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TECHNICAL  
MEMORANDUM  
ORO-T-266

FC

## Problems of Field Tactics

# in Defense against Area Weapons

by

S. L. A. Marshall

Received: 5 March 1954

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Project ATTACK  
Technical Memorandum ORO-T-266  
Received: 5 March 1954

**Problems of Field Tactics  
in Defense against Area Weapons**

by  
S. L. A. Marshall



**OPERATIONS RESEARCH OFFICE**  
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## **THIS IS A WORKING PAPER**

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**FOREWORD**

This is a working paper. The original intent was not to attempt either to define or exhaust the subject. The problems of field defense against atomic attack have been little regarded and are in any case much too vast to warrant the hope that any one man or group of men may explore to their practical and theoretical limits. About the best that any analyst may do is to bring a few basic ideas forward in the hope that they will encourage specialists in many fields to explore more deeply, either supporting the ideas with more competent proof or proving their falsity. That is all that has been attempted in this paper. The theory of a possible defense which is contained herein was brought forward simply because it seemed the best device by which to highlight the fallacies in other current theories about how future field defense should be organized to meet attack by area weapons. To make a purely negative approach to the discussion of the problem would in effect say that it is beyond solution.

S. L. A. Marshall

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CONTENTS

	Page
SYNOPSIS	1
DEPLOYMENT	7
IMPACT OF NEW WEAPONS ON PRESENT DEPLOYMENT—DEFENSE IN LINE OR IN COLUMN—FOR FURTHER DISCUSSION	
THE BIGGER BANG	14
THE QUESTION OF REVISING STANDARD DOCTRINE—POSSIBLE AREAS OF STUDY	
EXTENSION OR CONTRACTION	18
EMOTIONAL IMPACT OF TACTICAL BOMB ON TROOPS—PHYSICAL DAMAGE CAUSED BY TACTICAL BOMB	
ON IMPACT	26
EFFECTS OF EARTHWORKS IN MINIMIZING A-BOMB DAMAGE—TIME FACTOR— TYPICAL DEFENSIVE PROBLEM—TYPICAL ATTACK USING TACTICAL BOMBS— SUMMATION	
PROBLEMS OF THE DEFENSE	36
EXTENSION TO CONTRACTION—MOBILITY OBSTACLES—EFFECT ON COMMUNICATIONS—RE-ASSEMBLY	
TRENCH SYSTEMS	45
UN FORCES' DEFENSIVE SYSTEM IN KOREA—ENEMY BELT OF DEFENSIVE FORTIFICATIONS	
DEVELOPING THE TARGET	54
AIR RECONNAISSANCE—LAND RECONNAISSANCE ARMS AND TECHNIQUES— DIRECT FIRE RECONNAISSANCE—"SOFTENING UP" THROUGH SATURATION BOMBING	
DISENGAGEMENT	71
THE NARROW FRONT	73
IN DEPTH	78

# CONFIDENTIAL

	Page
TACTICAL CONSIDERATIONS	83
GENERAL DEFENSE TACTICS—ALL-AROUND DEFENSE	
SOME FACTORS IN CONTROL	90
VALUE AND USE OF THE LIGHT PLANE	
SCREENING	94
FORWARD SCREENING—SECOND SCREEN—BLOCKING PURPOSE	
OVER-ALL CONSIDERATIONS	97
CHARACTERISTICS OF LINEAR DEPLOYMENT AT START OF WAR—	
CHARACTERISTICS OF DEPTH DEPLOYMENT	
PROBLEMS OF THE BATTLEFIELD	101
DEFENDING BASE PORTS—COUNTERATTACKING CITIES	
THE AIRBORNE THREAT	106
ATOMIC COUNTERATTACK BY DEFENDER—DEFENSIVE INTELLIGENCE—	
VULNERABLE PERIOD FOR COUNTERATTACK—OBJECTIVES OF AIRBORNE	
STRIKE	
SOME MORAL FACTORS	111
OFFENSIVE SPIRIT DURING PROTRACTED DEFENSE—MOBILITY WITHIN	
THE DEFENSE	
TACTICAL ORGANIZATION	117
FUTURE FORM OF ORGANIZATION—IMPACT OF AREA WEAPONS ON FIELD	
OPERATIONS—HISTORICAL DEVELOPMENT OF THE FIELD ARMY—PRESENT	
USE OF THE FIELD DIVISION—IN CONCLUSION	
FIGURES	
1. VARIATIONS IN LINEAR DEFENSE	9
2. REGIMENT IN LINE	10
3. REGIMENT IN COLUMN	11
4. ATOMIC PENETRATION	33
5. MANEUVER AND COUNTERMANEUVER	35
6. ATOMIC STRIKE ON DEFENSIVE BLOCK	39
7. LOCAL ENVELOPMENT	39
8. IMPACT ON COMMUNICATIONS	41
9. RE-ASSEMBLY AND COUNTERATTACK	43
10. AIR BURST. ESTIMATED DISTANCES WITHIN WHICH DAMAGE TO GROUND FORCE	
TROOPS AND MATERIEL ARE PRODUCED BY A 20-KT ATOMIC MISSILE EXPLODED	
2000 FT IN THE AIR ON A CLEAR DAY	69
11. DISENGAGEMENT PRIOR TO ATTACK	72
12. THE DEFENSIVE SALIENT	75
13. PENETRATION AND CONTAINMENT	85
14. USE OF THE MASKED FRONT	88
15. SCREEN BLOCK AT RIVER CROSSING	95
16. PHASED SCREENING	96

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## SYNOPSIS

### *Deployment*

Flankless line vs column (three battalions only).

### *The Bigger Bang*

Panic due to sudden cut-off.

### *Extension or Contraction*

If troops are in maximum extension, how can they fill a gap? After being hit troops tend to regroup on MSR and reserves.

### *On Impact*

A 1500-yd A-bomb tactical radius gives sufficient gap for breakthrough; advantage of the offense; futility of the flankless front.

### *Problems of Defense*

Dispersion not an answer; mobile forces still require secure bases; discussion of acropolis defense; vital importance of communications; need for regrouping.

### *Trench Systems*

Logistic load reduces mobility; Eighth Army trench system in Korea poor; OP's over-munitioned; CCF trench system better; neither suitable for atomic war—inconsistent with mobility and dispersion.

### *Developing the Target*

Importance of target intelligence; advancing columns less vulnerable than retrograde ones; air defense of field army shows its location; past failure of cavalry screen; use of heavy and light, balanced screening forces; modern direct fire reconnaissance close to main attack; use of conventional weapons as expendables in target development; the side weaker in conventional weapons is more vulnerable to atomic attack; saturation bombardment of Kwajalein produced only 4 percent KIA.

### *Disengagement*

Need for reconnaissance force which disengages at point of atomic attack prior to strike, strengthening flank attacks.

### *The Narrow Front*

Numerically inferior army has no mobility on a wide front; "defense by beachhead" deployment—location and use of reserves; defense of a river line.

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## *In Depth*

True defense in depth; reserve, greater than front line force, just out of artillery range and not concentrated; use of dummy and alternate positions; importance of terrain.

## *Tactical Considerations*

Fighting power must face forward; position of strategic reserves; evacuation of A-bomb casualties; reconnaissance of A-bombed target area; use of dummy positions; need for 3-mile map grid system.

## *Some Factors in Control*

Value of light reconnaissance plane; need to decentralize communications net and avoid straight lines; subordinate units taking over destroyed command; need for luminous panels and abbreviated code for ground to air communications.

## *Screening*

Retardation; series of screening actions to shape up enemy for atomic attack.

## *Over-all Considerations*

Vulnerability of defenders troops concentrated forward at outbreak of war; barrier plans impractical and not necessary for "beachhead defense"; fortification of column deployment; effect of refugees and civilian nationals.

## *Problems of the Battlefield*

Defense of communication zone; enemy goal is line of base ports; importance of road net; possible enemy use of civilians and cities as shields; need for—and difficulties of—evacuating cities.

## *The Airborne Threat*

USSR would use A-bomb on air head, but intelligence lag and value of target would make such use difficult; profitable airborne targets; threat of air-dropped guerrillas.

## *Some Moral Factors*

Offensive vs defense, and their proper combination; US soldiers endured defensive action over 2.5 years in Korea; column deployment implies mobile defense; unlimited offensive can fail.

## *Tactical Organization*

Need for balance; role of artillery; atomic artillery almost certain to be used in next war; if evacuation of casualties is interdicted, 20 percent casualties will paralyze a tactical unit; positions of 10 main A-bomb targets in one conventional division area—along front and MSR—can be inferred from map study; rationale of present division structure; protracted defense increases vulnerability to vertical attack; despite wishful thinking about cross-country mobility modern armies are road-bound; existence of MLR implies concentration of force vulnerable to atomic attack; past increase in weight of artillery; in future wars there will be no "locked fronts," hence no conventional use of artillery; past development of army organizations based on principles of operational unity and economy of training effort; history of past 150 years; development of artillery has increased depth of front and logistic load; reduced requirement for artillery in future wars;

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impossibility of "squeezed front" offering safety from atomic attack through propinquity; communications breakdown would tie down present division; Korean experience; study of past campaigns-or inertia-keeps all armies unprepared for new war; suggested lines of inquiry on division organization; armies must protect their rear.

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**PROBLEMS OF FIELD TACTICS  
IN DEFENSE AGAINST AREA WEAPONS**

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## DEPLOYMENT

To determine what form tactical organization should take to minimize the destructive and disunifying effects of new major weapons, such as the tactical atomic bomb, it is first necessary to examine what will happen to men and units when and after these weapons are used against them.

Not until this is done can the problem be seen in its full dimension and not until we so see it can we be certain that what we are planning for tomorrow's war will be both practical and the best thing possible. To fight tomorrow's wars with yesterday's weapons is a bad enough beginning but to fight today's weapons with yesterday's tactics and ready acceptance of the imperfect knowledge on which they were based is an even more direct path to a dismal ending.

## IMPACT OF NEW WEAPONS ON PRESENT DEPLOYMENT

Any such examination, if its concluding propositions are to serve as limiting posts for the reorganizing of our tactical concepts and procedures, must start with an objective study of the impact of the new weapon upon the defensive array rather than with mathematical estimates of what it may contribute to offensive power, under varying circumstances. In short, it must be assumed from the beginning that the enemy has the same weapon and will be capable of exploiting its use against one's own forces in the field. All operations in war begin by making certain of the security of the defensive base which implies that its dispositions and doctrines postulate a form in operations which will ensure a maximum economy in the defense under the new conditions. This is the fundamental consideration in all military planning, and not until after its requirements are met can there be valid calculation of the potential of any new weapon or group of weapons when employed offensively to disarrange and break down the power of the enemy. For unless defensive calculations are fundamentally sound, either they will be corrected at excessive cost under the pressures of war, or the offensive, in its true sense, will never materialize.

Every major weapon has definite properties (a) as a killing agent, (b) as a destructive force, and (c) as a disunifying and demoralizing agent. As will be shown later, how it impacts to take life or disintegrates property is not necessarily the measure of its power, as a demoralizer varies greatly according to the nature and composition of the body of humanity which is its target. In World War II Pacific operations, as an example, we were able to effect the surrender of Japanese troops which had gone underground simply by threatening to use gas upon them after the active use of flamethrowers, satchel charges,

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and grenades had left them unmoved. The will succumbed to that for which the mind had never been conditioned. Simply by extending this same principle, we should be able to recognize that under the impact of any weapon which works paralyzing material damage over a wide area, troops which depend upon fairly primitive means for the greater part of their communications should react with relatively less disunity and mass inertia than tactical bodies which have come almost wholly to depend upon modern technical facilities.

Tactical bodies survive, and either hold their ground or go forward, because they have a carefully planned order depending on a man-to-man relationship which is supposed to react regeneratively when the group becomes threatened and begins to take losses under a common danger. The loss rate within the body proper is only one of the degenerating factors and unless it is so extremely high as to give all survivors a condition of intense moral shock is not likely to cause more than a temporary inertia. The doing of work together, the reconstituting of the integral tactical parts, and the appearance of even a slight success will largely relieve the strain from that source. But less easily withstood is the consequence of any severing of the ties which join the group to all larger, tactical bodies, to flankward and rear. The sense of isolation, of hearing, seeing, and feeling nothing from any friendly quarter, is the worst thing that can befall a tactical body; even a force surrounded, but in radio contact with friends can endure more strongly than a force which thinks itself lost or forgotten, though the immediate threat to its position is containable. In Normandy, one major command, being out of all contact for more than one day, had about concluded that the great battle was lost and that its own elements were among the few survivors still capable of fighting when at last the silence was broken. It is no different with a squad or company. It would therefore seem reasonable and obvious that in the calculating of how new major weapons will affect the deployments and other procedures of infantry forces and the other arms and services which support, sustain, and succor them, primary attention should be directed to the over-all disunifying effect of the agent rather than to its potential as a taker of life or a destroyer of property.

