earth they create in the vicinity of where they land what is known as a "radioactive area," and human beings required to enter such an area need to be protected both during the period they remain there and immediately upon leaving it. This protection can be afforded in three ways:

(a) Protective clothing;
(b) Electronic detection instruments (Geiger counters);
(c) Decontamination centres.

Protective Clothing.

Whatever design of protective clothing is finally adopted for use by service personnel, certain definite

principles must apply. Foremost amongst these is the necessity for the whole body to be covered, and for the radioactive dust to be kept out. This will require the wearing of boots (preferably rubber), gloves, respirator, a combination over-suit and hood, together with standard underclothes and socks. The simpler this clothing is the better, because it will be appreciated that not only the soldier, but all his clothing and equipment, will need to be decontaminated, and such things as pockets, cuffs, etc., which will collect and hold dust, will present problems in the final cleansing of this gear and its complete decontamination. In this regard we can expect to see some changes in service equipment as we know it at the moment.

Electronic Detection Instruments (Geiger Counters).

Not only must the soldier be protected against the radioactive dust, but he must be able to locate bad patches of radioactivity and be able to define the boundaries of areas of high radioactive intensity. To do this he will need to carry an electronic detection instrument known as a Geiger Counter or Portable Monitor. These small compact instruments, operated by batteries and read either by a dial (illuminated at night) or by means of earphones, will provide him with the means to pick his way safely and thus avoid contact with hazardous patches of radioactivity which would be dangerous to enter.

Also within the category of instruments is the pocket or individual dosimeter and the personal film badge. The pocket dosimeter is a small fountain pen-like instrument with a hairline scale at one end which can be checked progressively whilst in a radioactitve area by holding it up to the light and against the eye and will show the accumulated dose of radioactivity absorbed since entering the area. The personal film badge is a small strip of sensitized film (similar to dental X-ray film) enclosed in a small flat plastic bag and pinned to the clothing. This also will record the accumulative dose of radioactivity received since entering the area. It can subsequently be developed and read in conjunction with the pocket dosimeter.

From the foregoing, it will be appreciated that by means of the clothing, instruments, etc., and training in their use, ample protection is available to the soldier who is required to move around in a radioactive area.

Decontamination.

To arrive at the requirements of a suitable decontamination centre to treat troops who have been subjected to residual radiation, it is necessary to observe two main factors:

(a) The characteristics of radioactivity;

(b) The method of control of personnel proceeding to and from a radioactive area.

Firstly, the characteristics of this radioactivity. Many complicated methods are possible in an endeavour to describe it. However, the most simple way to understand radioactivity is to regard it as grease —INVISIBLE GREASE—and treat it as such in all decontamination. It can well be imagined what an area would be like if many thousands of gallons of sump oil, etc., had been scattered about by an explosive force. It would be lying in patches on the ground, clinging to vehicles

and buildings, and any contact with it would cause it to be transferred. Just as a man can walk through a patch of oil and move on with it clinging to his boots or wipe his greasy hands on his face or sleeves and leave stains and marks behind, so it is with radioactivity—except that it is invisible and can only be detected by the instruments mentioned previously.

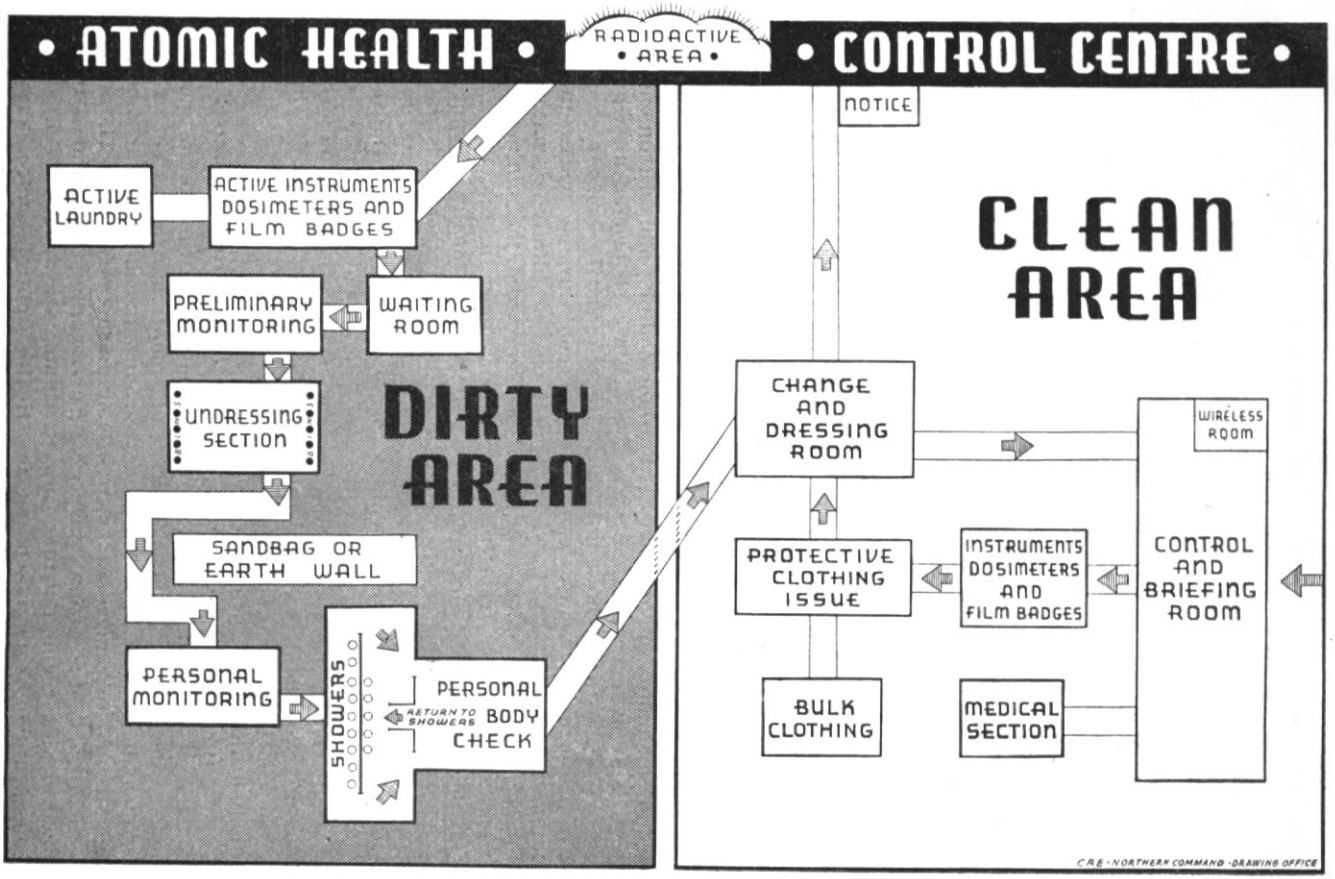
Furthermore, the problems of decontamination are no more complicated than if we were dealing with grease, and radioactivity is treated in exactly the same way. The decontamination of personnel who have come into contact wtih radioactive material can be carried out in exactly the same manner as that which would be used for the removal of grease, that is, by the use of bar soap, liquid soaps, soapless household cleansers of any type and certain synthetic detergents. All these items have been found to be quite effective for decontamination. In a dire emergency, any clean uncontaminated material at hand, such as paper, straw, grass, leaves or sand will remove activity from the skin if applied vigorously. However, care must be taken in this regard not to tear the skin or to drive the loosened material into wounds, body openings or skin folds.

For the emergency decontamination of equipment, weapons, etc., harsher methods may be adopted, although the same principles will apply. Household cleaning and scouring compounds, grease removers, detergents, paint cleaners, dry cleaning solvents, gasolene, etc., will all help to remove radioactive particles and dust from surfaces. However, in carrying out these processes, care must be taken not to distribute the radioactivity. The cloths or other materials used should be buried and not burned unless special incinerators which prevent escape of the active material are available.

The second factor upon which the planning of a suitable decontamination centre must be based is the method by which personnel will be controlled in their entry into, and exit from, the radioactive area. Uncontrolled movement to and from such an area can bring about extensive spreading of contamination to areas previously unaffected, and will also result in personnel not being individually cleansed, checked and medically examined following exposure to radioactivity. Consequently, the establishment of a centre reasonably close to the contaminated area is required, one through which troops can pass on their way to the active area, receive their clothing and instruments, and, above all, be briefed on what they are required to know and do, and also one through which they can return, be totally decontaminated and checked in the minimum of time consistent with the maximum of safety and health requirements. Consequently there has been designed what may be termed "the half way house," the control point of movement associated with a radioactive area, known at the moment as an Atomic Health Control Centre.

The Atomic Health Control Centre.

The standard method of movement of troops into an active area is in groups, possibly of four, known as Monitoring Teams. The accompanying illustration shows the diagrammatic layout of an Atomic Health Control Centre, and to explain the functions of this Centre it


• ATOMIC HEALTH •
RADIOACTIVE • AREA •
• CONTROL CENTRE •
ACTIVE LAUNDRY
ACTIVE INSTRUMENTS DOSIMETERS AND FILM BADGES
PRELIMINARY MONITORING
WAITING ROOM
UNDRESSING SECTION
DIRTY AREA
SANDBAG OR EARTH WALL
PERSONAL MONITORING
SHOWERS
RETURN TO SHOWERS
PERSONAL BODY CHECK
NOTICE
CLEAN AREA
CHANGE AND DRESSING ROOM
WIRELESS ROOM
PROTECTIVE CLOTHING ISSUE
INSTRUMENTS DOSIMETERS AND FILM BADGES
CONTROL AND BRIEFING ROOM
BULK CLOTHING
MEDICAL SECTION
C.R.E. NORTHERN COMMAND DRAWING OFFICE

is intended to take just one member of a Monitoring Team through it and explain each process as it occurs.

It will be noticed that the Centre itself is divided into two sections, known as the Clean and Dirty Areas, meaning that one area is not at all subject to radioactive contamination and has absolutely no dealings with it, and the other has. These two areas are strictly separated and divided by clearly marked fences.

The first port-of-call on reporting to the Centre is the Control and Briefing Room. Here the soldier reports and is briefed on what his task in the radioactive area is to be. This section is aptly called the brains of the Centre, and has available all the latest information on the area to be visited, such as boundaries, bad patches, most suitable routes, etc. This is obtained mainly from wireless reports sent back from parties who are in, or who have been in, the radioactive area. A special wireless room is maintained for this purpose and verbal information is confirmed on their return. Following an explosion, progressive information is consolidated and passed on to teams coming forward. Naturally, the first teams have to ascertain this information themselves.

Attached to the Control and Briefing Room is the Medical Section, where each soldier's records are maintained and where he will be examined to see if he is fit to enter a radioactive area and how much of a dose he can absorb, particularly if he has previously been subject to atomic radiation.

Having been made fully aware of what he has to do, where he has to go and what he is likely to encounter there, the team member starts his move through the Centre. The next stop is the Instruments, Dosimeter and Film Badge Section, where a group of technicians maintain and issue these items. On collection of these, he moves on to the Clothing Section, where he is issued with the protective clothing mentioned before, that is, combination suit, boots, gloves, respirator, etc. Owing to the heavy demand for these stores and the time taken to laundry/decontaminate them, a large Bulk Clothing Section is maintained adjacent to the issue point.

All issues completed, he goes into the Change and Dressing Room, where he removes whatever articles need to be left behind, such as hat, normal boots, wrist watch, etc., and dons his protective clothing. He is now dressed, fully briefed, in possession of his instruments, etc., and ready to leave the Clean Area of the Health Control Centre and proceed into the radioactive area.

As he departs this area he will see a notice, conspicuously placed so that it cannot be missed, which reads: "You are now entering a Radioactive Area—NO EATING—SMOKING — OR DRINKING — beyond this point."

He then goes into the active area and carries out whatever task he has been assigned. When this is completed he returns. However, he is a vastly different individual now to when he left the Clean Area. Owing to exposure to and contact with the residual radiation and radioactive dust, he is a hazard, not only to himself, but to any other human being with whom he may come in contact, until such time as he is completely decontaminated, and once again dressed in his ordinary clothes. Accordingly, the

second part of the Health Control Centre is designed to do this with the utmost thoroughness and speed. Once again I will deal with just one individual passing through the various sections.

Firstly, he reports to the Active Instrument, Dosimeter and Film Badge Section, where these items are handed in to be read, checked and also decontaminated ready for re-issue. This section, staffed by highly trained technicians, also operates the Active Laundry, where decontamination of the protective clothing and associated items is carried out.