When that is done, a whole new range of problems will be brought into view and it may well be that certain of the ideas which have been accepted tentatively as doctrine will require searching re-examination. It is not inconceivable that once we begin to think a little more realistically about such major tactical considerations as evacuation and re-assembly, we will see that some of the conclusions we have reached concerning deployments and the place of the new weapons within the general system are hardly tenable.

For the time being, that is cited only as an interesting possibility rather than as a certainty. The only purpose of this memo is to discuss in general terms what the infantry-artillery-armor combination may find itself up against when its problem is to retain tactical integrity and cooperation under attack by atomic weapons.

## DEFENSE IN LINE OR IN COLUMN

Broadly, there are only two ways in which an army or any part thereof can present itself for battle, no matter whether its immediate purpose is to

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attack or defend. Either it can stand in line or it can be organized in column. There are numerous variations of both ideas which do not, however, alter the main proposition. The line forbids territory to the enemy over a wide front; if it is breached, the hope is that the enemy, not reaching deep enough to fix upon a vital object, will either be taken by counter envelopment or pay the attritionary cost for holding a defensive salient. Defense by column means that territory is sacrificed to the enemy for the sake of keeping the defensive body solid, mutual support optimum, and the line to the rear beyond violation. The enemy may move almost at will around the flank of the forward element. But to do decisive hurt, he must still conclusively breach a reversed line, and in the attempt to do so, he must expose his own flank. This manner of deployment in the attack and on defense is by no means outdated. The 1st Marine Division was organized in column during the battle of the Chosin Reservoir. For all practical purposes, the 25th Infantry Division was arrayed in column when first attacked by the CCF north of Ipsok, North Korea. Both of these fights were classic examples of defense in real depth, and both were eminently successful against an enemy maneuvering in vastly superior numbers.

Linear Defense

Some of the variations in linear defense can be illustrated by the diagramming of a few patterns which are intended to be geometric rather than photostatic:

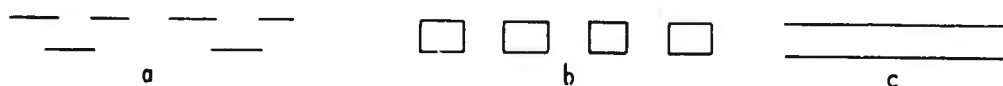


Fig. 1—Variations in Linear Defense

The middle figure is supposed to represent the so-called hedgehog or acropolis defense. Despite its nomenclature, and the illusion that it embodies a new principle in war, it is essentially just a variation in the form of alignment. Fundamentally, it is little different than the rigid flankless front of World War I (C) or the defense in depth using a parallel line of operationally semi-independent perimeters (A) as we did in Korea.

In all three of these deployments, main strength is organized forward, though under the acropolis system it is quite unevenly distributed over the line to be defended. Still, its main object, differing not at all from other linear systems, is to form a flankless front either along a national frontier or wherever geographical features provide an advantageous obstacle. In brief, defense by hedgehog would still deploy men forward to a line arbitrarily chosen because of geographical, and perhaps political considerations, rather than deploying them outward to protect absolutely the vital lines of communication.

For the purposes of this paper, the latter can be rather simply defined: they are the main roads and railways connecting a field army with its forward supply area, the base ports through which the greater part of its supply and reinforcement arrive, and the industrial and manpower resources of its homeland. So long as a defending army remains in possession of these lines, its battle is ensured a future. When the lines are cut and the field army becomes permanently separated from its supporting establishment, it is defeated, no

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matter that it is holding formidable ground forward or that it can be partially resupplied through the air. The attack upon the unity between a tactical force and the political body which sustains it remains essentially an attack upon its road-supply system. In that respect, the tactical object in Korean operations is no different than the object during battles in our own Civil War.

However, in our times we are so accustomed to thinking of defense only in linear terms that it may seem almost excessively rash to suggest that a general defense of a continental or national area may take any other form. During the present century, our experience with anything else has been either so limited in scope or so brief in duration as to make almost no impression upon tactical doctrine. While it is not infrequently suggested that we need to learn more about "area warfare" and we hear that because of the effect of the new super weapons tomorrow's tactics may trend in that direction, the term itself conveys almost nothing tangible. For these reasons alone the possible alternatives to defense in line would seem to call for examination lest we make the mistake of continuing to embrace worn-out ideas for no better reason than that they are traditional.

## New Concept of Depth Defense

Today the word depth is used in describing the conventional linear system. Despite an occasional appropriateness, as when it was applied to the German Siegfried defenses, the word is seriously misleading a great part of the time. It conveys an impression of balanced strength in works and dispositions along a vertical line when such does not in fact exist. In a word, depth is seldom very deep. Take the Korean front as an illustration. What was called "depth" over there meant only that the MLR was a series of rounded-out positions, operating in relative independence each of the other. Their reserves, which were rarely in excess of 1-to-2 proportion, stood far enough back that they were not likely to go off balance unless the front was widely breached. Behind the artillery lines lay open country, casually guarded by headquarters elements and line-of-supply troops.

The dispositions of a regiment over there could be represented by three blips, each representing a battalion, two in perimeter and one in reserve. The latter is probably not tactically deployed and is more apt to be located at an approximately equi-distant point which will enable it to advance and support either wing of the regimental front than with an eye to setting up on good defensive ground where the regiment can anchor if the forward position is aborted.



Fig. 2—Regiment in Line

In the usual conditions of the Korean fighting, the regimental defensive position would enclose the main road or track linking this part of the forward zone with the army rear. The conventional form of the enemy attack was a turning of the flanks of the forward line followed by an attempt to seize and block the road lower down, thereby to force a retirement. Because of observa-

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tion limitations, shortage of troops, the width of gaps intervening between the ridgetop perimeters, etc., the attack was frequently well launched before the defensive fires brought it in check. The width of the regimental front, by compelling the enemy to extend and march flankward, became a main factor in depriving the attack of velocity by the time that its forces were approaching the less-well-defended ground. The reserve, helped by the artillery, AA weapons, and armor serving in blocking roles, was therefore in most instances equal to the task of holding and beating back such enemy elements as had infiltrated the rear. Thus the action and reaction in the small-scale operations which were common to the Korean war.

Under Korean conditions, the system was a success, despite the lack of real depth in the defensive zone. But it is a fair question: would it have worked if prior to the enemy attack, the defensive perimeters of the MLR, with the pressing of a button, had become deprived of all communications, medical stores, transport, etc., to a depth of perhaps 1500 yards? Would it still have worked, even if personnel losses had been relatively slight?

From Korea, there are almost no data which would warrant an affirmative answer to that question. In the 1950-1951 campaign, there are a few random examples of companies and battalions which were struck hard while lacking any communication with higher commands or other elements. In no case did the defense persist for very long.

Simply for the purpose of illustrating a principle and provoking discussion, we will take the same three battalions, and dispose them in real depth, or column of perimeters, for the protection of the same MSR. Whether they stand astride the road, or are prepared to interdict it with fire from the high ground along the flank, is immaterial to the discussion. The disposition is now like this:

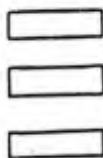


Fig. 3—Regiment in Column

The regimental front is now more violable unless by contracting the general front the army has enabled a reduction in each regimental sector. On the other hand, the vital artery of communications connecting front with rear is less violable than before. There being more open country, a shorter march is required by the enemy in moving around the open flank of the forward battalion. But he must march more than twice as far to envelop the regiment and irrupt its rear. In support distance, each battalion is as close as before to its nearest neighbor. In retreat, each must perforce fall back upon its own people and supply, thereby doubling safety after a defeat. By giving increased depth to the position, the deployment decreases the possibility that the regiment as a whole will become unhinged through instantaneous destruction of its facilities over the radius already mentioned. As set up, the regiment is no less mobile for purposes of local counterattack. Increased depth means

greater readiness and flexibility in deployment in the hour when maneuver can accomplish the maximum. The secret still consists in knowing when and where to extend the front. In other words, to deploy at the right time and the right place in the right way is the true foundation of the fight, constituting as it does the grand tactics of battle, that part of the art of war which links strategy to fighting tactics, the movement of men's legs with the movement of their arms.

#### **FOR FURTHER DISCUSSION**

All that has been said thus far is simply for the purpose of starting discussion and, if possible, whetting the imagination. The battalion or the regiment cannot, any more than the army, array itself in depth without, at least initially, or even in the crisis of the action, sacrificing some part of its fire power by the self-masking of its weapons. This is so obvious as hardly to require statement.

On the other hand, there are conditions in warfare wherein, unless both the regiment and the army are prepared to fight in depth and make certain first of all that the position to be defended will not fail for lack of reserves, they may soon find themselves without any front to defend.

One question which calls for answer is whether "operations on a wide front," by a side which sees itself destined to start with a marked numerical inferiority, does not involve two mutually exclusive considerations. A second question is whether the introduction of atomic weapons into field warfare, instead of providing an additional margin of safety to wide front operations, does not in fact greatly increase their jeopardy. Again, it is necessary to examine both of these problems from the viewpoint of the defense before evaluating the changes which the new weapons make possible in the form of the attack.

If the answer in both cases should prove to be that the bomb has put a greater premium than ever on keeping forces closely joined and reserves closer to hand, then conventional methods will no longer suffice.

Toward a further exploring of these questions, it is not necessary to assume, either that the area weapons to be used in support of field operations by the two sides are in limited supply or that the stockpiles are relatively inexhaustible.

Neither one condition nor the other is hypothesized in this study; for practical reasons in tactics, rather than because the balance of things now is a secret, and must remain so in future, the paper simply assumes that area weapons, in an undefined number, are available to both sides for direct use against field forces.

The line of reasoning is briefly as follows:

If it can be shown that area weapons, when used even in limited numbers against field forces, do indeed radically alter, if not transform, all of the decisive considerations which heretofore have regulated maneuver between opposing armies (mass, penetration, communications, etc.), then that showing is sufficient to dictate the need of commensurate change in the existing tactical order.

What will no longer suffice against a relatively limited threat must have even less practical virtue if the threat becomes multiplied.

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It is recognized that the time may shortly arrive when, through extension of the present cycle of weapons development, it will be possible to fire atomic missiles from practically all field weapons, other than those which are man-carried. That of itself does not argue that equilibrium will thereby be restored to field forces, making them capable of maintaining the field in relatively solid strength and extending their historic role as the main instrument of decision in wars between nations. Rather, it makes more inscrutable the general question of whether the arrayed army—as we now know it—has any real future.

The arrayed army is, at best, a ponderous instrument. Without freedom of maneuver and the power to concentrate, it becomes at best an occupying force, and at worst, an invitingly soft and highly vulnerable target. If it cannot concentrate, it cannot close, and without closing, it cannot over-run and win.

To premise a situation in which area weapons are available to ground forces on both sides in such numbers that they replace conventional fires almost wholly is therefore to concede the possibility that neutralization, or virtual obliteration, may be achieved at long range, either mutually, if the sides are in approximate equipoise, or by the one side which best couples strength with surprise. That is to say that the field force struggle could become nothing more than a distant engagement between opposing artilleries (including guided missiles and air bombs) with decision being had before infantry tactical bodies have moved to contact.

Further, to object that nothing of the kind has ever happened in war suffices no answer. Prior to 1914, it was not foreseen by any general staff that fires had been augmented to a level which made it impossible to close in sufficient strength to bring off decisive penetration. But the phenomenon happened and the resulting deadlock lasted four years, being at last broken by the intervention of armor and the dissipation of German reserve strength on political enterprises in southern Russia.

We have witnessed that fire power can thwart the organization of decisive mass. Therefore to say that it cannot happen again, under an order of weaponing far more threatening to military bodies than any force heretofore known, is to indulge in that form of prophecy which Count Bismarck described as "gratuitous folly."

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## THE BIGGER BANG

### THE QUESTION OF REVISING STANDARD DOCTRINE

Several of today's ablest tacticians have written that employment of the tactical bomb against field troops will change nothing fundamentally in field operations and that the main effect will be to introduce a "bigger bang" into the battle.