It is of interest at this stage to observe that the personnel who operate the Dirty Area of the Centre are themselves dressed in protective clothing of various degrees, dependent upon the intensity of radioactivity encountered by the people they are dealing with.

Having rid himself of all portable and loose items, he proceeds to a waiting room, where the team members are called forward one by one into the Preliminary Monitoring Section. Here he is checked over by means of a Geiger Hand Probe, which will locate the bad patches of contamination on the outside of his protective clothing. As an aid to the laundry/decontamination of this clothing these bad spots are marked with chalk, either red or green, dependent upon the degree of contamination, and this will subsequently assist in their cleansing.

Now he goes forward to the Undressing Section, where all items of clothing are removed from him. These will be placed in metal bins ready to go to the laundry. A separate bin is provided for each item, such as suits, boots, gloves, respirator, etc. A sub-division is again made for those marked with red chalk and those marked with green.

He is now ready to proceed on and at this stage is possibly naked or dressed in underclothes only, dependent upon how active his clothes were. It will be noticed that he is gradually leaving behind the radioactivity which he picked up. He is being converted from what is known as a Major Hazard to a Minor Hazard and eventually will be completely decontaminated.

The next section is the Personal Monitoring. This section is separated from the previous ones by a sandbag or earth wall, designed to break down any impulses of radioactivity being given off by contaminated clothing, instruments, etc., left behind which would tend to cause the checking instruments there to give false readings.

Here in the Personal Monitoring Section his complete body is checked with the same Geiger Hand Probes as used in the Preliminary Monitoring Section, and he is told of any bad patches which still remain, such as particles of dust, etc., which may have entered his protective clothing and lodged on the skin, particular attention being paid to such places as the feet, hands and hair. It is necessary that he knows just where they are because, bearing in mind my previous notes regarding "invisible grease," he has to go and thoroughly scrub and wash himself in the Shower Room. Here he will find the necessary nail brushes, bar soaps, liquid soaps, detergents, etc., to enable him to do this. When he is satisfied he is clean, and after having washed thoroughly those portions which were previously indicated to him as contaminated,

he proceeds from the Shower Room to the Personal Body Check Section. Here he will be checked again to ensure that no residual radiation remains on his body. However, as often happens, some patches are very stubborn and complete removal of them may not have been carried out in the first showering. If such is found he will proceed back via the Return to Showers Route for further showering, scrubbing and washing, and here I draw attention to the one-way traffic rule which applies right throughout the centre. As personnel passing through are progressively becoming cleaner, there is no retracing of steps and there is only one way towards complete decontamination and that is—Forward. So the Return to Shower route is a separate route on its own, with its own shower section. When the soldier, possibly after several showers and much cleansing, is finally passed by the Personal Body Check Section, he can move back direct to the Change and Dressing Room, where he again dresses in ordinary uniform and then proceeds through to the Control and Briefing Room to submit his report. The full circuit has been completed. (Naturally all personnel working in the Decontaminating Centre must follow this same cleansing route.)

The foregoing has dealt possibly somewhat briefly, but at least with consideration of all the principles involved, with the methods by which protection can be afforded to the soldier exposed to radioactivity and how he can be completely decontaminated following such an exposure. An understanding of the necessities of this protection and its associated decontamination will do much towards removing the veil of mystery through which the modern serviceman is looking at the Atomic Age.

We must resort to all sorts of stratagems, manoeuvres, illegal methods, evasions and subterfuges.

—Lenin.

INTELLIGENCE IN THE FIELD

★ ★ ★ ★ ★ ★

Current Trends in Organisation and in Handling Information

Major J. J. S. Hobbs, Australian Intelligence Corps.

THE aim of this article is to review some of the changes affecting intelligence in the field that have occurred since World War II.

The increase in the tempo of war brought about by trends in modern equipment, the tremendous improvement in communications and the tendency towards uniformity in the organisation of Allied armies have all contributed to such changes that have occurred in the functioning of intelligence in the field.

The principles involved in the handling of operational information have not changed, for speedy, accurate, and, if possible, anticipatory information concerning the enemy and his plans, at the right place at the right time, is still the requirement of commanders.

During World War II, the experience of a well-developed intelligence consciousness was not enjoyed to its full extent by the AMF until the latter stages of the war, and then mainly under conditions peculiar to the Pacific theatre.

Consequently, a review of intelligence courses and other intelligence training over recent years has revealed a tendency on the part of intelligence officers to approach problems in the light of past and often out-of-date experience, rather than an inclination to adapt methods of World War II to modern conditions brought about by recent developments.

Unit Intelligence.

Those intelligence officers who, under conditions prevailing in the Pacific, enjoyed the command of a battalion intelligence section of ten men, assisted at times in the gathering of information by a sniper section, would doubtless find it difficult to adapt themselves to carrying out the same tasks with a section reduced to five in number and with no sniper section (as they knew it) to assist.

Furthermore, the battalion intelligence officer has come to be regarded as the personal staff officer of the commander in battle, and his duties in this direction will frequently prevent his more personal

supervision of the duties of the intelligence section. If the intelligence officer is not with the commander, he is most likely standing in for the adjutant by manning the rear link wireless set or is engaged upon the co-ordination of the battalion patrols.

The old idea of nicely dividing the intelligence section into observation, special reconnaissance and office groups is now hardly feasible, except in certain circumstances, such as during static defence. The intelligence personnel can no longer be expected, as a general thing, to man observation posts, to act as guides, to carry out frequent reconnaissance, to form the battalion navigating party in an attack, to form marking teams for start lines and forming-up places and to man check points in a withdrawal.

The role of the intelligence section in relation to these tasks has changed from one of participation and responsibility, to one of organisation and co-ordination. The scarcity in numbers of trained intelligence personnel makes it imperative that they be used sparingly and only when the task in question cannot be carried out by less highly trained members of the unit.

The observation system on the unit front will be evolved from the co-ordination of the responsibilities for observation of mortar and machine gun observation posts, sniper posts manned by company personnel, standing patrols and artillery observation posts. The intelligence section will prepare an observation coverage plan along the same lines as a fire plan and will advise on the establishment of further posts to be manned by company personnel.

Guiding must be organized on a battalion plan and certain company and platoon personnel trained as company and platoon guides by the intelligence section, during training or quiet periods.

Marking teams for the marking and lighting of assembly areas, forming-up places and start lines can be drawn from that portion of the unit earmarked as a reserve for the particular operation, and the marking carried out under the supervision of intelligence personnel.

The inclusion of at least one member of the battalion intelligence section in the battalion navigating party in a night attack is desirable and reasonable, for the success or otherwise of the operation may depend upon maintenance of direction to the objective and on arriving there at the right time.

In a withdrawal, the organisation of check points can be the responsibility of the intelligence section, but members of the section should not be expected to man other than the main battalion check point. At least two intelligence personnel will be required in the battalion "R" group, if a new main position is to be occupied.

Unless accurate topographical information in the form of a sketch is required, the use of intelligence personnel on reconnaissance patrols is seldom warranted, for the task can usually be carried out adequately by an NCO from a rifle company, or, in special cases, from one of the specialist platoons.

A principle for the efficient functioning of intelligence within the battalion is that at least two rifle company personnel should be trained in intelligence duties, to

provide on-the-spot assistance to companies and to form a reserve against casualties in the battalion intelligence section. The responsibility for training these personnel rests with the IO.

With the engagement of the battalion IO on battle staff duties, the immediate control of the unit intelligence section becomes vested in the intelligence sergeant, who must be prepared to assume considerable responsibility for the efficient functioning of the section and of the battalion intelligence net generally.

The IO must ensure during training periods that his section is capable of functioning without his immediate supervision. He must be ever alert to methods for facilitating the duties required of his section, and he must take steps to ensure that the section will receive ready co-operation from the entire unit in regard to the collection and distribution of information. In other words, he must make his unit "intelligence conscious."

Apart from the changes in the organisation of the infantry battalion intelligence section, a significant change has occurred in artillery regiments. During World War II, the Orderly Officer of an artillery regiment listed intelligence duties amongst his other responsibilities, but now an IO will be found on the establishment of each field, light anti-aircraft and light regiment.

Intelligence Staffs at Corps and Divisional Headquarters.

The main changes in the organisation of intelligence staffs have occurred at corps level.

During World War II, we became used to a corps intelligence staff of a GSO1, GSO2, GSO3 and 15 other ranks, assisted by a Corps Section (Intelligence Corps) of three IOs (Captains), two IOs (Lieutenants) and seven other ranks. Futhermore, intelligence had the responsibility of supervising the functioning of a Field Security Section of a captain and 14 other ranks, a detachment of a Field Censorship Company, a Public Relations Field Unit, an Army Air Photographic Interpretation Unit, a detachment of the Allied Translators and Interrogators Section and a Field Security Section (Enemy Equipment).

Although a Corps Section (Intelligence Corps) exists on the peacetime order of battle of the AMF, it has been raised solely as a training unit for the provision of IOs trained in advanced intelligence duties, and is not now part of the higher establishment of a corps headquarters.

The provision of a GSO1 (Int) at corps level was peculiar to the AMF and was brought about by the increased intelligence duties of a topographical nature in the Pacific theatre.

The trend in the AMF in the reorganisation of intelligence staffs at corps has been to bring them into line wtih the British organisation and to make intelligence at corps more or less self-contained in regard to qualified personnel.

The present policy is that the GSO2 (Int) will be responsible to the BGS for the functioning of intelligence within the corps and that his staff will consist of a GSO3 and two IOs on battle intelligence duties, a GSO3 and an IO on security duties, 19 clerks, orderlies, map issuers and draughtsmen, and a Corps Headquarters Interrogation Team of two officers and two NCOs.

In addition to the organisation of the intelligence staff, the GSO2 (Int) will be responsible for the functioning of the following intelligence units:

(a) Headquarters Field Security, which is responsible for the technical control (through GSO3 Security) of all Field Security sections operating in the corps area.

(d) Field Security Section (Mobile) of two officers and 29 other ranks.

(e) Corps Army Photographic Interpretation Section of three officers and six other ranks.

(d) Corps Technical Intelligence Section, which replaces the Field Security Section (Enemy Equipment).

(e) An Interrogation Team of two officers and seven other ranks for interrogation duties at the corps prisoner-of-war cage.

(f) Field Censorship Company.

The control of the Public Relations unit is no longer the responsibility of intelligence.

During the war in the Pacific the intelligence staff at corps was responsible for the production of a considerable amount of strategic intelligence, due mainly to the smallness of the AMF, with a corps headquarters virtually the senior theatre headquarters. With the introduction of the Joint Intelligence Bureau, this position should not arise in a future war, and the intelligence staff at corps will be fed with necessary basic strategic intelligence data. Thus the responsibility of intelligence at corps level will change from that of the production of this material to one of amending existing intelligence publications on economics, logistics, topography and enemy order of battle, thus allowing considerably more time for the carrying out of normal intelligence functions in the field.

Changes in the intelligence organisation at divisional level have not been so significant and are mainly as follow:

(a) The size of the Field Security Section has been practically doubled.

(b) The division now has its own Army Photographic Interpretation Section of two officers and four other ranks, instead of a detachment from the old AAPIU.

(c) It will be usual for a detachment of a Field Censorship Company to be attached.

(d) The allocation of an Interrogation Team (Army troops) of two IOs and three other ranks replaces the detachment of ATIS, which was usually made available to divisional headquarters.

(e) There is no longer a Field Security Section (Enemy Equipment), but a detachment of the Corps Technical Intelligence Team may operate in the divisional area.

(f) The intelligence staff at divisional headquarters has been reduced from a GSO3, an IO, a sergeant and four corporals to a GSO3, an IO, a corporal and three privates.

(g) The allocation of a command vehicle (A3) with high-powered wireless sets to act as a rear link (voice).

In an Airborne Division, the normal divisional intelligence staff will be augmented by the addition of a

GSO2, an IO, two other ranks and a Mobile Photographic Enlargement Section. The GSO2 becomes responsible for the co-ordination of intelligence within the division, whilst the GSO3 is primarily concerned with the interpretation of air photographs, and thus should be a skilled interpreter. The additional intelligence staff has been introduced to meet the more detailed planning necessary for airborne operations.

The Handling of Operational Information.

The responsibilities of intelligence staffs for the handling of operational information remain basically unchanged with the exception of increased responsibility in the handling of air reconnaissance. However, the methods for the transmission of intelligence have changed considerably since World War II, not necessarily to a great extent in substance, but certainly in nomenclature.