This conservatism, moreover, is not confined to a few prophets. Since the development of the tactical bomb, our tactical doctrine has been moderated slightly, but there has been no sign of a revolutionary change. The treatment of the subject has been such as to suggest that the bomb is but one more weapon which, added to the general system, will augment fire power greatly without transforming practically every factor which regulates fire and movement on the field of battle. It is more or less commonly agreed that the new weapons will make warfare more mobile rather than less so. Another axiom is that it will necessitate wider spacings in deployments, that men must fight thinned out, and units must be spread over more ground. A third proposition is that because ground cover when rightly used will cut casualties under attack by the bomb by four-fifths or more, it isn't necessarily a decisive weapon in the land battle even when it hits on target.

If these three ideas—and particularly the last one—could be supported by proof of a kind which had practical application to the tactical problem, there would be no need to consider whether standing doctrine requires revision. We could keep on with what we are doing, though making sure to do it better.

The rule which governs tactical progress in an era of rapidly evolving changes in major weapons has been stated in these words: "It is the marriage of the novel with the conventional, and not in the sudden substitution of the latter by the former, in which true military development is sought. The future of warfare lies halfway between a number of new and evolving means of movement and an ever-increasing number of means of slaughter and destruction."

Granted that we are now seeking such a marriage, its first requirement would seem to be an objective re-evaluation of the old system, with special attention to all we have learned about the limits of our human material, to determine whether and wherein change is required, that the union may be attended by the best possible results. Paradoxically enough, within a weapons system, it is only the old and orthodox that can be reformed and accommodated to a more perfect balancing of the whole, since the revolutionary weapon itself has little or no human experience behind it.

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But there seems room to question whether we are approaching the problem along the most direct path. What has been done may be thorough enough, and still be wrong from the standpoint of priority. For example, we have extended ourselves in trying to determine what the tactical bomb in our hands will do to enemy forces; but we have put little thought on what this same weapon in enemy hands will do to our defensive concepts and our order of battle. The question is whether, by so doing, we are putting first things first. The determining of a new and better balance does not come primarily of repeated experiments to measure accurately how much destruction the bomb will work upon a given area and situation when exploded at various altitudes; but much may be gained by studying patiently and imaginatively what its general impact will be on the old system so that tactics and doctrine will continue to march.

More than we need to know how many men will become casualties when a bomb of given dimension is dropped on a field deployment, we would seem to require the answer on what new tactics must be devised so that a vacuum along the battlefield may be sealed off in time by troops still able-bodied.

To that end, it is not necessary to have an accurate table of mortuary calculations. What any average citizen may read in his newspaper about the Nevada tests provides enough generalized information for a take-off to working estimates of the tactical significance of the bomb. From that point forward, the object of the search is to determine whether conventional tactics have any chance to stand once the bomb is introduced into battle between land forces.

It is of course vital information that earthworks and underground shelters will greatly reduce troop casualties under atomic attack, and it is important to know that instant use of accident of ground may afford some protection to the individual caught in the open. But once these elementary facts have been determined, and there is competent proof that the bomb can produce a condition of paralysis over an area of such-and-such a radius, calculations as to whether it will kill 1250 men or 2500 men under a given pattern of deployment within that area has relatively little bearing on how tactics must be revised so that critical gaps will not remain unfilled in a decisive hour. It is quite enough to know that the bomb will snuff out most living things over a sector one mile in width when what we seek is an answer to the question: "Does the weapon simply introduce a bigger bang into the battle or does it revolutionize field tactics?"

Every one of the effects produced by the bomb will impinge on field tactics. The numbers of men which may be blinded by its fierce light, the numbers which may be burned, maimed, or shocked into a condition of complete dependency on others, and the numbers which will be deprived of materials that they would normally use to fight, supply, communicate, and give first aid—all of these, representing so much lost power and added friction, contribute to the size and complexity of the problem. But as with an unforeseeable and therefore unmeasured natural disaster, the inability to predetermine exactly what will happen does not preclude the planning of measures which will limit and minimize the cost.

Adjustments can be weighed and made on the basis of generalized approximations. For example, if instead of concerning ourselves with casualty computations, we started with the proposition that the atomic bomb, dropped

# CONFIDENTIAL

# CONFIDENTIAL

against troops, can be counted on to create an absolute tactical vacuum over "X" number of yards, we would then begin somewhat more clearly to define the measure of its impact on a general situation, which is more important than reckoning the consequences to people grouped in and around ground zero. This is the first true area weapon to be introduced into field tactics since the World War I gas cloud; and unlike the latter, the bomb effects cannot be neutralized by protective measures diligently applied over the same area or by a wind blowing from the wrong quarter.

The decisive difference between the new weapon and a mass bombing employing conventional block-busters, insofar as its effect on field tactics is concerned, is that it does in fact saturate and obliterate, and so doing, kills a sector rather than a man. There is much more to be said on this subject, partly in answer to the objection that the bomb, like any other weapon, will be greatly reduced in its effective application because of the vagaries of target intelligence data. It is better discussed under another heading.

A moment's thought should reveal that a panic which bolts an army, or any decisive portion thereof, is more effective than 10,000 bullets which, more or less at random, get that many individuals through the head. Because the true object in battle is disorganization through demoralization, the real value and threat of the tactical bomb are to be measured in terms of how it serves that object, rather than by its potential as a killing force. Given a firm figure of the kind already described—the radius over which the bomb can be counted on to paralyze all operations except self-salvage and escape—we will have the most material fact needed to begin exploration of its impact on field tactics. It will not make the exercise less realistic to conclude that all troops within the vacuum area have become a load on the problem; in other words, that temporarily the survivors will be a greater liability to the command than if they had been wiped out. That will provide some margin for error; also, it will probably come closer to the truth of the battlefield than the assumption that any troops, which were within such range of ground zero that they might have been killed, can be saved in condition to be of effective help in the immediate tactical emergency.

The grand tactics of an army depend chiefly on the value its commander sets on any particular weapon, as well as the cooperation of all available weapons and means toward the desired end. Likewise, the commander who first grasps the true trend of any new, or improved, weapon, will be in a position to surprise an adversary who has not. Today we are at grips with a situation in which both sides are assumed to be in possession of a new family of super weapons which have not been tried in field operations against an active enemy. How they will alter field deployments and limit the useful employment of all other weapons are questions still approachable only in theory. Realizing this it can still be predicted with utter certainty that the side which, while preparing to exploit every offensive possibility in the new weapon, rearranges its defensive order and procedures so as to present minimal vulnerability to the disorganizing power of the new weapon, will in the end prevail unless it is hopelessly out-numbered from the beginning.

# CONFIDENTIAL

## POSSIBLE AREAS OF STUDY

From calculation of the area figure should stem all other estimates. It is the initiating point for all of the considerations which govern organization and provide an index to manpower requirements. The area figure is the handle to a more perfect grasp of the new time-space factors, which in turn hold the answer to how tactics must change to conform with weapons development. To draw up a complete list of the tactical parameters is obviously in itself a major study. What follows is not intended to be more than a random check list of some points requiring examination:

Procedure for initial reconnaissance of the bombed area

Evacuation from the bombed area

Establishment of blocking forces

Re-assembly and withdrawal of troops in the peripheral area

By improvisation, restoration of command contact with the struck force

Deep reconnaissance, air and ground, forward of the hit sector

Preparation for prompt air counterattack with atomic weapons.

As will be shown further along, when the range of the problem is seen, it also becomes clear that the search for solutions must enlist all branches of the service, since all are affected in some degree. Therefore to limit research to the few technically-informed specialists would in the end defeat the chance for more perfect organization.

Certainly great change is impending, for if we have closed one era in weapons evolution, then old tactics died with it. During the past 50 years the flankless front, in varying forms, has been the dominating idea within the defensive order. In the beginning, it was the product of the growth of modern railway systems which made possible the rapid deployment of millions of men. The multiplying of fire power through the development of automatic and quick-firing weapons in turn brought deadlock to mass against mass. Then the development of armor altered the balance and temporarily restored mobility to offensive power, until the threat superinduced a rapid evolution in antitank weapons, works, and doctrine.

The case for change now, and prompt evaluation of the direction it must take, rests wholly on the proposition that the cycle of development of this past century, in which the vertical attack and air bombardment advanced rapidly, still without altering the decisive character of flat trajectory weapons, has been closed by the introduction of the tactical bomb.

But this is so, less because of the weapon's impact upon communication lines and factory systems, than because of what it will do to the human stuff of an army. To utter the dictum: "We must condition troops to stand fast and maintain tactical order at whatever cost!" will get us nowhere if what we know about the factors which enable an army to operate under control shows that the bill cannot be paid.

No general staff has as yet more than hinted that the old tactical order is dead. But so long as the possibility exists, all questions pertaining to it require to be asked and answered. If there is reasonable proof that the system we have used will no longer stand, the next step is to reason toward the more hopeful alternative.

# CONFIDENTIAL

## EXTENSION OR CONTRACTION

The impact of any new weapon upon a tactical system can not be measured accurately in terms of its efficiency as a killing agent. Whether the calculating is done on a dollars-per-life basis or by expressing the radius over which the weapon will theoretically have lethal effect, there are certain imponderables which will always be missed. Fear is the great enemy on the battlefield. Not the casualties already taken but the death or wounds which men still expect to receive are the main cause of organizational paralysis and tactical disunity. Even so, man being the superstitious animal that he is, the extent of his fear is rarely an accurate reflection of the reality of the peril which confronts him. Men outpostting a position along the front are more likely to become unnerved by a continuing intense silence than by repeated signs and sounds indicating the near presence of the enemy. And as was shown by the first full collision with the Chinese Communist Armies in Korea, November 1950, troops which have become hardened against the storm of mortar fire and bullets may still be shocked into inaction or even stampeded by unanticipated sound effects produced from harmless musical instruments.

Military experience provides numerous other examples of this same phenomenon, that the disorganizing and paralyzing effects of the agent are not in proportion to its mass-killing efficiency, and not infrequently are in inverse proportion. During World War I, the small German one-pounder, though seldom taking out more than one man or one gun at a time, was more demoralizing to our infantry than the enemy 77-mm field piece, and as a harassing, nerve-destroying weapon was excelled only by the so-called Austrian 88. The average soldier is not more afraid of a 2000-pound air bomb than of that intensely personal missile, the rifle bullet. If either gets him in the wrong spot, he is just as dead. To examine the same factor over a yet wider range is to recall that the people of London were less demoralized by V-2 than by V-1, though the big rocket had many times the lethal power of the buzz bomb. The latter could be seen in flight. It was a fiery spectacle and made a great clatter. A long period of dreadful anticipation preceded its blast. In these things, more than in its power or newness, lay its unnerving effect. But V-2 was exploded and done with before any but its victims felt the danger.\*

\*The comparison becomes all the more startling when it is recalled that defense scored a striking success against V-1. Fighter planes and ack-ack guns using the proximity fuze shot down approximately 79 percent of the V-1s. But not a single V-2 was intercepted by the defense.

# CONFIDENTIAL

## EMOTIONAL IMPACT OF TACTICAL BOMB ON TROOPS

If it were possible to harden troops to stand against the unexpected, the mysteries, or the terrors created by the imagination simply by issuing the dictum that they must be trained to preserve coherence and unity in the face of the gravest danger, then all troop management and all tactics would become relatively easy. But when theory fails to foresee the stresses which will promote dissolution, and therefore cannot envisage a safeguard against it, words become powerless to ensure preservation of form and order on that battlefield.

The Nevada tests have shown that there is no unusual emotional disturbance to troops when an atom bomb is exploded a couple of leagues away and the troops have reason to believe beforehand that they are safely outside the target area. Only a strained imagination would have anticipated any other result. A speeding automobile has killing force; but normal individuals do not become emotionally upset when crossing a congested thoroughfare, though a South Sea savage might; in our peacetime civilization, we live among many dangers, but we early acquire a faith—sometimes misplaced—that others will keep them under control.

The Nevada tests also demonstrated amply that troops will pick up and go forward into the bombed area almost as quickly as the dust storm settles, and that in so doing, they will not drag their feet, rattle their teeth, or worry about the possible sacrifice of their procreative powers. So far, so good, though quite conceivably, it would make some difference in their emotional reactions if the bomb was a hostile blow against one's own side rather than a body punch against an enemy force, and in marching toward ground zero, the same troops had to brace themselves against "the groan, the roll in dust, the all-white eye turned back within its socket" (Byron) of their fellow soldiers. The corollaries of that kind of fear cannot be produced under any test system possible to the Atomic Energy Commission.

Even so, the point can be waived for the time being. The main findings in the Nevada tests which have come out of the use of infantry troops near the scene of the explosion are not inconsistent with the lessons of military experience or with the sum of what we know about weapons' impact on men moving under a martial discipline. In the recent conflict, we witnessed atolls smashed flat during the preliminary bombardment until, prior to the start of the direct assault, it seemed that no living thing could have survived amid the wreckage. Then as contact was made, we saw men crawl forth from underground shelters and fight as aggressively as if they had come fresh and eager to the battle.

Nor do unscathed regiments quit the battlefield and flee rearward upon getting the word that the regiment to right or left has been annihilated. If they have been given a proper training, they will respond to orders. With the shattered remnants of a demoralized element from their own army falling back through their ranks crying that the fight is lost and the enemy is at hand, they will still keep order and press forward upon command. Recent historic proof of these statements is to be found in the records covering the operations of US VIII Corps during the World War II Battle of the Ardennes.

Insofar as moral power is concerned, there is thus good reason to conclude that the great body of troops will be able to sustain the shock consequent to employment of the atom bomb against some part of the line. But the statement

# CONFIDENTIAL

covers only the lesser portion of the problem. We have considered only the moral impact of the tactical bomb against troops outside the radius of actual physical damage. What of the impact of the same bomb upon the physical situation of the general body? That is the main question. We need to know what a weapon with such far-reaching destructive power will do toward breaking an army apart and rendering obsolete all our established methods of restoring unity, re-establishing control, and regaining the initiative.

## PHYSICAL DAMAGE CAUSED BY TACTICAL BOMB

At the turn of the century, toward breaching an enemy's line by heavy concentrations of fire, it was usually necessary to do one of the following two things:

(a) Hold the enemy by rifle and cannon fire, and then, when the decisive point was discovered, withdraw guns from positions which could ill spare them, then move them toward the decisive point.

(b) Withhold a great artillery reserve for the decisive operation and risk that it would be concentrated in time at the decisive point before the enemy could bring off an effective counter concentration at some other point.

With automatic weapons coming forward rapidly and becoming the chief instruments for pinning the defender's infantry in the zone marked for penetration, the offensive undertakings of World War I, particularly in the years 1915 to 1917, developed mainly around use of the second method. On the Western Front, they were uniformly unsuccessful, partly because of the depth of the defensive zones and partly because of the thick earth cover which enabled defending forces to withstand the artillery battering and then regroup in time to deny the attack entry into decisive ground. The attacking elements were both slow-moving and vulnerable to small arms fire. The vise which automatic weapons held upon the tactical situation was neither broken nor shaken until the introduction of armor provided the attack with a new shield plus velocity. Except for Cambrai, the early battles which exploited the new weapon did not gain surprise, and invariably the tanks were imperfectly handled, as to tactical planning. But by the end of the war, the concentrating of armor was near to eclipsing the massing of artillery as the main technique for achieving breakthrough. Its other great advantage, apart from mobility and protection in the attack, was that it materially reduced the time and strain of the buildup period. Military air power developed rapidly during these same years. But it influenced the basic tactics of the land battle scarcely at all.

Artillery did not withdraw from its traditional role during World War II; it simply gave way to the left to make room for a new combination running a different kind of interference when the situation called for it—armor and air power, moving together in coordinated hitting against defensive field works. Again the attack was speeded up. Again there was a diminished requirement for the extraordinary massing of conventional artillery. Again the mounting time was cut. But the decisive mass, though less inert and ponderous, bulked just as large as ever and during the period of preparation was no easier to conceal. Whether filling in for artillery, or working in combination with it, armor and air power did not lighten the load of war or lessen those risks

# CONFIDENTIAL

which attend staging a superior concentration in the hope of achieving a decisive effect. The essential problem in the attack remained the same—to cut a corridor and hold it until the main blow could be exploded across the enemy rear.

## Penetration

The leading principle of penetration is mass, the same principle which enabled Bonaparte to win his greatest victories in his early years; it is as good today as ever. But what has happened is that the assembling of mass has been enormously speeded up and at the same time the initial difficulties of penetration have become simplified beyond anything dreamed in the earlier wars between industrialized alliances.

The fundamental change that has now come over field warfare is that one airplane, carrying the tactical atomic bomb, can strike a blow having a magnitude which in former periods would have required a carpet attack by 800 bombers or the concentrated effort of 20 battalions of field artillery. By one stroke, delivered within a few seconds, the plane can wipe out the greater part of a regiment, leaving only a smoking landscape where formerly there was a body of men who could move and communicate, fire and dig. It is this one prime, easily-stated fact which makes the decisive difference.

We learned during World War I, and rediscovered during World War II, that it is impossible, simply impossible, to keep field positions inviolate to attack by a single airplane. What the low-flying Fokkers did to troops along the Western Front in 1918, the kamikazis were able to repeat against the transport line and the beach installations at Okinawa. Command of the air has never been, nor will it ever be, an impenetrable shield keeping at bay the lone-handed raider.

In other times such thrusts had little more than a nuisance value. They were incapable of precipitating convulsive change. But from here on out, they will be hunting big game, and the tactics of support aviation will be shaped toward truly decisive ends. It would be folly to risk such an expensive mechanism as a medium bomber on pea-shooting expeditions against field positions and road columns, when with no increase in hazard, it can strike a full-armed blow against a division.

Though every enemy plane which is sent forth atom-bomb loaded cannot be expected to strike fair on target, some will make it, and a battalion or more of men, defending a key hill, or deployed to cover a main avenue of approach, will be destroyed in the twinkling of an eye.

After that, what comes next?

How will field troops react to employment of the bomb against them?

What general effect will their reaction superinduce in the body of the army?

Will the bomb cause greater dispersion, not only in the interest of protection against further bombing, but to redress the line and to fill vacant spaces?

Or will the inevitable consequence be greater contraction and compaction within the defending side, thus seemingly producing greater vulnerability to atomic attack?

On first appraisal, this may read like a set of foolish questions, since tacitly, it already has been answered by what is called "doctrine." According to the word, to cope with atomic attack, individuals and tactical bodies will at

# CONFIDENTIAL

all times space themselves as far apart as possible, within the limits permissive of control and unity of action. So when the tactical bombs begin to drop, this greatly attenuated force, already stretched to the limit so as to keep casualties minimal, will stretch itself still farther to cover the gaps where casualties have occurred anyway!

At this point isn't there some slight reason to pull up and begin to question whether the doctrine contains its own contradiction? We all know what happens to a rubber band when after it is stretched to the limit it is then given one more yank: it snaps! When troops are already in a condition of maximum dispersion to reduce the effects of enemy fire, they cannot widen their interval to take care of an emergency situation and still retain their fighting power. These are mutually exclusive ideas. Moreover, it goes against nature to expect that they will react in any such way.

In field tactics, there are some factors which are constant and are likely to remain so. Of these factors, the two most important are human nature and ground. Because they remain unchanged, despite the recurrent revolution in weapons systems, there is a geometry to field tactics which applies with the certainty of any other mathematical law. It is not by accident that salients in war are invariably wedge-shaped; nor is it due only to the circumstance that the flanks wither, and the center, usually aimed at the decisive point, has been strengthened and is also likely to have the better of the ground. This phenomenon will recur as frequently in a company-size attack as in a general offensive by an army group. Its root cause is man's gregarious instinct which under the compulsion of fear and threat of fire turns him back to his fellows. Every junior leader who has been in combat knows what a terrible struggle it is to keep men from bunching together when the bullets begin to sing overhead. Long training may moderate the impulse slightly but in the end it cannot thwart nature. The average individual will always be able to rally his spirit, fight more effectively, and advance more willingly so long as he has physical touch with his fellows. That mathematically he might have a better chance for survival by operating in greater detachment from the file on right and left may be quite clear to his intellect, but this knowledge will not restrain his emotions or govern his movements in the hour when he feels that death is close at hand.

Losses invariably promote contraction toward the axis of advance during the attack and toward the most active point of resistance while on defense.

The measurement of actual battle salients will show that the flanking angles of a determined attack will incline inwards at approximately 45 degrees.

It is for this reason that the counteroffensive out of a narrow salient, against an enemy strongly fixed and weaponed along the encircling high ground (such as was attempted by the Third Army out of the Bastogne salient in January 1945) is an impossible operation in war. To keep flanks joined, the attack must in fact move out on an expanding front. But since this is contrary to human nature, the result is a series of open flanks, as the wedges begin to form, each subject to enfilading from the heights.

## Forming a Defense Pattern

On defense, the pattern is not greatly different and the herd instinct is not less pronounced. Under the pressure of fire, outposts tend to withdraw prematurely upon the main body and that element of the line which is operating

# CONFIDENTIAL

in greatest detachment begins to think of huddling closer to its next neighbor. The final form of the defense, if it becomes hotly engaged on all sides, is generally a close-joined square or triangle.

There are, of course, other technical reasons for the convergence. The artillery, mortar, or other fires given in protection of the flanks are limited by the arcs of fire of the weapons. Hostile weapons pressure is best applied at an oblique or where it can sweep the line along its length, and becoming so regrouped against the flanks, tends to round off the attack. But these are effects rather than causes; weapons are employed in the manner only because through centuries of warfare, it has been observed that one prime effect of fire, and the fears which it promotes, is to drive men back upon each other. When we try to anticipate troop behavior under attack by the atomic bomb, again we are faced with contradictory and apparently irreconcilable demands which can never be wholly satisfied. But if the propositions heretofore set forth are correct, then it is unreasonable to believe that under atomic attack, to absorb the shock and to preserve union in the defense, we can count on establishing and holding greater intervals between men and between units. For forces already thinned, lateral displacement with the object of filling gaps and providing reenforcement becomes out of the question. There will be greater dispersion under the impact only when troops become stragglers or a rabble in mad flight incapable of obeying orders or of thinking of anything save escape.

## Deployment Pattern

What should be the deployment pattern, as to the spacing of individual riflemen and other users of hand-operated weapons within an infantry body, under atomic warfare conditions? It is possible that by looking at this question first we may arrive at certain principles which will also bear upon deployments in the largest scale.

Until now, staff thinking on the subject is largely undefined, consists mainly of glittering generalizations, and like a woman's kimono, covers everything, while touching nothing. "The interval will be widened as far as possible without sacrifice of control." The desirable object is usually stated in some such language as this. It is right enough as far as it goes. But until we define just how far "possible" is, saying it in terms which have concrete meaning to the operator, we have made no progress.

The truth which military men should hold to be self-evident is that what we can do with men and still retain control is not governed by the power of the weapon but rather is limited by the powers of man's nature. Troop spacings in an extended line are not radically different now than prior to 1914 but in the interval the development of such weapons as napalm and the 2000-pound bomb made it possible to wipe out a company in a split second.

There is no logic in believing that the atom bomb will make possible and profitable any wider extension, or that it will make less desirable the economy of the buddy system and the two-man foxhole. Nothing has yet been cited in the American experience with our troops in war, nor is anything to be found in the literature describing the reactions of men under the abnormal stresses of the battlefield, which would suggest that it would be feasible to thin out men and formations any more than was done in Korea. Possibly, the man-to-man intervals could be widened by a few feet, with no loss of tactical coherence or dimi-

# CONFIDENTIAL

nution of fire power, but it would not be a radical difference. Should more than that be attempted, the intervals might very well be maintained until the hour of extreme pressure, at which point human nature would again take over and the seeming gains of a new form of training would fade away.

The main problem in preserving unity of action and the chain of force during the fire fight is not the technical one of "keeping men informed." To approach it from that angle wastes time and government money. We get back to one very simple fact—that the fighter's worst enemy in his time of greatest trial is his feeling of going it all alone against a determined opposition. The intense feeling of personal isolation which attends infantry combat is as oppressive to the human spirit as is enemy fire. Those who have been under fire many times might think back over the experience: Being with comrades along a fire step, they nerve themselves to the danger, however heavy the rain of enemy missiles; but on the next day, crossing a field where there is not another human being in sight, a chance artillery shell explodes within 50 yards and a frenzy of terror grips the heart. One recalling such a moment can but say with Ardant du Picq: "We are brought by dispersion to the need of a cohesion greater than ever before."

If the soldier is to fight effectively, he must continue within seeing, shouting, and hop-skip-and-jump distance of some other man, and so on, all along the line. Of this linking of personal force, visible to the eye and reassuring to the senses, comes unity of action and coordinated group response; when men do not actively feel the near presence of personal support, they will not stand, much less fight. It is just another Buck Rogers' fantasy that placing a radio receiver in a fighter's belfry, thereby enabling him to communicate with the next file around the brow of the hill, will give him all the assurance needed to keep him alert and steadfast. Though scientists have proposed it, it is not scientific.

Regarding the deployment of units, and the spacings between them which are consonant with morale requirements, the same principle applies. It is not the presence of support on right and left but knowledge of the presence which gives the center the confidence that it can play its part well. When units in line are so far thinned out that they cannot actively feel the presence of one another, when conditions permit a besetting doubt that an enemy force may become installed upon a flank, arriving unheralded, the unit suffers a decline in morale power by at least one-half.