The familiar intelligence reviews, summaries and reports have been replaced by the "supintrep," the "perintrep" and the "int message." Only the "ISUM," the brief daily summary of important operational intelligence issued after dark by intelligence staffs at all levels down to brigade, remains relatively unchanged.

The "supintrep" (supplementary intelligence report) has superseded the "intrev" (Intelligence review) as the organ for a periodic review of enemy information at any level. The "perintrep" (periodical intelligence report) has replaced the corps and divisional intelligence summary and is issued bi-weekly or, more frequently, if the operational situation so dictates. The "int message" takes over the function of the "intrep," which is to supplement (for intelligence purposes) the information contained in the operational situation report issued by unit and superior headquarters.

With the use of wireless nets now commonplace, it must be realised that information will often be received at a higher headquarters simultaneously with its receipt at a lower level. Accordingly, the IO originating the dissemination of intelligence must be fully aware of what stations are "on net," in order that his reports may be brief and relevant and not padded with information already known to, and acted upon by, the higher headquarters. Of course, frequently it may be necessary for the IO to confirm information already received by the higher headquarters.

The main change in the handling of topographical information has been the increased use of air photographs and anaglyphs. In the fast-moving battle, commanders at all levels, including patrol leaders, may be briefed mainly from air photographs. Air reconnaissance reports, too, can most conveniently be related to air photographs. It may be desirable to keep a duplicate battle map on a gridded mosaic, and this is a particularly useful practice in regard to the master intelligence map at the higher headquarters.

The study of chemical warfare intelligence at the higher level must be widened to include atomic and biological warfare intelligence, and intelligence staffs must be alert to indications of the likely use of any of these special forms of warfare by the enemy.

Whereas, during World War II, the handling of the requests for, and the results of, air reconnaissance was usually left to intelligence, such duties are now part and parcel of the responsibilities of GS (Intelligence). Working in close liaison with G (Ops) Air, GS (Int) is responsible for receiving and co-ordinating all requests for air reconnaissance, excluding Arty R, which is the responsibility of G (Ops) Air. Intelligence is also responsible for air photographic reproduction and interpretation, although the responsibility for the actual interpretation and distribution of air photographs is delegated to the Army Photographic Interpretation Sections at all levels. In an independent force the co-ordination of air reconnaissance can become an inter-service matter with GS (Int) presenting the Army requests.

Sources of information remain the same, with greater emphasis on the value of air reconnaissance, but the considerable possibilities occasioned by the development of the counter-bombardment organisation should not be ignored, for here is a relatively new artillery intelligence service. From the sound-ranging posts in the FDLs, through the ACBOs at brigade, to the vast CB organisation at higher levels, spreads an intelligence net primarily interested in the collection, collation and distribution of intelligence concerning enemy guns and mortars, but at the same time probably gathering much information of great interest to GS (Int). Conversely, GS (Int) will acquire much information of vital importance to the CB organisation, and accordingly the importance of the "shelrep" and the "mortrep" becomes more pronounced.

Apart from the increased rapidity in the distribution of intelligence occasioned by the use of wireless nets, great advances have been made in the perfecting of reproduction machines for the use of operations and intelligence staffs in the field. The old methods, such as the use of a Gestetner for the reproduction of traces and other documents, are gradually giving way to the use of modern printing machines capable of rapid and clear reproduction of maps, air photographs and intelligence publications. These machines will facilitate and speed up the distribution of intelligence.

Changes in Staff Duties Affecting Intelligence.

As has already been stressed, the most important change in staff duties, as far as intelligence is concerned, has been the increased use of "voice nets" (formerly RT nets). This development will probably influence the functioning of intelligence in the field more than any recent changes in intelligence organisation. Intelligence personnel, particularly IOs, must become experts in voice procedure.

In addition, there are several other changes in staff duties, of which the IO must be well aware. These are:

(a) The new form of operational situation reports;

(b) The new standard layout for operation orders and patrol reports;

(c) A complete change in military symbols from those used in World War II.

(d) The introduction of a new message form and new message precedences;

(e) The acceptance by the Allied

powers of a common map reference system, called the Geographic Reference System (GEOREF).

As We Train So Shall We Fight.

From a perusal of this paper it can be seen that an IO relying solely upon his past experience to stand him in good stead for the efficient performance of his duties in modern warfare will find himself ill-prepared for the tasks he has to do. Forewarned is forearmed, therefore let us be sure that during our peacetime intelligence training we become used to the new systems in current operation.

AUSTRALIA IN THE MODERN WORLD

The Director of Army Education has requested publication of the undermentioned corrections to "Australia and the Modern World." Holders of the booklet are asked to insert the necessary amendments.

1. **Page 21, line 5, after the word "referendum" insert in parentheses "(having the support of a majority of the electors throughout Australia)".**
2. **Page 24, at the beginning of Chapter III, the change in status of Pakistan to a republic bearing the title of the "Islamic Republic of Pakistan" is mentioned as an accomplished fact, whereas the necessary constitutional changes have yet to take place and will probably occur later this year.**
3. **Page 36, last paragraph, states in part ". . . it is well to remember that it is across the Antarctic Territory that lie Australia's shortest lines of communication with her neighbours in the Southern Hemisphere—South Africa as well as South America." Actually, the statement is true of South America (particularly the Atlantic sea board) but not of South Africa. (This was pointed out by an examiner in the promotion examinations for officers in Current Affairs, who was working with a globe beside him.)**
4. **Page 55, line 8 of the first complete paragraph on this page, the years "1939/45" should read "1945-52."**
5. **Page 60, line 4 of the third last paragraph, the reference to "Mr. Stanley Bruce" should be followed in parentheses by "(now Lord Bruce of Melbourne)".**

GUERILLA WARFARE

Major J. G. Sloman,
Royal Australian Infantry.

1—The growth of "special forces" and their place in modern warfare.

MODES of warfare change, the introduction of new weapons and their counter-weapons dictate, to a large extent, the tactics of the day. So "guerilla warfare," both as a tactical and strategic concept, will change.

In World War II "special forces" were employed on certain tasks which were outside the scope of normal operations, and these make exciting military reading. We can learn from these past experiences, but the major problem is to plan and train for the future and to have well ingrained in our minds the basic essentials for the employment of such guerilla forces.

The object of this paper is to demonstrate some of the basic principles of this so-called "guerilla warfare," and to discuss the more important tasks, both offensive and defensive, which may be undertaken by "special forces." In addition, the lessons from individual operations will be discussed in an attempt to correlate them with our present-day training requirements.

"Guerilla warfare is a method of waging war employed by men living in an area occupied or surrounded by the enemy. The guerilla may be fighting in an area of his own country temporarily under enemy domination, or he may fight in a foreign country favourable to him, but at the time in the grip of a superior enemy."

Such a wide definition covers the employment of "irregular" and "special forces" used in the past. Over all, the same principles apply to these forces as to forces employed in regular warfare, but it is in the interpretation that the difference lies.

In the past, guerilla forces under the vital leadership of a junior commander have often come to be known as "private armies." This has been mainly because there have been no suitable regular units to carry out such operations. This is bad. If such a force is necessary in warfare it should become an integral part of the war establishment. Training at all levels should include guerilla principles, and staff officers should be capable, not only of giving orders and directives to their artillery, engineers and air support, but

should also be conversant with the directives they should give to their guerilla component. There should be a recognised staff officer on all senior formations whose job it would be to deal with such "special forces."

Units Available for Special Tasks.

In the past guerilla forces have been formed for three strategic reasons:

(1) A conquered people attempting to liberate itself from an oppressor—"Armies of Liberation."

(2) A defeated army leaving guerilla groups to harass the enemy while the main army regroups. Such were the "stay behind" parties planned in Malaya.

(3) Offensive guerilla activities planned and carried out before a major attack to confuse and soften the enemy's defences.

The great danger of the political type of guerilla warfare as instanced by Armies of Liberation is that a revolt, once started, may get out of control or into the wrong hands. How to control such a revolt is a military problem in itself. No better illustration of such a situation could be found than that existing in Indo-China at the present time.

Another instance of the importance of adequate control, details of which are not widely known, occurred in England after Dunkirk, when a strong bid was being made by Communists led by Tom Wintringham to obtain control of the Local Defence Volunteers. Many L.D.V. Committees were won over to his side, and even a "school for saboteurs" was opened. This threat to the country's security was recognised and countered by the sudden disbanding of the L.D.V. and the formation of the Home Guard, with its staff and headquarters all over the country bursting with retired generals, admirals and air marshals.

The answer to this very definite danger is that such "special forces" should be raised legally and have a definite military purpose, with a trained staff to look after them and understand their problems. It is desirable that there should be an organisation in peace, which could be readily expanded, if necessary, in time of war.

"Stay behind parties" have a great nuisance value. Their object is to delay the advance of the enemy by ambushes and by interfering with his lines of communication, causing a diversion and gaining time for the orthodox troops in which to concentrate for the counter-attack.

If such a party is to remain in action behind the enemy lines for any length of time, communications with a friendly force and the supply of ammunition and food become very important. This requires considerable preparation before such a party is launched, and continuous liaison while the party remains in contact with the enemy.

Offensive guerilla activities include deep penetration behind the enemy lines, the collection and immediate reporting of information about the enemy which may be of use to the orthodox units, and demolition and general harassing activity against the enemy's fixed defences. These activities, together with those previously mentioned, require expert staff planning and execution by soldiers trained for such special tasks.

Let us now examine the types of units available for these special tasks:

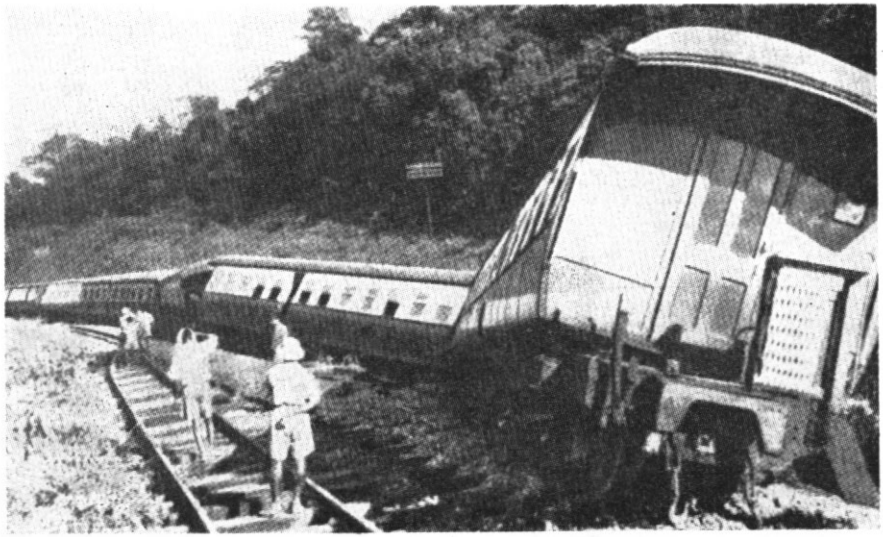
Secret Service: During World War II the British Service carried out many operations behind enemy lines and, although many of their personnel were supplied by the Army, they remained a clandestine unit dealing with agents in enemy-held territory.

Political Warfare Units: These were important, particularly in controlling the strategic movement of forces operating in enemy-held territory, but it is very difficult to assess their role in any future war from the purely military point of view. Suffice it to say that there must always be a political organisation in liaison with guerilla forces.

Orthodox Units: These are units with a regular establishment, and their primary task is not that of infiltration behind the enemy's main forces or clandestine work of any nature. However, it could be anticipated that the members of such an orthodox unit may be trained for such work as a secondary role, the limiting factor being that the unit is composed of well-trained men of a high physical standard.

Special units: These are uniformed army units specially trained to carry out tasks which lie outside the scope of an orthodox unit, such as:

Long-range reconnaissance;
Harassing operations; and
Demolition work.



Train derailed by guerillas in Malaya.

—Reproduced from the "Military Review," USA

It is realised that, although the Army will provide most of the personnel for such a unit, it is only with the full co-operation of both the Navy and Air Force that their special tasks can be carried out. Such problems as the delivery to the site of operation and the supply of a force in enemy-held territory with food and ammunition are very much a sphere for close co-operation with the other services.

2—Some lessons learned from the operations of "special forces" in World War II.

It is of interest to consider some of the varied tasks carried out by special units in World War II and to consider whether there will be a requirement for such units in a future war.

The raising and maintenance of Resistance forces: This was well carried out by the Special Air Service (SAS) in both Sicily and North-West Europe. Uniformed parties were dropped by parachute and maintained by air. Such small parties behind the enemy lines were able to lead the partisan groups, and achieved results far out of proportion to the number of uniformed men employed. Their communications were of the utmost importance, and for the French Maquis operations a BBC transmitter was used from Britain, with a special link to the desk of the Brigadier commanding the Special Air Service. General of the Army Eisenhower stated in his report that the Maquis were worth 12 divisions to him. Their uniformed corps was the SAS.

The destruction of communications, radar installations and enemy beach defences, both for strategic reasons and in immediate tactical support of particular operations, were carried out by Commando units. The first Commandos were used in July, 1940, and they were to operate in small parties along the front line in North-West Europe to keep alive the offensive spirit and cause the enemy to disperse his forces in order to defend the whole of his long front line.

The Commandos were trained to operate as individual units without any supporting arms, and this made them very suitable for surprise raids. They were often employed in a seaborne role, and the future employment of such Commandos most likely will be bound up with amphibious operations.

Commandos were also used to carry out raids, both as a diversion and in support of operations launched by orthodox forces with full land, air and sea support.

Collection of information by observation behind the enemy lines was carried out by a number of special units. As an example of this type of operation the work of the Long-Range Desert Group is outstanding. This group was formed in the Western Desert in June, 1940, for reconnaissance and survey of the vast desert behind and to the enemy's flanks. As well as carrying out long-range reconnaissance, this unit undertook other tasks such as the dropping and supplying of agents into the enemy-held desert, and the preparation of "going" maps. Also they acted as guides to orthodox units in desert operations. The Long-Range Desert Group was able to produce much useful information

Railway guards on a train in guerilla-infested country in Malaya.

—British Information Service Photo
—Reproduced from the "Military Review," USA

about the enemy by means of protracted patrols, their military value being much greater than could have been obtained by air or other types of reconnaissance. The Western Desert was particularly suitable for this form of operation, and the necessity for such a unit may well arise again.

Another unit working in an entirely different sphere, but with a similar role, was the Australian Coast Watching Organisation, which operated in the islands to the north and north-east of Australia during the crucial period when the Japanese were advancing southwards and threatening the continent.

The origin of the Coast Watchers goes back to 1919, when a scheme for manning the long coastline of Australia and the islands was studied. However, it was not until the immediate pre-war years that the Division of Naval Intelligence was able to put the organisation into working order. The Watchers were installed in strategic island outposts, New Guinea, the Solomon Islands and New Ireland, and in the months following the Japanese occupation they remained at their posts and were able to report on enemy positions and movements.

Wireless was the means of long-range communication, and reporting on convoy dispositions and warnings regarding enemy air attacks were their main roles. Had the enemy been able to deliver their air attacks, without any warning from Coast Watchers, then the position for allied shipping would have been very serious. As it was, the ample warn-

ings of the approaching air attacks made it possible for the shipping to be ready and on the move, and the allied fighters to be in the air waiting.

The success of this organisation was due largely to its prewar planning, and it is now that we must plan for similar special force tasks in any future war.

Diversion and exploitation of the enemy to force him to dissipate a considerable force for his own internal protection is another very useful guerilla activity. Land Forces Adriatic (LFA) were used for such a purpose in the Balkans. This heterogeneous force, with supporting weapons, carried out operations on the mainland bordering the Adriatic to assist the partisans in disrupting the enemy's lines of communication. Raids were also carried out on the occupied islands of the Adriatic, and these sometimes developed into major battles, the LFA using its Raiding Support Regiment and the Army Field Regiment to provide supporting weapons.

The operations in this theatre demonstrated that a small mobile force, well led, could contain a much larger force of the enemy, and these were of material assistance in diverting enemy troops from the main operations in North-West Europe at this time.

Harassing and demolition activities far behind the enemy's front line will cause a great deal of confusion. Such was the role of the first Wingate expedition in Burma. A number of small, self-supporting columns, re-supplied by air, marched across the Chindwin River in February, 1943, deep into enemy-held country, and by their mobility they were able to block the main railway line and put it out of action for six months. Their further operations prevented the Japanese attack on Fort Hertz, but eventually the columns were forced to retire because, due to enemy fighter interception, air supply could no longer be continued.

An essential requirement for such an operation was the co-operation of the local inhabitants. If this had been lacking, all movements of the column would have been reported to the Japanese, and security thereby compromised.

Such an operation, with long jungle marches, imposes a heavy physical and mental strain on all those taking part. This emphasises the importance of selection and adequate training of the troops. Satisfactory evacuation arrangements for the sick and wounded must be made.

The campaign demonstrated that a small, mobile force, operating in the jungle behind enemy lines, could gain much useful information and cause the diversion of a much superior enemy force from its main task.

Special beach reconnaissance carried out stealthily before an amphibious assault and *the provision of guides* to lead in these assaults were two of the important tasks carried out by the Small Operations Group. The SOG was formed in South-East Asia Command in June, 1944, to group under one command all the special units serving in that Command. This step was taken both to simplify command in the area and to bring about some measure of standardisation in training and equipment of these units. The function of the Group was defined in a directive thus:

"To provide small parties of uniformed troops t r a i n e d and

equipped to operate against enemy coastal, river or lake areas, using as their final means of approach various types of small craft, inflatable boats, paddle boats or swimmers . . ."

During its active existence in 1944 and 1945 this Group carried out many most important operational missions in South-East Asian waters:

Beach reconnaissances were made for large-scale landings in North Sumatra and in Malaya. Submarines were found to be the best means of transporting the units to the area of the operation, and then detailed tasks were carried out in canoes. Information on the following lines was often obtained:

(i) A cross section of the beach, including gradients, to assist in landing of troops and equipment.

(ii) Details of runnels and obstacles, both above and below the water level.

(iii) Heights of the tides and times of ebb and flood.

(iv) Periscope photographs of the beach area for future recognition.

(v) Information about the enemy coast watching service.

This form of information made for better planning of amphibious operations.

Coastal reconnaissances in force were made on the Arakan coast to test the enemy's defences. The information gained helped in the final assault. SOG units also played an important role in the crossing of the Irrawaddy River by the Fourteenth Army. River patrols were carried out together

Vietminh guerilla captured by the French forces in Indo-China.

—Reproduced from the "Military Review," USA

with the reconnaissance of likely river crossings so that, when the operation commenced, units of the SOG were able to guide the assault troops to the correct beaches and across the suitable river crossings.

In the South-East Asia theatre these small special units did an invaluable job and under similar conditions they would be required again. It seems desirable, therefore, to have a unit ready trained for such employment. Basic training similar to that required for all special units could be implemented by training in canoes and small boat work, operational swimming (including under-water swimming) and in the general technique for small-scale amphibious raids and beach reconnaissance.

The Role of the Modern Guerilla.

In considering these individual activities of special units, an attempt has been made to emphasise their most appropriate role and to anticipate future requirements. Tactically there will always be an area behind the sphere of activity of the orthodox units but forward of the enemy's rear echelons. This area will become the field of operation of the special unit filling the gap between orthodox operations in the tactical zone and the operations of the secret service behind the enemy lines. Because of the unusual nature of their tasks these units will require special training, but, once committed to battle, they would come under the direct command of the orthodox headquarters in their area in a similar manner to any other supporting arm.

This is but one concept for the employment of the special unit. In such a role the unit could well be used to support the orthodox force by some special operation, or by long-range reconnaissance into enemy-held territory to provide the normal forces with invaluable information.

It cannot be stressed too often how important it is for the special units to have the active co-operation of the native population of the country in which they are operating. If this co-operation is present, then many of the problems of security and supply of a force operating well forward of its own lines will be solved.

The actual type of special unit required will vary with the geographical conditions of the theatre of operation. However, the equipment and training should be based on the general requirements of a special unit which hinge on long-range reconnaissance, demolition and the collection and reporting of information. These tasks will be common to all theatres, so that special training will be required in both communications and demolition techniques.

This training can be organised in peacetime, and an establishment designed for rapid expansion in time of war. The basic training is already available at established Army Schools, while the special skills necessary to these units may well be learned in co-operation with the other services, e.g., paratroops and small ships units. In war the actual training will vary depending on the different conditions of the various theatres so that advanced training schools could well be established for special units in each different theatre. This would give centralised control and a continuous flow of important local battle experience

which could be passed on to the new units as they arrive in the area.

If these lessons learned from the last war are considered in the planning of special units in the future, much time and energy will be saved and the special unit will emerge as a properly organised fighting component, ready to go into action when the need arises.

In peace, preparations can be commenced for the employment of "special forces" in war, and it is that aspect of our study of guerilla warfare which will now be considered.

3—Peacetime preparations make guerilla victory possible

It becomes increasingly clear from the study of the various activities of special units in the last war that there will be a requirement for such units in the future. However, if these rather specialised tasks are forgotten in peacetime and no thought given to the preparations that must be carried out then there will once more be hasty organisation, with competition for trained personnel and suitable equipment, and all the inherent dangers of the so-called "Private Army."

There will always be a tendency for these units to be regarded as forces apart, and so drift away from normal command. This tendency must be carefully controlled—the operations of special units should not be cloaked in any form of secrecy and at all times orders should be passed through normal staff channels.

Having stressed the importance of control of these special units through normal staff channels, let us pass on to a discussion of a suggested method of peacetime training. Because of the economic limitations imposed in times of peace it is not possible to have a full-scale special unit organisation with its own training school. However, it is possible and, in fact, thought advisable, that all existing Army Schools include the relevant aspects of special unit training in their syllabi. This inclusion would not necessitate any great change in the existing organisation, and in a short time there would grow up an appreciation of the correct roles of special units.

For example, the School of Infantry could deal with the training for long-range patrols behind enemy lines and the various problems of supply that would arise. The Armoured School might well develop the use of the light car armed with an MMG that was used with promising results in North-West Europe. The School of Military Engineering could teach the important techniques of demolition and sabotage behind enemy lines, while development of special wireless sets suitable for such operations would be carried out at the School of Signals.

Some of the special force techniques could be incorporated in the training carried out at normal Army Schools are:

Long distance marching;
Long distance reconnaissance and demolition;
Small boat work;
Airborne approach and supply;
Casualty evacuation behind enemy lines;
Sabotage and explosives;

Desert navigation;
Mountain warfare;
Operations in Arctic conditions;
Personal weapons and their use;
Beach reconnaissance;
Ambushes;
Maintenance of a small operational base;
Use of special wireless sets.

In this manner all personnel would soon appreciate the importance of guerilla activities and would come to regard it as a phase of normal warfare. If war then came there would be a source of well-trained troops available for service in special units, requiring very little additional experience before going into action.

In addition to the training at the various Army Schools it would be advisable to co-operate with the other services — particularly for training in small boat operation, amphibious attacks and, of course, paratroop training. It would also seem desirable that a central special unit organisation should be set up to study the problems of training at the various Army Schools and to control inter-service liaison. Then in time of war this central control authority could rapidly expand into the "Special Unit Headquarters" and be immediately responsible for the formation of special units from the trained troops available. Then, in the ideal case, further training as a team only would be required before the unit would be ready for action. The officers and NCO would, where possible, be chosen from those who had instructed and received advanced instruction in special unit work at the respective Army Schools.

It is not possible to fix an ideal size for an operation unit because each task will have its special requirements. However, a force between 20 and 50 strong would be suitable for most tasks, and four to six of these "troops" could form a special unit under a lieutenant-colonel's command. Troops could always be detached to assist orthodox forces, but they would still remain part of their own unit, with their own esprit de corps. Again, it is necessary to stress that, although there is an intelligence aspect of the training of these units, there should be no secrecy as to the definite role of these special units. They are soldiers trained for particular operations of reconnaissance, demolition and harassings, tasks which often lie outside the scope of the orthodox unit.

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Grateful acknowledgments are made to Brigadier J. M. Calvert and Lieutenant-Colonel B. J. Callinan for their help and advice in the preparation of this paper.

No doubt the anti-tank weapons have grown better in recent years. The bazooka, the panzerfaust, anti-tank guns, anti-tank ditches and devices and bombers are all dangerous foes. But to date there is no universal remedy against the most frightful weapon in ground warfare.

If anti-tank weapons undergo constant development and increased effectiveness, the same may be said for the tank. For this weapon, too, inventive faculty knows no limits. Now, as before, surprise is possible. Spaced armour will protect against the hollow charge. The bazooka and panzerfaust are employable at short ranges only, thus serving more the purpose of calming the nerves of the infantry-man than for effective defence. Anti-tank guns, once spotted by enemy tanks, are exposed to rapid annihilation if they are not armoured.

Thus armour should be combated by armour, by mobile and armoured anti-tank guns.

—General Heinz Guderian.

National Service and The Student

Sergeant G. L. Perkins,
Australian Army Education Corps.