Korea was a war of great open spaces, due to infantry shortage. The stretch-out there just about reached the ultimate practical limit, and wouldn't have worked at all had the opponent possessed an active air power in direct support of his infantry. When battalions are spaced 3500 to 5000 yards apart, mutual fire support becomes a polite fiction and lateral communications are in constant jeopardy.

Where the defensive blocks are constituted from whole regiments, rather than single battalions, the interval may be increased, a larger reserve can be kept at hand to move to any threatened quarter, and the other elements of the RCT may be more effectively concentrated. But these modifications still do not solve the problem of how to achieve a more efficient tie-in across intervening space. The integral fires will not reach out any farther and communications are still at the mercy of a chance shell or a prowler with wire cutters.

# CONFIDENTIAL

In Korea, the basic situation was one of chronic over-extension; it would be well now to recognize that in any major war of the future in which we become engaged by an enemy strong in air and armor, we will never again afford such intervals if we expect to keep a defense solvent. Applying a rule-of-thumb which is based upon the reach of weapons within the present infantry system, it seems reasonable to conclude that 1200-1700 yards between battalion blocks and 2000-2500 yards between regimental blocks will be about the absolute limits, the tolerances within these brackets varying according to the lengths of fields of fire, the availability of cover, limitations of observation, etc.

In individual deployment, in any circumstances and condition of terrain, it is senseless to expect men to engage satisfactorily against fire at intervals any greater than 12 to 20 yards, average. Finally, the effectiveness of a field army depends on the unity of action within several thousand squads. Riflemen fight well only when they work fairly closely together, and the better they work in combination with their automatic weapons, the higher rises the rate of rifle fire. One effect of widening the interval is that men fire less; another is that they have less group understanding of how their fire should be directed toward the common object. Should these factors be disregarded in the determining of infantry intervals in the period ahead, we will get less effective fire than before; it is one certain way to backslip from the very real progress made in recent years.

Within the divisional structure itself, no really decisive augmentation of fire power is to be anticipated in the foreseeable future, except through possible use by the heaviest weapons of some such deadlier agent as the nerve gases. We have progressed about as far as we can in this direction, and though it is reasonable to believe that we can double our infantry fire efficiency through improved training methods and a more perfect application of intelligence techniques, the weapons system has about reached ceiling. Some helpful changes may be made in missiles, but fire rates will not be radically increased, and it does not appear likely that any new weapon can be added to the family which will materially influence the balance.

So it may be assumed that the infantry company or battalion will not tower above what we have today. It may come to possess a bit more punch in the attack; on defense, it may be able to pour a few more missiles into its own killing zone. But there are no top secrets that are going to give it a wholly transformed character, either as to its manpower, its arms, or the missions which they together perform.

**ON IMPACT**

Since we cannot count on our average man developing, quite suddenly, a superman quality, and we cannot provide troops with personal and organizational weapons which will double their power to shatter enemy ranks over a wider arc than ever before, casualties and the subsequent extension necessary to keep the line whole must exact their usual penalty—that much, at the very least.

**EFFECTS OF EARTHWORKS IN MINIMIZING A-BOMB DAMAGE**

It is now well-known that simple earthworks, in a depth and with a form not unlike the World War I trench system, are of major assistance in the reduction of casualties under atomic attack. This part of the Nevada test research has been carried out systematically, in that both the defensive construction and the observing of its effects have been done more thoroughly than would be possible under the conditions of engagement. Noting that exception, the research method would seem appropriate to the problem, and the conclusions would appear to be fully warranted. There is this, however, about warfare conducted between sides which have both settled within a system of entrenchments. The condition has always inhered from a temporary or long-term state of equipoise in the two sides, wherein, for one reason or another, both are deprived of decisive mobility in the attack. The use of general entrenchments in Korea did not start until after the tactical deadlock; in World War I, it derived from the paralysis of both sides, following the futile Race to the Sea, which was a nugatory, mutual outflanking effort for which the German defeat on the Marne set the stage. When both sides became held all along the line, and neither felt capable for the time being of attempting a decisive concentration, entrenchment became the inevitable sequel. When entrenchments are necessitated because of the introduction of a particular weapon, this becomes a radically new condition in warfare. It becomes difficult, if not impossible to see, whereby the new requirements of protection can become other than a dead weight on mobility in the attack. Trench systems, particularly in the terrain of Western Europe, are always costly to build and difficult to maintain; they put an extraordinary demand on combat troops and an excessive strain on the logistical establishment. A necessity when opposing armies are standing only yards apart for a prolonged period, they must still be regarded as a fantastic luxury when the two sides are a hundred miles from collision with neither knowing where the battle will be drawn or how fluid will be its character. A trenchant analysis of the problem was made by a British commander who pondered first-hand its

# CONFIDENTIAL

far-reaching effect during World War I. "Though it is possible to dig hundreds of miles of trenches in the summer, it is next to impossible to maintain hundreds of yards in the winter, unless the trenches are solidly revetted, and boarded, and carefully drained. Seldom are material and labor sufficient to that end. The result is that the system built during the summer is not only unsuitable during the winter but a positive danger, for the more it is patched up the more it falls in. When once a trench is half full of water, unless the water can be drained, nothing destroys it more than trying to clear it out and revet it."\* Even this brief commentary would seem to suggest that to commit an army to semi-permanent works for the sake of protection must ipso facto load it down, reduce the flow of offensive materials and deprive men and units of time that might otherwise be used for more intense training.

The protective works in Nevada are deeply dug (the trenches are deeper on the average than those used in World War I), most solidly timbered, and methodically revetted with sandbag parapets. What has been learned from them must be evaluated in light of the fact that an optimum engineering service was always available to the testing authority and that the object was to prove that nature and man-work can avail some protection against the bomb rather than to simulate the conditions which are likely to limit the protective possibilities of a deployed army. In short, the penetrative power of the bomb was tested against ultra-standard works, though various materials were placed on the flat ground and there subjected to the blast.

One thousand five hundred yards from ground zero that side of a sandbag revetment which is faced toward the blast will become ash. But the blast does not disturb the rest of the bag, either by setting the sack afire or blowing off the sand. The inner side of the trench itself is undamaged though there may be a slight charring of the highest timbers along the parapets. Communications wire laid above ground at that range, though its insulation becomes hardened and sloughs away, will still work. Such fighting tools as are above ground are not likely to be destroyed by the explosion—again, at 1500 yards from ground zero. A medium tank parked at that distance had only one large blister on its forward armor plate; its gasoline had not been ignited. An L-5 staked out at 2000 yards had the plexiglass cracked on the leeward side but was otherwise undamaged.

There is reason to believe that if troops had been within the trenches and had gone flat on seeing the plane approach, the majority would have survived relatively unscathed—again, at 1500 yards. Several sheep did so, even though they were penned at parapet level with no prominent interdicting elevations between them and ground zero.

Based in part on these observations, but even more on an extrapolation of the bomb's characteristics, and knowledge of how it produces its killing effects, the scientists have calculated that if a regiment were deployed within the lethal circle, through the use of field works it would multiply its prospect of survival by a factor of four. For the purpose at hand, we can accept that as a reasonable working figure. In the same terrain and set of circumstances, the whole might be wiped out if positioned in the open, where not more than 500 would die if all hands had been well entrenched.

\*J. F. C. Fuller, Maj Gen, *On Future War*, Sifton Praid, London, 1923.

# CONFIDENTIAL

It is a factor of prime tactical consequence, the significance of which should neither be minimized nor exaggerated. When 500 men become lost to one regiment at the bat of an eye, through death, shock, or injury, the emotional impact on the survivors and the sheer physical stress of coping with human suffering and physical damage will mean the counting out of four to five times that number, at least temporarily. And paralysis in one regiment means standstill in one division. Some analysts have likened the result to the aftermath of the Petersburg mine of Civil War days, with inevitable wishful conclusions. The two are in no sense analogous. The old-time subterranean mine such as the one mentioned, or those used around Arras in World War I, disintegrated or killed most of the soldiers who were situated directly above the charge but had no adverse physical effect on men just outside the crater area. The crater became a quick harbor of protection and of tactical usefulness to troops within the immediate vicinity. The modern 2000-pound air bomb, exploded against troops, is similarly limited in its shock radius. Men foxholed only six feet away from the lip of the crater have been knocked back a few feet by the violent jar, picked themselves up feeling no concussion and then jumped into the crater to take up more forward ground. It need hardly be pointed out that under the atomic blast the victims who meet instant death will be a lesser problem of the able-bodied who survive.

## TIME FACTOR

One of the important post-war books on the possibilities of the new weapons bears the title, "There Will Be No Time," (William Liscum Borden). The phrase is a simple statement of the fundamental tactical fact which gives the problem its extraordinary complexity, as to a true weighing of the effect on men and formations, and the collapsing of the time cycle within which in former times the sending forward of support and the restoration of the position became possible. In the sheer speed with which the thing occurs and in the terrible concentration of destructive power at one focal point lie the danger of disastrous disarrangement.

In the former period the pulverization of one main sector of a front required a long-term build-up of artillery strength by the army seeking a penetration, frequently provoking a counter artillery re-grouping by the other side. These concentrations were time-consuming. They enabled the defender to become set through the shifting of some part of his infantry reserve to the zone where break-through was threatened. Following the prolonged artillery exchange, the infantry began its slow crawl forward, and by the time it reached the broken entanglements, the defending automatic weapons were out of their holes and firing and the defending reserves were marching toward the fire. How wholly the factors of time and space regulate all possibilities of successful tactical achievement becomes evident on taking a retrospective look at some of these operations.

The battle of Verdun was begun on 21 February 1916, and achieved initial surprise. The French knew an attack on the area was impending but had expected it to open with the accustomed prolonged bombardment. Instead, after a violent cannonading lasting only two hours, the German infantry struck.

## CONFIDENTIAL

In the first phase, the attack made great headway because the entrenched garrison was demoralized by the suddenness of the onfall. By 24 February Verdun appeared ready to fall. In the interim, the French had recovered from the initial shock, and the reserves had begun to arrive. The battle lasted another four months. The maximum penetration was 12,000 yards. The attacker lost approximately 500,000 men and the defender about 350,000. Over-all, the defense of Verdun cost 20,100,000 artillery shells, while 21,700,000 artillery rounds had been spent in the attack.

In the Somme offensive, launched by the Allies in July of the same year, the attack was opened on a 25-mile front, after a preliminary bombardment which lasted eight days and consumed approximately 3,000,000 artillery rounds. The attacking infantry took 40,000 casualties on the first day of direct assault, yet at no point got forward to ground which endangered the defender's general line. Though the battle continued until mid-November, it got little closer to its main object—cutting a sufficient gap to enable the attacking forces to advance on Cambrai, cut the Thionville-Lille railway, and so unhinge the German communications.

But in either of these battles, the prompt erasure of a divisional front, followed by entry into the gap by the attacker and a rolling back of the open flanks before the defender could react to the blow, shift his artillery, and concentrate his reserves toward the threatened point might have won decision within 24 hours. Twenty-four years later, the Germans were to prove the point when they breached the French defenses at Sedan. It was in the beginning a very narrow breach, the width of one average bridgehead, exploited by one armored division, with strong support from the dive-bombing stukas. But its effects were decisive. Much later in the war, in the breakout through the Avranches "bottleneck" by American forces, it was again demonstrated that narrowness is not of itself a limitation upon the decisiveness of a corridor opening full unto the enemy rear. In fact, this lesson is emphasized over and over in World War II operations. After Operation MARKET-GARDEN, the Allied front in Holland was maintained via a corridor that at the point of greatest constriction was only one-half mile wide, with enemy forces deployed along both sides. Despite the attenuation of the corridor, the attack failed of its decisive object only because in the airborne phase the force was too light to seize and maintain a bridgehead across the Neder Rijn at Arnhem.

In passing, it is to be noted that any one of these three offensive maneuvers, in the early phase, presented such a compaction of target area that it is reasonable to believe that one tactical bomb, accurately delivered, would have ensured its defeat.

Among other things, we have learned from the Nevada tests that when the tactical bomb is dropped on a field position, infantry forces bent on exploiting the rupture can move into, and through, the bombed area without danger to themselves in somewhat less than two hours after the explosion. This approximation applies when the bomb is dropped in open country and the target area is not otherwise under fire. If, as the test would appear to prove, an attacking side can move in and occupy atom-bombed ground within two hours of the strike (and the interval is more than sufficient to enable motorized troops to have their LD at a safe distance from ground zero) it means in broad effect that the gap will have to be closed within about that same period if the defensive

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line or position is to stay solvent. So stated, the race for the breach might sound like a dead heat to the finish line. But in real warfare, where things are done differently than in test exercises, it probably wouldn't work out that way. Out of a healthy respect for the weapon, the exploiting force would stand back double or twice what is considered a normal safe distance. Though that may be a dangerous assumption, the added march distance does not invalidate the argument here under consideration, but rather strengthens it.

One parenthetical note is needed to make the argument fully understood. The objection may be raised by those who are more interested in criticizing detail than in examining tactical problems in the round that it is initial error to assume the two-hour interval, since an additional margin of safety was provided in the Nevada tests, and so far as radiological danger is concerned, troops may move into the bombed-out area in considerably less than two hours. To stick on that point is to see the tree and miss the forest. For one thing, any 4000- to 5000-yard advance by a tactical body into irrupted country, when the atmosphere is charged with danger, will require on the average considerably more than two hours. (This estimate is based upon study of many company and battalion marches during World War II and in Korea in approach situations.) Secondly, the to-be-anticipated conditions would prohibit any earlier entry. What was possible under the Nevada test conditions has relatively little significance. Nevada is dry, barren country, and the test area was tenantless. On the other hand, troops in the normal fighting situation are moving more times than not in proximity to built-up area, near or under forest cover, or adjacent to water surfaces. The implied increased danger from fires, etc., is not more of a tactical obstacle than the obliteration of road surfaces and of objects which provide map check-points. That the bombed-out area is relatively small by no means implies that troop disarrangements caused by the upending of the landscape will be relatively trivial. Troops deploy and maneuver by squads and the squad customarily guides on some object only a few rods away. When nothing looks familiar, when all map data seem off and when all small units experience untold difficulty in determining and holding to, a boundary line, then all movement proceeds at a slow crawl. This is one of the main lessons drawn from World War II small unit maneuver in the wake of saturation bombardment in such widely differing areas as the Central Pacific atolls and the Normandy hedgerows.

## TYPICAL DEFENSIVE PROBLEM

Now let's look at the problem. We can take it that on the defending side, to both flanks of the bombed sector there are garrisons of similar size within such distance that its front can be given protective fires by their light field guns. That could mean anywhere between 2500 yards and 6 or 7 miles from one perimeter or "hedgehog" to the next. Even so, the advance guard of the attacking force is between 12 to 18 miles distant from ground zero when the explosion occurs. When thus stated in linear terms, the space factor is obviously in favor of the defender. But it does not follow from that that time is also on his side. To the contrary, the defender still will need two hours in undertaking the closing maneuver. Yet in those two hours he can do very lit-

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tle. The odds are against the likelihood that a sufficient local reserve will be in just the right position to move up and close the breach. If the defending side is markedly numerically inferior, but at the same time is attempting to operate on a wide front, local reserves are largely liquidated by its own grand tactics. As for the general reserve, it would be much too remote from the scene, and in any case its mission is to backstop the general position by securing the rearward road net, rather than to serve as a bucket brigade dampening fires along the line.

This means that the main hope is in lateral displacements. Once that fact is glimpsed, the conclusion must follow that companies will be called upon to do the work of battalions and the latter, in the emergency, must suffice for regiments. There is one other critical disparity in the two situations. When a deployed unit is knocked out by atomic blast, with it most likely will go a key piece of terrain and the greater part of the installations by which a defense is articulated. Toward a further development of the logistics of the problem, however, we will say that the target is not a commanding stretch of high ground, and that hence the defender has the alternative of re-establishing the security of the sector by forming a new line either forward or rearward of the bombed-out area.

A circle approximately 3000 yards in diameter has been devastated and is choked with its own wreckage. To realign forward of this blacked-out zone means to form a salient. To shore-up a defense to the rearward of it means to accept a bulge. In either case, more troops will be needed because of the lengthened line. And in neither case are they likely to be available. Salients are a throw-away against an enemy attack heavily weighted with armor. Troops forming a salient to the fore of an area struck by the atom bomb would be in air and fighting without a rear. Troops taking position to rear of it would have to contend with its human debris, quite conceivably emerging from the stricken area coincidentally with the beginning of the enemy's attack through it; an attack so timed could be expected to exploit every circumstance which might produce panic. Neither of the situations heretofore outlined appears tenable.

The need of comprehensive evacuation planning and staffing is, of course, clearly indicated. That its systematization and procedures should be governed as completely as possible by giving foremost consideration to the object that the forces still battle-worthy shall remain unencumbered is also self-evident. Some of the possible measures toward that end will be discussed further along.

But returning to the problem, let's suppose now that the ground is such that the defender has no choice but to undertake to reoccupy and defend the bombed-out area as quickly as possible. We will grant—and it is saying a lot—that his troops can harden against seeing their own dead and unhelped shocked and wounded, and devote single-minded attention to the problems of the continuing battle. They must still re-establish a communications net, get weapons set at the point of greatest vantage (a hard thing to calculate in a blast-stricken area when familiar landmarks are wiped out and maps lose their accustomed value), and perform a miracle of supply.

## TYPICAL ATTACK USING TACTICAL BOMBS

The attacking force, depending on prior arrangements which are being regulated according to plan, is under so such set of necessities. It has all of

# CONFIDENTIAL

the advantages which commonly adhere to columns as opposed to lines. It is not only more effectively concentrated, but is also more mobile because it is not yet deployed. Its supply already is in motion toward the target. Its dispositions have been predetermined with the exact tactical object in mind. The chaos worked by the bomb is its meat and drink and it will not be stayed or swayed by human pity. We can liken the situation to a football game in which, upon the ball being snapped, only three men in the defending line are permitted in motion, while in the offense the total of power is all being projected toward one point.

But to move on from that to the main consideration: it is a highly significant tactical figure—this one that the bomb can blacken the landscape and blot out life over the greater part of a circle measuring 2000 to 3000 yards i. e. diameter. In fact, for the purposes of exploring what atomic weapons have done to field operations, that radius is quite sufficient, and it is not necessary to ask what effects will be wrought by bigger bombs devastating yet wider circles. These descriptive lines were written of the Hindenburg Line where it ran past St. Quentin, France, in 1917: "The enemy was still working on the support line which was at a depth varying between 500 and 1200 yards. The first line was of great strength and was protected by irregular barbed-wire entanglements in some places 200 yards wide. It ran along the reverse slope of the heights and was invisible from the ground observation posts. Concrete machine-gun emplacements were built well in front of the trenches. The line was so constructed as to give the maximum scope for flanking fire and a line of observation ran along the crest of the high ground in front of the whole system. The French front line was between 800 and 1200 yards away."\* Putting the numbers side by side, it is apparent that the bomb has almost total neutralizing power to a depth greater than that possessed by the strongest belt of entrenchments seen along the Western Front during World War I. Except for the Maginot and Siegfried systems, which were fortified zones requiring years of peacetime construction, there has been no defensive belt in modern times which the effects of the bomb would not bracket. What one 155-mm round would do to a single-apron wire, the bomb would do to a fortified line from front to rear.

The comparison is enough to suggest that two tactical bombs laid side by side are more than ample to clear a sufficient corridor for a decisive breakthrough, provided that the shoulders are promptly sealed off by armor supported either by field artillery or by tactical air using conventional bombs. The two-mile depth would liquidate a normally-arrayed opposition. The six-to-eight-mile width is more than the Germans held on initiating their decisive 1940 break-through at Sedan.

Provided that the armored concentration within a two-hour run to the battlefield is adequate for the mission along the flanks, there is no need that infantry be heavily massed in the forward area to bring off the initial penetration. Two divisions are enough to open the way. The possibilities of this type of exploitation are roughly diagrammed in the accompanying figure, the outer arcs representing the tank lines (Fig. 4).

\*E. L. Spear, Brig Gen, *Prelude to Victory*, Jonathan Cape, London, 1939.

# CONFIDENTIAL

Some of the assumptions are implied in the diagram. As to the bomb pattern, to give extra breadth to the corridor, the two strikes while made roughly parallel, could well be in excess of 6000 yards apart (ground zero to ground zero) without risking that decisive resistance could be organized in the median ground. The sealing-off columns have the mission of advancing into the gap, organizing its ground and assisting the armored divisions to secure the shoulders.

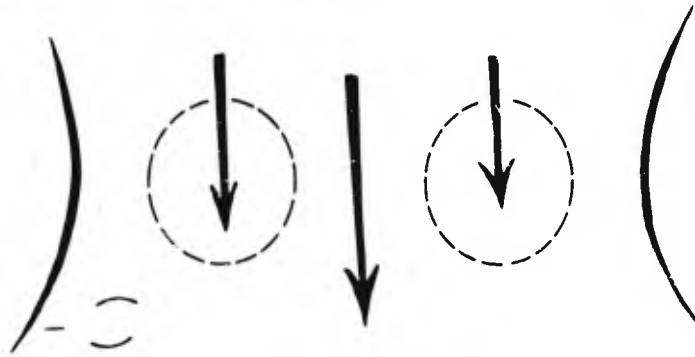


Fig. 4—Atomic Penetration

Should the two bombed-out sectors bracket an MSR, the third column of penetration advances via this artery to the main road junction below the corridor and there holds until the trunk of the army passes through. As heretofore described, the operation, up to the stage where the enemy mass begins entry into the defender's rear, could be accomplished by two armored divisions plus two motorized divisions plus one armored TF.

## SUMMATION

The discussion is not presented with the object of demonstrating that the method described is the sound way to employ the atom bomb in an attack upon a field army; there are doubtless any number of other maneuvers which are better suited to the character of the weapon and more likely to lead to conclusive results. To assault the main position of an army after it has deployed into its defensive line is unnecessary extravagance if there is a way open to shatter its columns during the march up. Further, a plan of penetration, based upon use of a limited number of bombs simply to initiate an infantry battle, runs contrary to the principle of economy of force, if the attack is backed by a sufficiently strong air power and atomic stockpile to stage a shock bombardment running the length of the front, which could conceivably collapse further military defense and leave only the mop-up. On the other hand, if the attacking side must carefully husband its atomic bombs, the surer way to decisive results might be to atomize the area of the strategic reserve and the arterial centers between its location and the front, then follow up with an assault in main against the defensive line, using conventional weapons.

The object at hand is simply to show that the bomb's potential makes insolvent defense in line as we have known it during the last 40 years. Whether it is composed of a belt of men in the open, a continuous trench system, a loosely connected set of perimeters established on fortified hill tops, or an array of defended laagers enclosing forces in divisional strength or greater,

makes no difference: the heavier the concentration, the more inviting the target. Getting back to basic figures, 3000 yards is too wide a zone to be successfully interdicted by regimental fires from the flank, unless RCT artillery strength is built to several times its present proportion. When the 3000-yard figure is doubled or trebled, field artillery can not do more to the corridor than harass it.

And besides, there is the other point, that even a gravel pit is too large a hole to be filled by any formation already stretched to the breaking point.

All figures in the discussion have been kept minimal for the sake of accenting the tactical problem. Provided the defensive system is hinged upon a line of strong points, say of regimental strength, with gaps between these bastions averaging 3000 yards and protected by mine fields, antitank works, etc., the sneak attack might be directed toward eliminating two such blocks thereby to clear ground for a corridor initially 10,000 yards wide. In a well-roaded country, that would provide sufficient elbowroom for break-through. However, under the new conditions the attacker must either widen the corridor by rolling up the exposed flanks or duplicate the corridor elsewhere along the line. Otherwise his attempt at penetration is not secure against the chance of effective counterattack by the same weapon which he has employed. He cannot exploit his opening and not risk concentrating his forces in the decisive zone. His entire design, also, may be wrecked by one or two airplanes. That he has achieved, for the time being, possession of the air above the battlefield does not ensure him against the hazard that he may be surprised at high tide.

But so long as any such threat is potential, the attack itself is likely to take the form of successive thin waves of riflemen and supporting (accompanying) weapons, rather than of closely bunched or "mass" formations. That, for the most part, was the form of the Chinese attack during the war in Korea. It is not less sensible when the controlling idea is to keep casualties low in the face of an elaborated defense by automatic weapons as when the object is to deprive the atomic counterattack of highly profitable targets. Its main effects are achieved by the slow, steady squeeze which harasses the defender into excessive rates of fire, leading to insolvency and the aborting of the position.

More than ever, in future warfare the selection of the best possible fields of fire, combined with protection which emphasizes camouflage and concealment more than deep dug works, will be the key to sound defense. Where perimeters will be located will obviously depend on the nature of the country and the natural obstacles which it presents. But high ground with limited possibilities of observation will not pay off. Vital approaches more than vital points will be the dominating consideration. Before making any choice of ground, the defender will have to look carefully to his flanks and rear.