From time to time criticism appears in the Press about the alleged disabilities imposed on students by their national service obligations. While some complaints may have been justified in the early stages of national service training, the Army in general, and the Army Education Corps in particular, is doing its best to assist students with their studies, and at the same time ensure that their military obligations are carried out. Methods and results vary from place to place, but this article gives a fair indication of what the Army is doing to assist students.—Editor.

SINCE the beginning of National Service Training in 1951, the first intake of each year has contained a large percentage of students representing the University of Sydney, University of Technology, Teacher Training Colleges, and University Colleges throughout the State.

At the commencement students had complained that NS Training interfered with their studies and handicapped them in preparing for post examinations. In some instances this criticism was justified, but the experience gained by the Battalion ARA Staff in previous intakes is now being used with telling effect. Hence NS Training—far from being a handicap to NS trainee students—has proved that a young student can combine both his study and his national obligation without detriment to either. A brief survey of this work in one NS Training Battalion will show how.

During the previous intakes of 1952-53, a check had been kept on the number of University students, and special leave was given for post examinations. No analysis of this

work was kept—as the importance of this aspect had not been readily accepted. To overcome all the problems associated with work of this nature, a very cordial liaison was established with the schools. The formation of a policy to come within the bounds of the regulations in force for NS Training was needed. This was done, and so to work.

Towards the end of 1953 documents for the personnel of intake 1/54 arrived and were examined with the co-operation of the Company Cadres. A tentative list was made and used as a medium for gathering data on the arrival of the members. The list showed that 65 members from various centres had post examinations to do in a variety of subjects. They included degrees, diplomas and certificates in Civil Engineering, Architecture, Metallurgy, Food Technology, Radio Engineering, Chemical Engineering, Optometry and Teacher Training. When all these matters had been finalised down to the last detail, the machinery was set in motion.

Study Facilities.

The Battalion Education Centre was given over to the use of students of one company; other companies set up their lecture huts as study rooms and they were open until 2359 hours daily. This was only made possible by overall co-operation within the battalion. Leave was granted for post examinations and extra emergency leave up to seven days was given in some cases. Another feature was that fees for post examinations could be paid in Sydney. Examinations could be taken there also. Each man was excused night duty until he had completed his tests. Strict control of study was necessary and any absence had to be explained.

Briefing.

The scheme had to be initially introduced, so at first opportunity a meeting was arranged and details explained to the students. In some cases complete surprise was expressed. To quote one member, "This is a surprise to me, as I was told that I would have no opportunity to study whilst in National Service Training." This meeting created the right attitude on the part of the students and made the whole scheme run like clockwork.

The early weeks of the intake were very busy, and it meant long hours of duty at the Education Centre, with normal educational activities being carried on as well. Everything was dovetailed, time was an important factor. The hours worked were worth it in every way because the results were so important in good public relations, in which the Army Education Corps may take some credit.

The next job was the enrolment at University and Technical Schools for the following year. Here again arrangements were made so that all fees could be paid in Sydney for country members. Diploma students of the University of Technology were granted one extra night and half a day a week leave, to meet the request of this institution. Ordinary technical school students were given one extra evening a week leave. At this point a final count was possible of the number within the battalion and they were as follows:

84 Diploma Students (various types), University Technology.

50 Degree Students (various types), University Technology.

2 Degree Students (various types), University Technology.

58 Students (various types), Teachers' Colleges (Sydney and Bathurst).
168 Students (various types), Evening Classes.

This made a total of 362 to be controlled, and it ran very smoothly, due to the spirit of co-operation within the unit.

Results.

As soon as the results of the post examinations were obtained, recorded and double-checked at an interview, an analysis of results was made as follows:

Passed in all subjects taken:
26 Sydney University Technology;
5 Newcastle University Technology;
1 Sydney University Teachers' College;
5 Newcastle University Teachers' College.

Failed in all subjects taken:
13 Sydney University Technology;
2 Newcastle University Technology;
1 Sydney University.

Passed in 1 or 2 subjects:
10 Sydney University Technology;
1 Lithgow University Technology;
1 Sydney University Teachers' College.

Students from the Teachers' College at Bathurst had no worries in respect of post examinations as they had made arrangements to do them after training.

On percentage, the above results would read as follows:

55.4% passed in all subjects;
12.3% passed in 1 or 2 subjects;
12.3% failed in 1 or 2 subjects;
20% failed in all subjects taken.

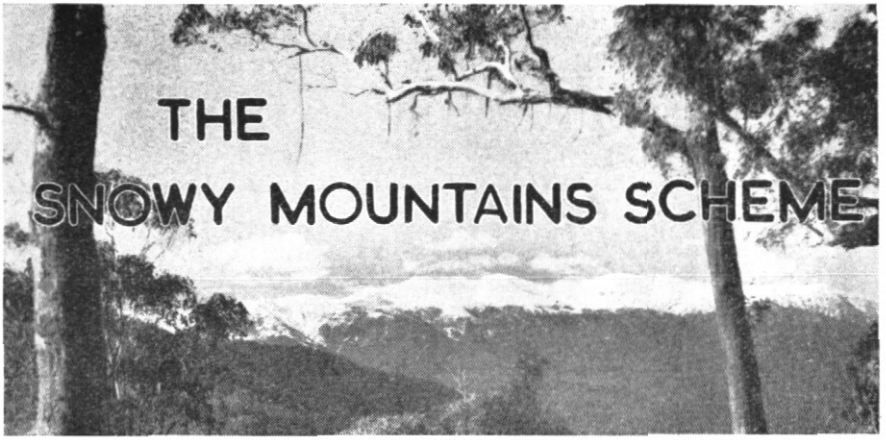
Criticism.

Before the members marched out they were personally interviewed and asked to express their opinions as to what they attributed failure. The reply in all cases was THAT IS WAS THEMSELVES and NOT the fact of being in an NS training camp. Several made complimentary remarks on the way they had been treated and two constructive suggestions were offered:

(i) That, if possible, drawing boards and instruments be provided for engineering drawing students.

(ii) That whilst the reference library was good and every effort had been made to get the books needed, it was suggested that a set of basic textbooks for all kinds of studies at Universities be kept.

From results of post examinations it was finally ascertained that NS students compared more than favourably with civilian students. Seemingly there is an advantage for students working under controlled conditions in camp.



Contributed by the Snowy Mountains Hydro-Electric Authority.

WATER and power are two resources which are likely to contribute more than any other to the future of Australia; water, because the dry inland can only be developed with irrigation; power, because the industrial efficiency of any country is directly related to power usage.

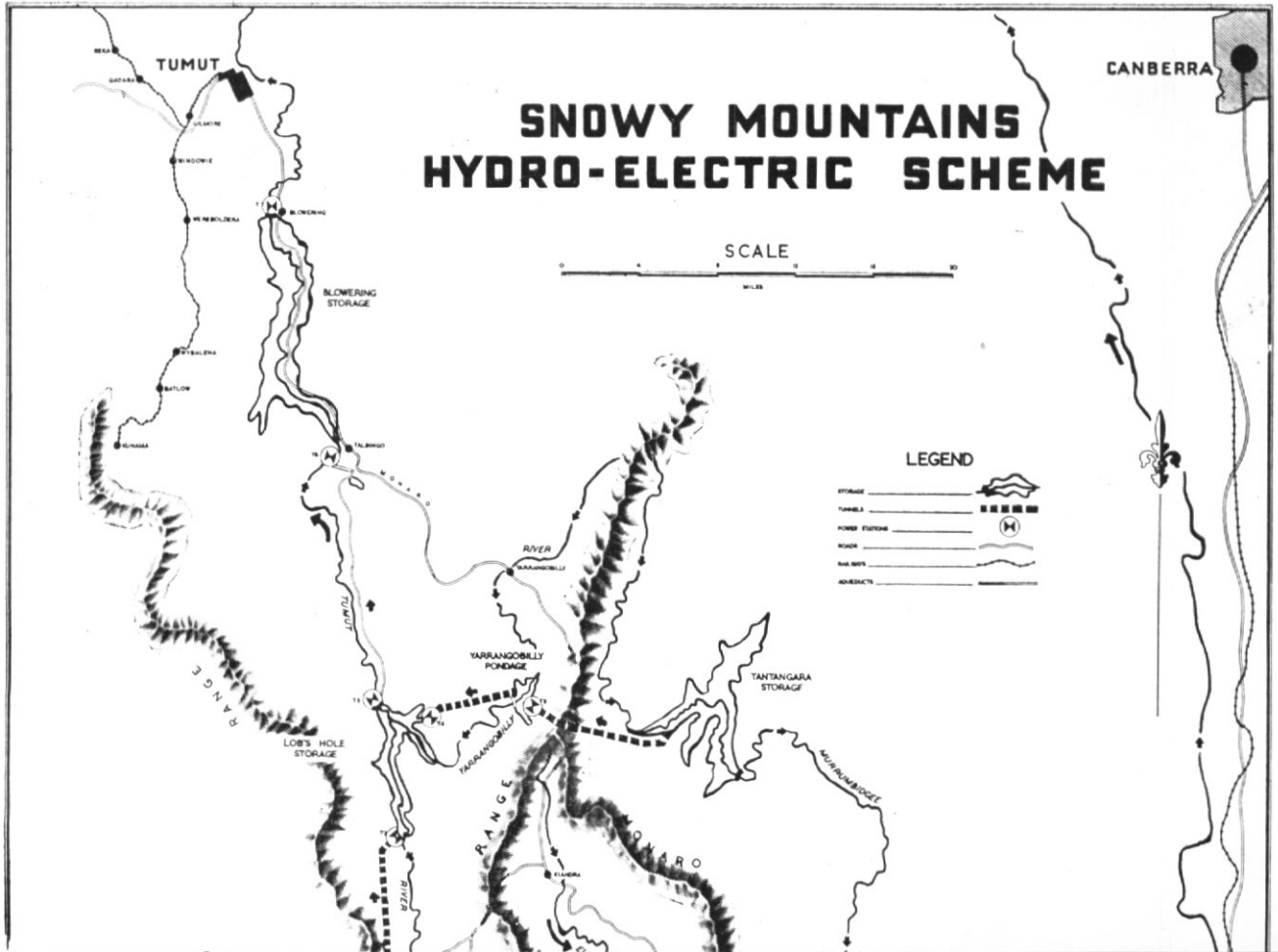
The Snowy River, which rises on the upper slopes of Mt. Kosciusko (7313 ft.), in the Snowy Mountains, is one of Australia's unused water resources. It is also a potential source of power. The Snowy Mountains attract a high rainfall and every winter are covered in deep snow. This rainfall and the water from the melting snow feeds many rivers and creeks.

After leaving the eastern slopes of the mountains the Snowy River runs across the tablelands of the Monaro, through eastern Victoria, and thence across the lush coastal plains of Orbost to the sea. The flow of this water into the sea is a waste which Australia cannot afford.

The first of many suggestions for the use of the Snowy River was made over 70 years ago. Since then districts and States have vied with each other in supporting the plan which would best serve their local interests. Gradually, from the discussion of these conflicting interests and sectional claims it became increasingly obvious that to get the full benefit of the water, the Snowy must be turned inland.

The final plan was not evolved until 1949.

On the steeper western slopes of the Snowy Mountains the creeks and small rivers collect and run into the Murray and the Murrumbidgee Rivers. After winding and twisting through the mountain valleys, the two rivers flow to the west and run for hundreds of miles before reaching the sea in South Australia. The plains through which they pass are dry but the soil is good and along the course of both rivers prosperous


SNOWY MOUNTAINS
HYDRO-ELECTRIC SCHEME
TUMUT
CANBERRA
SCALE
MILES
BLOWERING STORAGE
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TANTANGARA STORAGE
LOBB'S HOLE STORAGE
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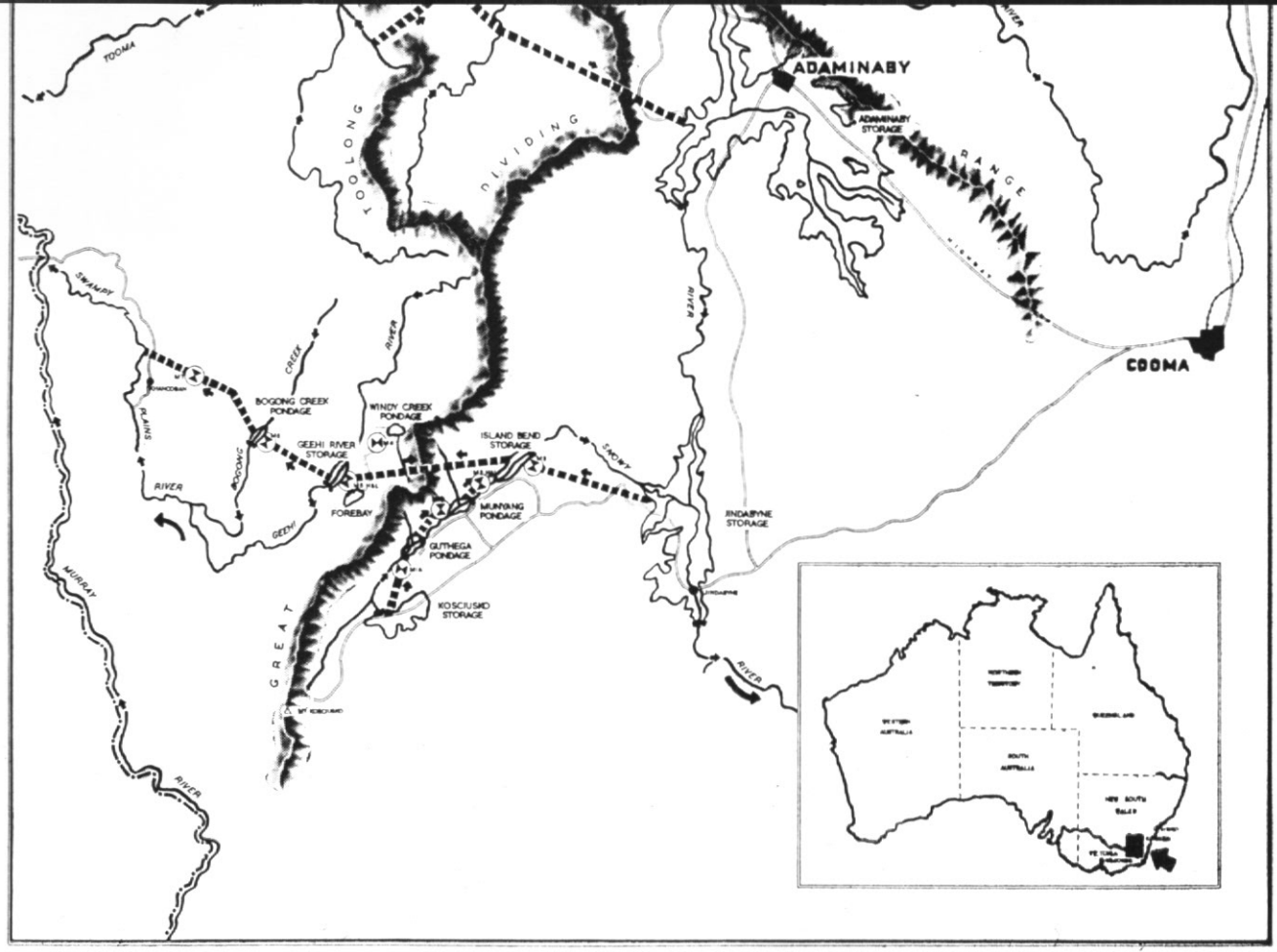
TOOMA
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DIVIDING
ADAMINABY
ADAMINABY STORAGE
RANGE
COOMA
SNOWY
RIVER
BOGONG CREEK PONDAGE
WINDY CREEK PONDAGE
GEEHI RIVER STORAGE
ISLAND BEND STORAGE
FOREBAY
MUNYANG PONDAGE
GUTHEGA PONDAGE
KOSCIUSKO STORAGE
JINDABYNE STORAGE
MURRAY
GREAT
RIVER

irrigation areas have been developed. A single example of the far-reaching effects of irrigation in Australia will suffice. Land in the Murrumbidgee Valley, carrying £90,000 worth of sheep 40 years ago, today returns as a direct result of irrigation a total of more than £10,000,000 from primary produce, and its farms now support a population in excess of 20,000, where only 150 people lived in 1913. There is, however, a limit to the amount of land which the summer flow of these two great rivers can irrigate. It has already been reached in the Murrumbidgee Valley, and it will not be long before a similar position exists in the Murray Valley.

The plan finally adopted for the use of the Snowy River is to turn its water inland to augment the flow of the Murray and Murrumbidgee. This will be done by diverting the water of the Snowy through the intervening mountains to the Murray and the water of the Snowy's tributary, the Eucumbene, to the Murrumbidgee via the Murrumbidgee's tributary, the Tumut. During the diversion the water will have to drop thousands of feet. Power stations will generate electricity from the falling water to give a power output far greater than that visualised in any earlier plan.

Since 1949 detailed investigations have, of course, resulted in modifications and extensions to the original plan. For the Snowy is not only to be turned inland. It is to be turned inland in such a way as to ensure the maximum economic harvest of water and power.

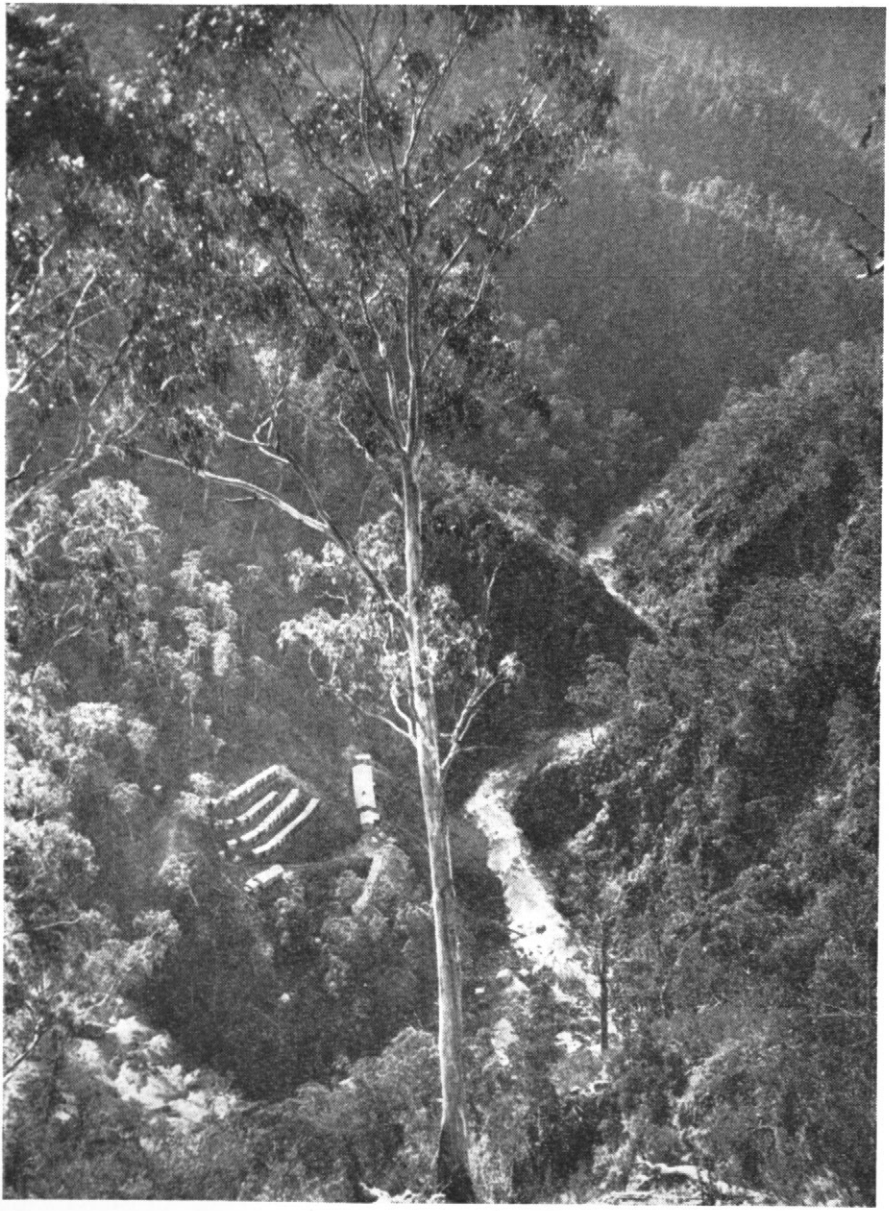
The Snowy-Murray Diversion.

After leaving Mt. Kosciusko and the Ramshead Range, the Snowy River runs through the Jindabyne Valley. Two miles downstream from the town of Jindabyne a dam will be built across the river and its water checked to form a storage equal to 3½ times the volume of Sydney Harbour. The town of Jindabyne will be submerged and the construction of a new town has already been commenced on the high ground overlooking the storage area.

From this dam, on the eastern side of the range, water will be taken through the mountains in a 30-mile tunnel. As the water flows from east to west through the tunnel it will be fed through two large underground power stations. These stations alone will have a generating capacity equal to that of all the stations operating in N.S.W. today.

The hydro-electric output of this section of the Scheme will be increased by the construction of three subsidiary projects on the Snowy River between its source and the Jindabyne Valley. One of these, the Guthega Project, is nearing completion and will be producing 60,000 kW. of power before the end of the year. An interesting feature of the Upper Snowy Development is that the final storage at Island Bend is directly above the 30-mile Jindabyne-Murray tunnel. A vertical shaft of approximately 1000 feet in depth will therefore enable the water to be dropped into the main tunnel, passing through another large underground power station as it falls.

On the western side of the mountains near the source of the Murray River, the pattern will be repeated, the fast-falling rivers being harnessed to spin the turbines of a further three power stations.



An SMA camp in the Upper Tumut Valley.

The Eucumbene-Tumut Diversion.

The Tumut River is a tributary of the Murrumbidgee. It rises in the Dividing Range at the foot of Mt. Jagungal and runs northwards to join the Murrumbidgee near Gundagai. In its upper reaches the Tumut River is roughly parallel with the Eucumbene but separated from it by the Dividing Range. The diversion of the Eucumbene inland will be accomplished by driving a tunnel through these mountains.

A large dam is at present being constructed across the Eucumbene River, in the Adaminaby Valley. This will be one of the largest earth and rock fill dams in the world and is being constructed for the Authority by the Public Works Department of N.S.W. The diversion tunnel is already completed and other preparatory work is well under way. From this storage, which will eventually become one of the largest in Australia, water will flow through a 14-mile tunnel to the Tumut River. A high concrete dam built across the steep gorges of the Tumut River will control the additional water. The first water from the Eucumbene will reach the Tumut Pond storage by 1959. It will then pass through a large underground power station known as T1 and on to the irrigation areas of the Murrumbidgee Valley. The T1 Power Station is the first of five to be built on the Tumut River between Tumut Pond and the Murrumbidgee.

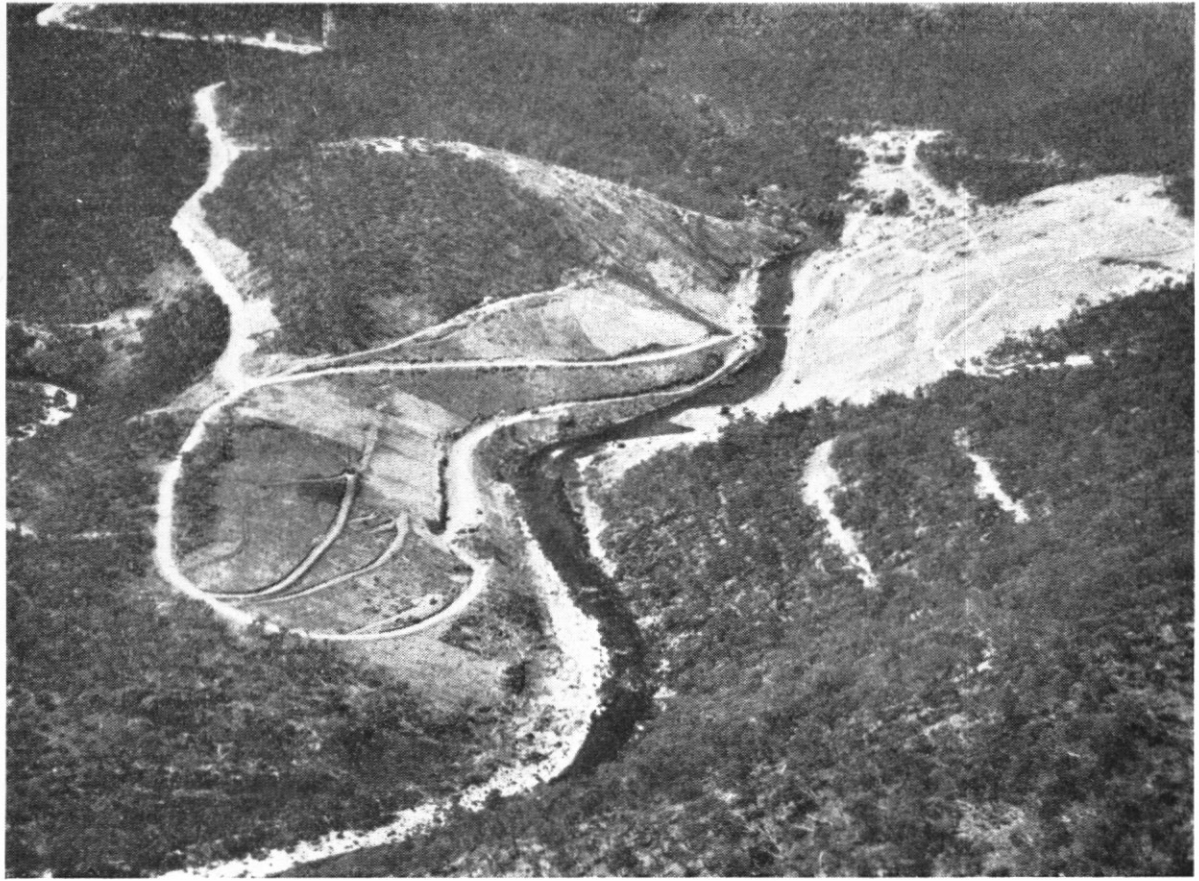
Contracts for the Eucumbene-Tumut tunnel and the Tumut Pond Dam have recently been let to a group of U.S.A. contractors, Kaiser-Walsh-Perini-Raymond. The T1 underground Power Station is to be constructed by a group of six French contractors, Compagnie Industrielle de Travaux, Entreprise Fougerolle pour Travaux Publics, Societe Generale D'Entreprises, L'Entreprise Industrielle, Societe Nationale de Travaux Publics, Etudes and Entreprises.