Simply to mention the possibilities of atomic counterattack by the defending air as a means of defense in the second phase raises the question: If penetration can be blocked by such means, after the attack is well developed, why could it not better be forestalled by counter bombing beyond the vacuum area in the first phase while the enemy columns are still enroute and the mass is more concentrated and vulnerable? The suggested maneuver and counter-maneuver is of promising design when committed to paper (see Fig. 5).

If air power could be thus relied on to counter surprise with surprise, linear defense by the field army would have a relatively assured future. It would be the most effective and least costly safeguard against penetration by mass since the rise of national armies. But there are reasons in elementary logic which argue that it is not likely to be done. So saying, we pass quickly over the obstacles of a purely technical character, since the writer knows

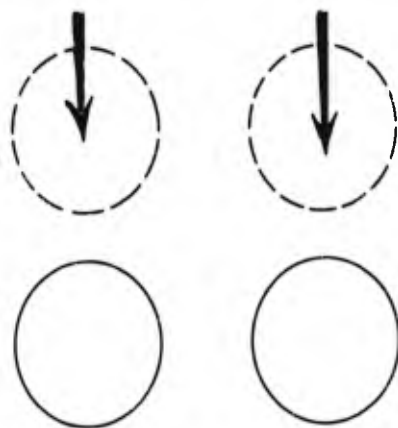


Fig. 5—Maneuver and Countermaneuver

nothing of how atom bombs might be stored under wartime conditions, or of what is involved in getting them loaded aboard plane, primed, and ready for dropping, or of what care must be exercised in the briefing of crews so that the strike will be made on exactly the right target. It would seem, however, that if we are talking about a penetration into the irrupted area which might take place within two or three hours after the first bombs fall, the defending air is caught on the horns of a dilemma; either it will arrive too late or it will have to risk bombing dangerously close to its own troop line. The more obscure the situation, the less the likelihood that it would risk atomic weapons in counterattack against targets approximate to its own front.

In the air as on the ground, the attack possesses certain peculiar advantages because all things have been coordinated previously toward a particular place and hour; communications have been regulated to the one point; air cover has been arranged for the field force in the attack; weather conditions and the almanac have been studied toward the selection of the optimum period for the effort, meaning that the time selected will offer the surest natural safeguards against disruption by counterattack from the air.

The defender will have none of these advantages. To consider one factor only, the blackout to his communications system in the critical area is likely to be of such completeness that much more than a three-hour period will have passed before the high command is able to define the vacuum area and begin the organization of countermeasures.

**PROBLEMS OF THE DEFENSE**

Before passing on, it might be well to take a somewhat closer look at the defense which was attacked by the atom bomb in the situation just described. Among its main characteristics would be these:

(a) The units in and around the impact area were already extended to the widest practical interval as a measure of protection against the bomb.

(b) That extension of itself composed a form of immobility, no matter whether the troops were fighting from within works or were scattered over the fields. The more widely separated the fractions of any unit, the greater their inertia, the more casual their response to control, and the greater their resistance to collected movement, particularly toward the flank or in any new and unexpected direction.

(c) Before the tactical forces nearest the axis of the enemy advance can organize to move toward the threatened sector, they must re-assemble and re-load to meet the needs of the new situation—a time-consuming feature of operation.

(d) Should they be quitting prepared works to re-deploy into the blast area, where their organic weapons might have sufficed for protection against armor in the former situation, they will need an accompanying armor when they move into open ground, if they are to have a good chance for survival.

**EXTENSION TO CONTRACTION**

There is nothing in any way radical about these several propositions. They are the normal cycle of movement upon the battlefield. Troops commonly move from extension to contraction (close order) in order to extend once again in a new direction. If the atomic bomb can compel field armies to do it in some other way, it will unlock a secret which has defied man for 5000 years.

True enough, in much of what is written about the "new look" in tactics which the bomb makes requisite, it is argued that only a greater speed in extensions and contractions (which is another way of expressing mobility) will give field forces the necessary additional protection. It is simple enough to follow the reasoning, though it is supremely difficult to go on from that and define the magic by which the trick can be accomplished. To reduce the human target, security demands the dispersion of force; and to increase hitting power, the offensive demands the concentration of force. The link between these two controlling ideas, under the terms of the new warfare, it is argued, is to "make mobility greater than ever before" so that troops can concentrate at the waving of a wand to deliver a decisive stroke either in hitting or in holding, and then

# CONFIDENTIAL

just as rapidly evaporate into the countryside. Toward bringing off this miraculous transfiguration, the argument continues, "all troops will be mounted in tracked vehicles" which, even though lightly armored, will go far to protect their occupants against heat radiation.

## MOBILITY OBSTACLES

But will the adding of armored infantry vehicles really have any such effect? Soldiers cannot live in tracked vehicles any more than columns of the same vehicles can continue indefinitely in a tactical shuttle. The vehicles must operate from a base and the safeguarding of the base, if nothing else, must require the field force to disperse over protective ground. In addition, and perhaps this is the main point, to the extent that the lethal power of the new weapons drives the field soldier to make yet greater use of the saving protection of ground cover, there is a lessening of over-all mobility and an increased drag upon all tactical action.

This is one of the more forbidding aspects of the new tactical cycle, though as yet there has been little tendency toward realistic appreciation of it. The introduction of the motorized vehicle and the armored fighting vehicle speeded up warfare immeasurably. The tank provided direct protection against the bullet and the motor car made possible more rapid maneuvering to exploit that added protection. In effect, a new protected base was provided for offensive action. In bullet warfare, the ground was the protective element; extensions between riflemen was added to it to reduce the target. During the major battles of World War II, mobile armor largely replaced static earth as a main element of protection, and the rapidity of movement from one position to another gave an increased decisiveness to extensions. The question, as yet unanswered, is this: What will keep that trend from being diametrically reversed by the new weapons which will require the field army to make more emphatic use of ground cover for longer periods while encouraging all troops to thin out their defensive deployments to the limit possible?

A partway examination has already been made of what might happen to a division front with regiments flank-to-flank in consequence of two atomic-bomb hits scoring directly upon one sector. It has been suggested that a frontal build-up by the enemy of two infantry (motorized) and two armored divisions would be sufficient to form and hold the shoulders of the decisive corridor through which the enemy mass would funnel into the rear area. As a rough calculation, the break-out maneuver would probably fill 48 hours or longer, as under atomic conditions, night marches and deployments are likely to be the rule rather than the exception. From that point on, the turning of the battle will come either of action by the strategic reserve (ground) or by atomic counterattack (air) against the corridor position. The latter is a main possibility only if (a) the defender can regain command of the air over the battlefield, and (b) there is material proof that he has no surviving forces within the irrupted area.

When a field division is thus disposed linearly, it is not apt to have a frontage longer than 10 miles; calculating that two bombs can neutralize approximately 8000 yards of this frontage, including the immediate supporting installations, it becomes clear that the division is immobilized and in no condition

to re-vitalize the deadened portion of its line. To imagine other troops yet farther to the flank performing the rescue mission, one would have to envisage their withdrawal from ground conceivably deemed equally important to make a lateral march approximately equal to the distance which the enemy maneuver body must travel forward. A flankward displacement across the path of an offensive is not a venture which tacticians counsel. In the last American attempt of this sort, two regiments of Marines barely escaped annihilation at Yudam-ni, Korea, December 1950.

Should an ample reserve be conveniently at hand, that would be the tailor-made solution. But again, it is to be remembered that when an army is greatly out-numbered, its chance of having the needed reserve at just the right point diminishes in the same ratio that its over-all strength is inferior.

The 10-mile front is a practical figure upon which to base these random calculations, since it is about the maximum distance that a field division may stretch over strong ground and still have some chance of withstanding heavy pressure. In fact, under average conditions of battle that much extension is a gamble (though we have stretched divisions up to 20 miles and more) in that it reduces mutual support between regiments and battalions to the vanishing point. Even so, the 10-mile frontage is a practical enough proposition for the purpose at hand. We can take the same length of division line and bend it. The bending might take one of several forms. We can imagine the division anchoring its defense upon the three sides of a strategically-placed scarp with highly favorable fields of fire outward toward the enemy and obliquely off the flanks. Call it a division box, or a hedgehog, or an acropolis. Say that the intervals which are maintained between its men and its units are approximately equal to the spacings kept when the regiments were disposed along a continuous line. If the position is three-sided and organized for all-around protection, each side of the hedgehog then represents from three to four miles of line. But the average depth of the position will necessarily be less than two miles. Two atomic bombs laid end on end will therefore under average circumstances be as destructive of the unity of the whole as two bombs placed laterally against the division when it is stretched horizontally. The division is not bodily destroyed; indeed, combat-worthy survivors may still ring the general area, with the greater number of men from each regiment remaining unshocked and fairly mobile. But the position itself is like a hollow shell because of the blight to communications and other sensitive installations. In this situation it becomes highly vulnerable to double envelopment with break-through as the ultimate object.

Assume for the purposes of the problem that the shape of the position like the form of the division is roughly triangular. Then it is assumed further that the enemy has the capability of putting the two bombs where they would superinduce the greatest possible infirmity in the defense. Where would that be? By these calculations, the decisive target is the geographical center of the position and the immediate rear in extension of it, since this ground will most likely hold the headquarters, the nodals of communication, main supply dumps, artillery, possibly the attached armor and most likely the local infantry reserve. The figure then is about like that shown in Fig. 6.

# CONFIDENTIAL

In the last stage of the approach to the decisive sector, the troops of the enemy have been distributed as they are likely to be required and not simply marched in that order. They are tactically deployed before they draw opposing fire from the ground. A quite normal formation and maneuver for the attack under these circumstances is the old open square (Fig. 7).

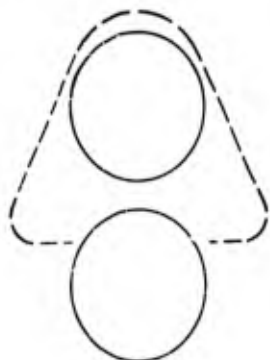


Fig. 6—Atomic Strike on Defensive Block

Force "a" makes contact with, and undertakes to hold, the defender in his forward ground while forces "b" and "c" maneuver around the flanks. The attack by infiltration, or double envelopment, has the dual advantage that it is more likely to frustrate effective re-concentration by defenders in the forward ground, and by bringing the initial attack force into a rapid and close physical

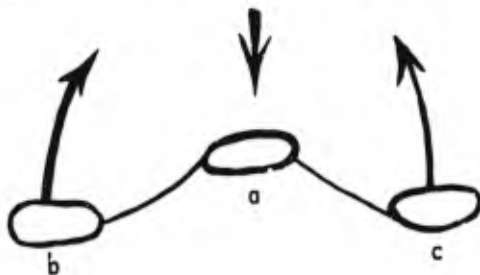


Fig. 7—Local Envelopment

proximity to the defender within the latter's general line, also cloaks it with an additional immunity to counterattack by any of the super weapons, including atomic artillery.

The situation thus far described does not premise any great physical damage to the infantry elements along the defensive perimeter. They still possess numbers of men; they have their rifles and automatic weapons. But they do not have tactical unity within themselves and they have lost the backing of their heavy guns. It should be a fair question whether an infantry thus suddenly unbased can remain capable of defending in place. If there is correctness in the propositions heretofore stated about the reaction of human nature to heavy shock bombing, in the wake of the bomb strike the tactical forces distributed around the defensive hedgehog are already in flux, and its elements are moving toward such natural collecting points as the scene affords, or as

# CONFIDENTIAL

the law of gravity may take them. This speculation does not imply that they will be in panic and running away from their leaders. The latter will move also to retain such control as is possible. For the defensive situation has undergone a diametric change, and the most sensible and stout-hearted men among the defenders will be the first to understand its import and to react instinctively to the new requirement. Contact has vanished. The lines have become unhinged. Units do not know the situation of their next neighbor. When doubt is thus general, men will move, and all procedures should be such as to canalize movement toward reorganization, rather than to forbid it, or to risk that for lack of guidance, motion itself will become the precursor to panic fear and mad flight. In the natural impulse of men to seek their kind in an hour of sudden danger lies increased protection as it develops from effective reorganization.

## EFFECT ON COMMUNICATIONS

In all that has so far been said about the impact upon the defender, there has been only the barest mention of his most critical injury—the wrecking of his communications. So to develop that subject more fully, it should be repeated that in the beginning the defending force already had been extended laterally to the limit permissive of control and united action. But to be effective when spaced at wide intervals, it had not only to possess a solid rear capable of providing artillery support, supply replenishment, etc., but it had to be held together by its telephone and radio net. It achieved extension without isolation only because of these technical facilities.