To increase the hydro-electric capacity of this Eucumbene-Tumut section of the Scheme two further diversions are planned. Water from the Tooma River, a tributary of the Murray, will be taken by tunnel in a north-easterly direction to the Tumut Pond storage and the Murrumbidgee will be diverted to its own tributary, the Tumut, via the Yarrangobilly River. This latter diversion will be achieved by damming the Upper Murrumbidgee at Tantangara and passing its water through two hydro-electric projects which will add 300,000 kWs. to the generating capacity of the Scheme.

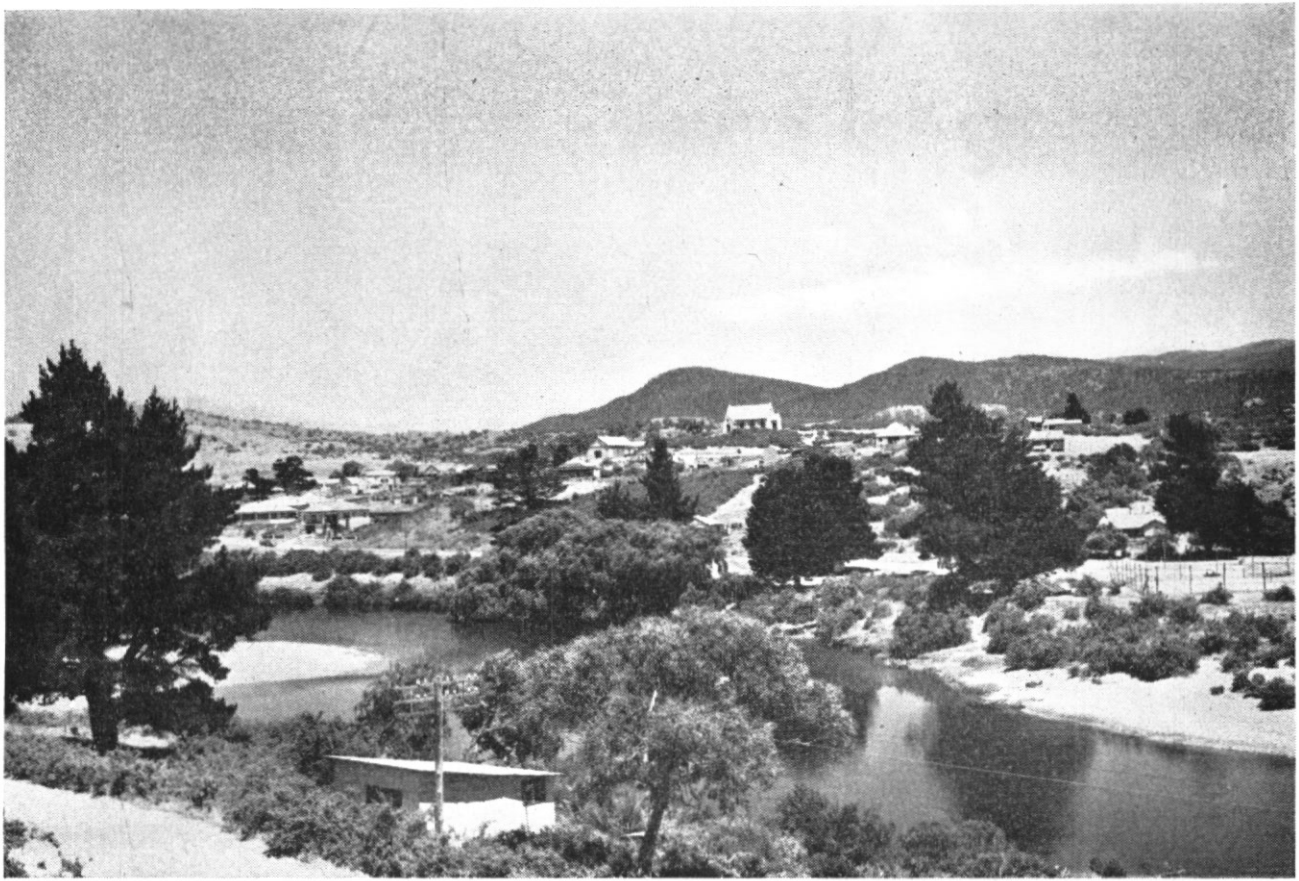
This, then, is the Snowy Mountains Scheme, one of the largest works of its kind in the world and certainly the largest engineering project ever undertaken in Australia.

It involves the construction of 7 major dams and at least 10 smaller dams, 85 miles of tunnel, 17 power stations, over 400 miles of aqueducts and numerous shafts, ranging up to 1100 ft. in depth.

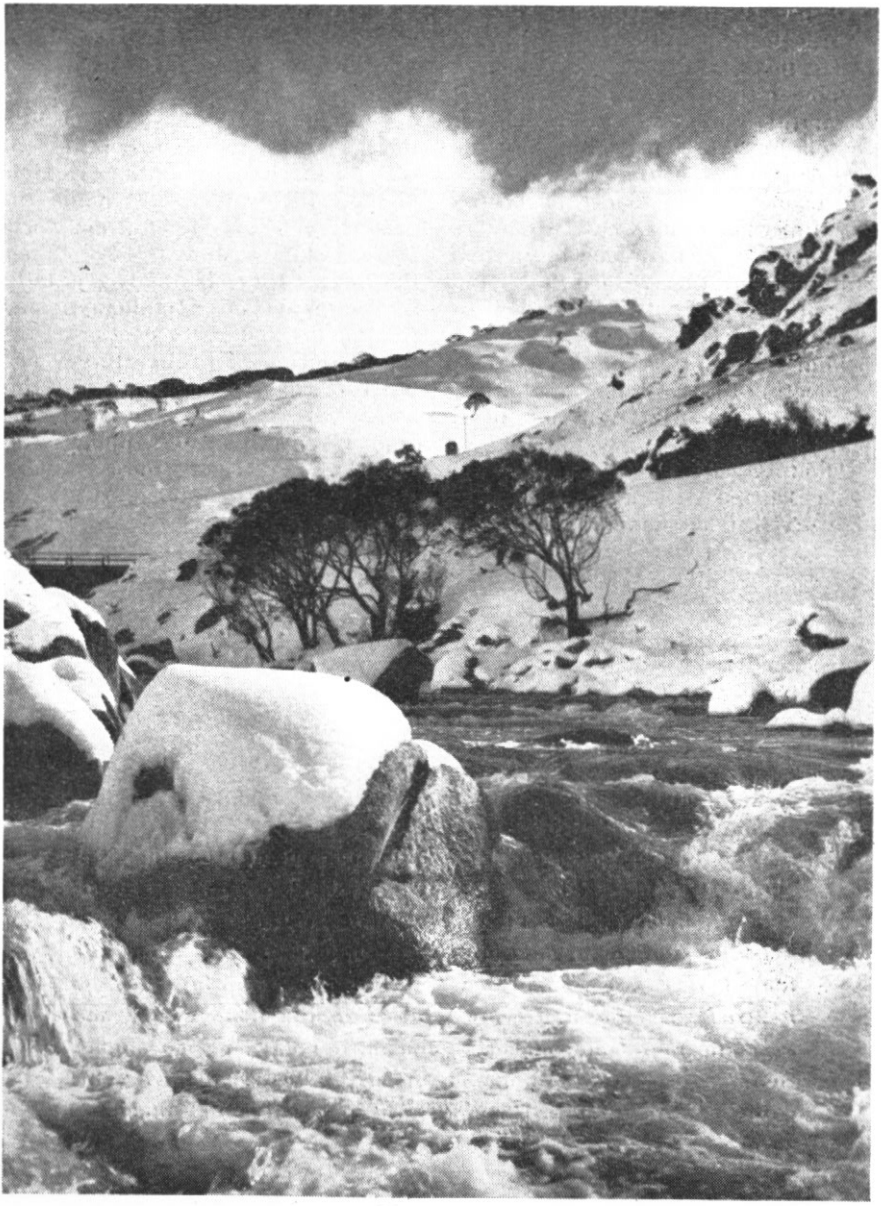
The installed capacity of the finished Scheme will exceed three million kilowatts, much of this power being generated from power stations located in deep mountain valleys or underground. In an emergency these stations will be capable of meeting the electricity needs of a large section of eastern Australia, but the Scheme is designed basically to produce power during periods of peak loading. It



Aerial view of the site of the Adaminaby Dam.



The Snowy River at Jindabyne



The Snowy River at Guthega.

will be readily appreciated that a hydro-electric power station is much more flexible in the development of power than a thermal station. It is for this reason and to provide for the circumstances prevailing in eastern Australia that the greatest overall economy can be achieved by allotting peak loadings to hydro stations and the base load to thermal stations. In this regard it should be pointed out that the cost of producing power from the Snowy Scheme will be less than the cost of meeting the same power requirements by building additional thermal stations.

The total cost of the Snowy Mountains Scheme will be borne by the sale of electricity and liquidated in a few decades. The cost of diversion and regulation of nearly two million acre feet of water each year will not therefore be charged against the States of N.S.W. or Victoria, which will distribute the water throughout the irrigation areas. This water will enable the production of over £25 million worth of foodstuffs each year. For, when the Snowy River is finally regulated by the great dams of Jindabyne and Adaminaby and water pours through the huge tunnels to the Murray and Murrumbidgee, virtually a third river will flow to the irrigation farmers on the western plains. This is the Snowy River's most valuable contribution to the Australian economy.

The feeling between the regimental officer and the staff officer is as old as the history of fighting. I have been a regimental officer in two minor wars and realized what a poor hand the staff made of things and what a safe, luxurious life they led; I was a staff officer in the first world war and realized that the staff were worked to the bone to try and keep the regimental officer on the rails; I have been a higher commander in one minor and one major war and have sympathized with the views of both staff and regimental officer.

—*Field Marshal Lord Wavell.*

BRIDGING THE GAP

Lieutenant P. J. Coakley, Military Police Corps, Irish Army.

IT is not uncommon to find in references to modern armies and modern warfare the terms "military machine" and "machine age." The impression is conveyed that the modern army is something mechanical and the modern soldier no longer a human being. In actual fact this is far from being the case. The many machines now used in warfare are all the time subject to their master, the soldier. The soldier himself, no matter how well trained, no matter how disciplined, is still at heart a man; still very much a prey to the instincts, emotions and impulses of the ordinary human being.

During peacetime training the soldier does very nearly become the automaton. His life is so well regulated, so highly regimented that, in so far as his reactions to the events of everyday army life are concerned, he is practically a machine. The longer the training, the more rigid the discipline, the more machine-like he becomes. Then one day comes a change. His period of training, his manoeuvres and mock battles are over. He faces the real thing for the first time.

All at once he is up against a whole series of entirely new experiences. Never before was he asked to fire on, and, if possible, *kill* another human being. And, unkindest cut of all, never before was the target for his fire able and even anxious to fire at and *kill* him. During all his exercises and manoeuvres things were never quite like this. Why *wasn't he told* there would be such a difference? He is like a new-born baby experiencing the outer world for the first time and he feels just as helpless.

You may say that there is not such a great gap between modern military training for battle and battle itself—that training is now so realistic that to go into battle is the next logical step and one for which the soldier is very fully prepared. In support of the contention that such a gap exists despite the advances in training methods, we turn to no less an authority than Colonel S. L. A. Marshall, the official U.S. historian of the European Theatre of Operations during the course of World War II. Colonel Marshall made a comprehensive study of the reactions of the American doughboy to his first engagement with the enemy and outlined his findings in his book "Men Against Fire." He has this to say: "It is not within the ingenuity of man ever to close fully the gap between training and combat." Clausewitz recognized the existence of such a gap and realized how im-

—From "Irish Defence Journal."

portant it was to narrow, if not to close it. His words are: "It is of first importance that the soldier, high or low, should not have to encounter in war things which, seen for the first time, set him in terror or perplexity."

Is it not intended that training should provide for every eventuality in combat, you might ask. Does it not tell the soldier what to do, and practise him in the actions required when he comes under fire? Yes, he is taught to dive into cover, to move to a position of observation and return the fire at the earliest opportunity. But now a new element has entered into the situation —an element which in training can never be properly simulated. This element is *fear*.

Somewhere out in front is an enemy eager to kill him. Fear strikes the soldier's breast and this applies to all soldiers except those of particularly low mentality who seem to be too "dumb" to be able to visualize where danger lies. Fear causes changes in mind and body which vary in effect from individual to individual. For some it may result in virtual paralysis. The term "petrified with fear" can be real enough in such cases. No bodily movement is possible. Even the mind itself virtually ceases to function. Of this Colonel Marshall says: "When the infantryman's mind is gripped by fear his body is captured by inertia, which is fear's Siamese twin." This applies equally to all human beings and not to the "foot-slogger" only.

Apart from fear, soldiers coming under fire for the first time have other new experiences to face. First of all, the man who up to this had been part of a team, with his teammates in sight or nearby, now suddenly finds himself alone when all go to earth. His companions, like himself, have melted into the ground. There is no one to see if he decides to lie "doggo" and let events take their course. This line of action seems to hold out promise of less danger to himself, and after all, if his companions are gone, only himself matters. The influence of human respect is, to a great extent, lost.

For those whose disability lies in a lack of initiative the incentive to action which imitation provides is similarly lost. There simply isn't anyone to imitate. Everything favours inaction and it is no wonder then that inaction is so often the order of the day. Is it any wonder that statistics show that even in active and successful units in the last war the percentage of the men who had even *used* their weapons in any engagement rarely, if ever, exceeded 25. One out of every four only had actually fired their weapons.

Some soldiers, it is true, will endeavour to carry out those actions which have become almost automatic with long training. They look for targets for their fire, but no targets appear. Again we quote from "Men Against Fire": "The common scene in open warfare is a landscape. The total absence of moving things is the surest sign that one has reached the line of danger." Men are naturally perplexed because they have always been taught to fire at targets and not at landscapes.

One or two may fire in the general direction of the enemy fire, but only in a half-hearted and shamefaced manner as if they were expecting

at any moment to be rebuked for wasting ammunition. What has now become of the fire-power of the unit? Some revision of the preconceived ideas on this subject seems to be called for. Alternatively some alterations in methods of training or selection of personnel are indicated.

What has been described above is, according to Colonel Marshall, the normal reaction of troops first coming under fire. "The weaker ones will be shaken out of the company," he says, "by this first numbing experience, adding fresh numbers to the statistics which show that more battle fatigue cases come from initial engagements than from all subsequent experiences in the line." The cause is mainly that men go into battle not knowing what battle is like. They face their first experience of combat without many of the aids to morale which *could* be provided. The gap between the raw replacement and the battle-wise veteran is too great. Too many of the former fail to survive long enough to warrant being termed the latter.

How to combat this fear, how to reduce the shock of this first contact with the enemy is the problem. Dollard, in his book "Fear in Battle," writes: "If a man knows what he is fighting for and has an intimate, personal need to win, his zeal in battle will tend to triumph over his fear . . . . the soldier must have the war aims within his skin, operating as personal motives to fight." Defence of homeland, the likeliest war-aim for our troops if ever they are called into battle, is sufficiently personal and intimate to meet requirements in this respect.

Pride in one's unit, which has been well engendered during training helps to overcome fear and to create an urge not to let the unit down in any circumstances. This urge will be all the greater if a man is never entirely isolated and alone during combat. The building up of small teams of, say, three men within sections, who are in all circumstances to operate as a team, would help to overcome this isolation difficulty. It has been found that men who failed as infantrymen could not, in fact, be got to return the fire of the enemy in any circumstances, afterwards operated quite successfully as members of teams, whether as machine-gunners, mortar-men or artillerymen.

Du Picq, in "Battle Studies," referring to the problem of isolation and its effects on courage, says: "The more men think themselves isolated, the more need they have of high morale." In modern warfare when men no longer fight shoulder to shoulder, when movement is more the order of the day, and when even in positional warfare the slit trench and fox-hole have replaced the continuous trench of World War I, the chances of men becoming isolated are all the greater. The need to strengthen the intangible ties that bind man to man is all the more pressing.

It is with this end in view that the suggestion already referred to is made that small teams of riflemen, strengthened possibly by the inclusion of an L.M.G., be formed *within* sections. These teams of, say, three men should be trained together, operate together and be imbued with the spirit of "each for all and all for each." This would not mean that the section and platoon organization be done away with. But it would mean that, no matter what

the exigencies of the situation, the smaller teams would continue to operate as such, that each man should at all times endeavour to keep in contact with his team-mates, uniting his fire-power with theirs. The smaller team is suggested in view of the difficulty of ensuring that the ten-man section maintain the very close contact that is envisaged above.

And what of the result? Again we quote Colonel Marshall:

"Whenever one surveys the forces of the battlefield, it is to see that fear is general among men, but to observe further that men commonly are loath that their fear be expressed in specific acts which their comrades will recognize as cowardice." The smaller the unit the closer the co-operation, the less likelihood there is of acts of cowardice passing unnoticed. If it should so happen that temporary isolation of a soldier occurs then the subsequent "post-mortem" on the section will soon disclose the fears and failures of each and every member of the team. In a larger unit an act of cowardice stands a much better chance of passing unnoticed.

Action stands very high among the list of means to combat fear in the soldier. In any engagement with the enemy, action, in the shape of using the weapon with which he is armed, is of vital importance, both to the man himself in his fight with his fears and, naturally, to the unit in its tussle with the enemy. Colonel Marshall has this to say: "The man who has the fire habit is always looking for forward ground from which to give his fire increased effectiveness." Here you have a combination of three things which make for increased effectiveness in a soldier. Firstly, you have action which combats reflection and the wild imaginings induced by fear and which in turn only add to that fear. Then you have fire which, if it does not affect the enemy physically, will certainly affect his morale. Lastly, you have movement forward, which is the aim of combat. "Fire is the key to mobility" it is said, and one soldier with the fire-habit is worth a dozen without.

This fire-habit is of such importance and the numbers possessing it so ridiculously low that special study into ways and means of promoting the habit is called for. It has been found that the absence or otherwise of companionship has a profound effect on a soldier's propensity to fire his weapon. Again we quote Colonel Marshall: "The warmth which derives from human companionship is as essential to his (the soldier's) employment of the arms with which he fights as the finger with which he pulls the trigger."

Who would think of sending a man into battle without his trigger finger? But this is what has been done as a matter of course so often in the past. Troops are frequently called on to fight without the boost to morale which companionship provides. The replacement so often fights side by side with total strangers just when he is most in need of high morale to meet the shocks of his first contact with the enemy. It was Colonel Marshall's experience that the "replacement who goes into battle without getting to know his new associates usually breaks under the early strain of battle." It is obvious that to have companionship you must first of all have friendship.

Have we not here another argument in favour of the "small team" already mentioned? If it should not be feasible to replace the entire company, platoon or even section that has been badly mauled in combat, surely it could be possible to keep the three-men teams intact and replace them as such. In this way we could make certain that each man has two "buddies" closest to him at all times. "The fighting man is sustained by his fellows primarily and by his weapons secondarily." Colonel Marshall surely rates companionship highly as a builder of morale!

If perchance a man should find himself temporarily isolated during the course of an engagement his training should tell him to use every means in his power to seek others and join his force to theirs. "United action is the basis of success," says Colonel Marshall; "united action as between the soldier and his fellows in the unit and united action between units, both small and big, that are in contact with each other in the line of battle." It may be hard to believe, but it has certainly been proved during the last war that leaders, and soldiers too, do not use the voice as much as they should to secure control and maintain contact during battle. In units gone to ground, men have been known to consider themselves isolated when only a few yards of broken ground separated them from their companions. Within sections and certainly within the "small teams" men should be taught to maintain contact by word of mouth; to shout if necessary if by so doing they help to dispel that sense of isolation so baneful in its effect on men's minds. "The battlefield . . . is the lonesomest place that men may share together," says Colonel Marshall.

Men should not be taught to underrate the enemy; neither should they be allowed to overrate him. It is a consoling thought for the soldier, feeling fear for the first time, to realize that the enemy is just as scared as he is, if not more so. It is also good to know that his (the enemy's) fear will definitely increase as does the volume and effectiveness of the fire directed at him. If this is impressed on the soldier during training it may result in more making proper use of their weapons.

Good leadership is of such great importance in the fight against fear in battle that it deserves very special consideration. Dollard says: "It is a military axiom to say that decisive and competent leadership helps to control fear." Decisive and competent leadership will help to eliminate the doubt and perplexity which beset the minds of men on first contact with the enemy. To quote only one example, if the Section Commander issues a very definite and decisive fire order to his men in a loud clear voice most of the section will automatically obey. They will set their sights and seek the target as indicated. Actions such as these will keep them occupied and may help to shut out the wild imaginings which are fear's great allies. Action is what is required at this critical moment, and decisive leadership quickly directs the action to be taken.

But good leadership can do much more than this. It can influence and direct even when the leader is far from the scene of conflict. Norman Copeland, in his book "Psychology and the Soldier," describes leadership as "the art of dealing with

human nature." To be more explicit, he continues, "it is the art of influencing a body of people by persuasion or example to follow a line of action." It is, of course, impossible for the leader to be always with his men in a physical sense. He may, however—and it is here that real leadership shows—continue to influence the actions of his men when far away from them. For a leader thus to influence the actions of his men he must be possessed of personality of a high order. In addition, his men must know him long enough to come under the spell of that personality. Far too often the soldier meets his leader, just as he meets his fellow soldiers, for the first time only a few days, nay perhaps only a few hours, before he faces the enemy, also for the first time. Once again we fail to fortify him as we should and could for this, perhaps his greatest, ordeal.

"A personality that is not built upon character will never lead. And much less will it ever inspire." For this quotation we are once again indebted to Norman Copeland. One of the first essentials in the future leader is character. The soldier must get time and the opportunity to get to know his leader as a man of character—a man from whom he can always expect a square deal. He must see in him the ideal to be aimed at. Finally, he *must come to regard him as someone whose opinion of himself matters not a little.* All this takes time and cannot come about suddenly on the eve of battle.

When, at a later date, the soldier goes into battle under this same leader he will have this leader before him in spirit all the while. All his actions will be conditioned and mainly determined by the thought of this leader passing judgment on them. Some may scoff at the idea of anyone being so easily influenced by another person. But not even the scoffers themselves are immune to the influence exercised by the leader who is possessed of strong personality.

"Weapons change," says Henderson in "The Science of War," "but human nature—which is the paramount consideration of all questions of either tactics or strategy — remains unaltered."

Man was originally a gregarious animal and will remain so even to the end of time. He seeks the company of others at all times and particularly in his moments of greatest stress. We should make sure we do not deprive him of that company. As a gregarious animal he requires a leader and a *leader* he must have. Our soldier going into battle must be possessed of good weapons with the necessary skill to use them to best advantage. He must be sturdy and well-trained from the point of view of bodily fitness. He must have a good motive for endeavouring to secure the defeat of the enemy—a motive which is as personal as it is possible for such a motive to be. But, most important of all, *he must have comrades near him in the field of battle and not strangers.* He must have a leader whom he knows *personally and respects.* It is only thus that we will, at least, have made an attempt to "bridge the gap."