That's where the rub comes. All possibilities of tactical soundness in extension are regulated finally by whether communications work. The smashing of communications in fact fractionalizes any command. Men can still fight but the battle becomes a general melee of a thousand alley brawls unrelated to any plan. When each unit is thus more or less on its own, its moral power evaporates along with its prospects for support from without. No words adjuring troops that they must condition themselves to bear such a handicap can make them insensible to the shock. As their feeling of unit isolation deepens, with the continuing of the silence in their own rear and the buildup of enemy fire against their lines, they will herd closer together and as the thickening increases, they will at last take the road out. So it was in the Battle of the Chongchon River, and so it will be in the battle of tomorrow. Our defeat in North Korea came fundamentally from communications failures and not from intelligence errors.

Though in the initial phase of the Ardennes battle in 1944, it took our high command approximately 48 hours to get a clear sensing of the frontal situation and to put in motion countermeasures commensurate with the threat, an absolute breakdown in communications was in that instance limited to about the three lower command levels in part of one division structure. From division level up to theater, there was no technical breakdown; the menace to the general situation and the retardation of reaction at the high command level were consequential to the severing of informational ties with the engaged infantry battalions. This is equally true of the Battle of the Chongchon River,

Korea, 1950, the only other surprise in our recent history comparable with the Ardennes. Again, theater and army appreciation of the change in situation ran about 48 hours behind tactical developments. By the night of 26-27 November, the enemy had done mortal hurt to the position of the defender. Still two more days were lost in attempting to save that which already was beyond restoration. But except in II ROK Corps, there had been no breakdown of communications channels and facilities above the company-to-battalion zone of operations. And there were only about four instances in which a battalion CP became cut off. The Army found itself groping in the dark simply because a dozen or so line companies had gone out of contact with higher levels. But there occurred at no time anything resembling a total black-out of a division sector or even of the position of one RCT.

These comparisons are cited simply to illustrate that there has been nothing in our experience which can be likened to the crippling effect upon the communications net produced by one atom bomb exploded upon the gravity center of a field division. The resulting paralysis is not limited to the body of the division; it extends to the highest level of command because the latter cannot order effective counter movement until there is clarification of the frontal situation. The difference in the magnitude of communications breakdown during the bullet-and-armor period and what is potential in atomic warfare is suggested in this diagram:

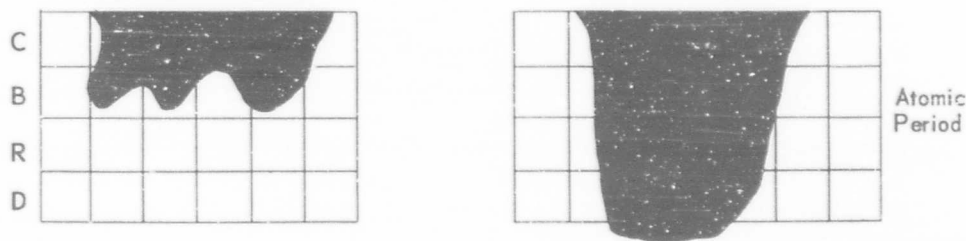


Fig. 8--Impact on Communications

After the bomb drops, the infantry forces deployed along the perimeter may still be physically whole. But the muscle power and the active will of this portion of the line have become heavily impaired. The separated parts can no longer respond to one controlling brain. Somewhere inside the perimeter lies a holocaust of unknown dimension but terrifying aspect. Even those troops which have escaped personal injury are likely to be greatly unnerved, and it is hardly reasonable to expect that in their condition they could be quickly collected, organized, and led to the task of rescue and restoration.

One other factor in the physical (tactical) circumstances bears directly on the question of whether they are likely to have the capability of either (a) making a stand-up fight along the line upon which they are deployed, or (b) self-organizing to cope with the interior situation. From their view of what has happened, they have every reason to think that their part of the front has been collapsed, and that they are therefore standing somewhat naked in enemy country. When troops have any such sensing of their situation, the impulse to get back to friendly lines pretty well dominates their movements and such

# CONFIDENTIAL

security precautions as they may take, and they are not likely to give a second thought to the organization of defensive measures on the spot.

Apart from these comments, what the general reaction of troops in the immediate wake of an atomic attack would likely be is most difficult to forecast. That the behavior of the defender will vary greatly according to the military object of the enemy strike seems highly probable. For example, if the bomb is dropped against a field army just for the damage that will be wrought by the explosion, and the attendant circumstances make it quite clear that the strike is not initiating a general battle, the reaction of the line is likely to be extremely passive until such time as command has re-knit organization by getting down to troops and making positive work assignments in view of the altered situation. To expect units of the line to recompose themselves as a set of volunteer fire brigades simply because the hour is heavy with crisis is an excessive hope and takes little account of troop nature. The commitment of line infantry to its own fire mission has to be nearly absolute if the line is to hold against battle shock. It is vain to expect that men in this service can acquire a wholly new flexibility just because all armies are confronted with new dangers.

Again, however, it is to be noted that under atomic attack, whatever the scope and purpose of the operation, if damage to the defender is to be kept minimal (and the point has particular reference to the conservation of his moral power) the overriding initial consideration is restoration of communications between the fractionalized parts and the still-solid body of the command. As a study problem the restoration of communications (this is discussed in greater detail further along) should have priority over systematization of evacuation, because it is antecedent to all else which requires unity of action.

At Frenchman's Flat, troops were about as carefully shepherded as men can be. They knew that they would not be hurt; science and military command had forces to school them to this particular realization. Hence their response was quite normal. But the safeguards of the parade ground cannot be duplicated on the battlefield, as is well understood. Should war come, apprehension of radiological danger within an atom-bombed area will be greatly reduced among the leaders of troops because of what has been proved by the Nevada experiments. But those who think that the masses of men within an army can be similarly indoctrinated, on the basis of hearsay testimony imparted to them by their instructors, are not reckoning with the nature of troops.

There is that in the nature of man that he continues to be mystified and terrified by the danger which he has not experienced first-hand. Take one example from our own military past. By the end of World War I, American troops were inured to the dangers of gas warfare. When under gas attack, they would respond with almost perfect discipline to the taking of protective measures, and would continue under better control than when subjected to other fires. But that confidence was lost between wars. In late June 1944 a gas alarm was sounded in Normandy, somewhere to the south of Cherbourg. It was a false alarm, and how it got started was never finally established. But the word carried all the way to the beaches, and up and down the line, troops were in a state of utter panic for several hours. Yet any junior leader, who has received elementary instruction on gas detection, possessed enough theoretical knowledge that he should have been able to quiet these fears.

**RE-ASSEMBLY**

Should the bomb be dropped as the prelude to a main assault against the defensive line, the natural and inevitable drift of its parts, possibly even before flat trajectory fire comes directly against them, will be toward the low ground along the flanks and thence toward the rear. In view of the "hollow shell" character of the defense, this movement is apt to have critical proportions even in the early stage of engagement, unless it is anticipated and met as any other natural phenomenon.

Well worth considering is the advisability of SOPs calling for outright and immediate (though temporary) abandonment of the general position, once its interior has been devastated. That action would be taken, not so much because the ground has become untenable, but so that troops can move quickly to new assemblies, reorganize with a minimal loss of time and confidence, and then stake the issue on counterattack back through the same ground. To make use of the same diagram:



Fig. 9—Re-assembly and Counterattack

The small boxes ("A") to rearward represent possible assembly areas. Their location would vary with the ground, the placement of roads, the extent of the devastated area, etc. What is here suggested is only the general principle that withdrawal might be regarded as the first essential step toward reunion of forces and re-establishing of the position. If the enemy forces of air and ground are already present in such strength as to make the maneuver impossible, they will have won the battle anyway.

Here again the importance of the time cycle has to be underscored if the possibilities of situation are to be correctly evaluated. It is assumed that the first full-armed blow against the interior position has hit like a thunderbolt. Even so, a minimum interval of between 1 1/2 and 3 hours must pass before work can begin on the restoration of operational facilities in the outer perimeter of the devastated area. The simple fact that this ground is free of radioactivity or other contamination in lethal quantities within less than an hour does not mean that it thereupon becomes suitable for reoccupation, since there is a variety of collateral dangers, such as a fire sweep through forested areas, the dust storm which would attend the explosion in an average countryside, and so on. The exodus of the ambulatory casualties, including shock cases, will start almost immediately, long before relief forces can get into the same area to systematize evacuation. Second, it is assumed that the enemy will be kept at distance temporarily by these same interditory effects, though he possesses the almost priceless advantage that his troops, proceed-

ing by plan, can be put in motion toward the target area at almost the second the bomb falls. This of itself assures the attacker an emotional safety valve in an abnormally straining situation.

How compare the two moral situations, if the able-bodied fractions of the defense within the bomb-blast area simply sit out the interval standing by their ramparts? The oncoming body has that unity of force which comes of velocity plus mass. "A rapid march exerts a beneficial moral influence on the army and increases its means of victory." By contrast, the defending line in the time-marking period is between Scylla and Charybdis, an unmeasured disaster at its back, a blow of unknown magnitude descending upon its front. This solstice cannot be used to tense men toward the coming fire fight; they are already overly tense.

The prime need of the defenders is a swift change of pace by means of which they can again be made to feel for a brief space the quickening force of organization. That is the main reason why automatic withdrawal in whatever depth the situation permits, re-assembly, and return are suggested as part of the tactical solution.

The argument for this expedient is hardly less valid when use of the bomb is unaccompanied by a spearhead thrust against the front. Provided that the maneuver is consistently practiced and the reasons for it are well understood, it would seem the readiest and most practical way to recompose troops and re-establish command authority. Almost needless to remark, the check points, alternative lines of march, time schedule for withdrawal unit by unit, signal code, etc., would have to be as carefully predetermined as for any other maneuver in the face of the enemy.

It may sound like heresy to speak of such things as re-assembly and march columns in the wake of an atomic attack that might well be launched in several successive phases. But this is one risk that there is no way to avoid running, though the march intervals, schooling of troops for immediate dispersal, elaboration of the warning system, etc., must be regulated toward minimizing the danger to bodies in motion. An army, or a regiment, can no more stand indefinitely in an extended position than a man can hold his arm continuously horizontal to the shoulder. Every tactical unit has to return periodically to a contracted form, not only that control may be re-established, but to prevent moral disintegration.

**TRENCH SYSTEMS**

Any balanced consideration of how earth cover may be used to give tactical forces protection against an atomic explosion must take account not only of what is possible when ideal works are present but of the readiness of an army to raise such works in the face of an emergency.

Here again the subject must be considered under two separate headings: First, is the logistical consideration. As pointed out in an earlier section, a ramified system of earthworks, calling for timbers, digging equipment, drainage facilities, etc., imposes a tremendous weight on a field army, and the load of itself becomes a drag upon the mobility of field forces, even if the tactics which develop out of a system of entrenchments do not have some anchoring effect. The more elaborate the works, the greater becomes the drag upon forward action; to answer that this is not necessarily so is to ignore the major lessons of military experience. The second consideration is the state of training within an army or a nation—whether within the system there is a constant refreshing of those techniques and practices which would enable a field army to turn easily and naturally from the requirements in a war of movement to perform correctly the manual tasks essential to sound entrenchment under modern conditions.

In the spring of 1953 the whole nation was invited to witness, via television, an atomic explosion at Yucca Flat, Nevada. At the scene a small body of soldiers was positioned within works which would have been lethally approximate to the blast had their construction been carelessly done. But all available engineering and scientific knowledge had been sedulous'y applied at this one point. The soldiers survived without hurt: their survival was supposed to be an augury of the durability of our troops against the atomic threat in future war.

Yet coincident with this headlined event of the "Atomic Age," an American field army was fighting from within an entrenched system in Korea against an enemy force which, by some major change in the war's direction, might employ the atom bomb to its immediate purpose. No one thought to raise the question whether things proved in practice at Yucca Flat were applied even experimentally by the engaged field army. Nor was it asked whether the field army showed substantial progress in the theory and practice of employing field fortifications to protect itself against fire from weapons either conventional or unconventional.

Yet these would appear to have been far more pertinent questions than what entered into the building of the bombproof works at Yucca Flat. The field army had been in a relatively stationary situation for more than two years; dur-

ing that interlude, it could draw upon practically any material needed for the comfort and protection of its tactical forces. From base port to front line, good roads were at the service of tactical commanders, running up the ridges to within a few yards of the firing step. Traffic flowed freely; what was requisitioned was usually received forward. Some of the resultant protective structures were expansive and secure almost beyond exaggeration. Battalion and regimental CPs, situated in defiladed space at the foot of a friendly hill, were pillared by 12 x 12, or 16 x 16 timbers, more than ample to withstand the weight of the 8 to 10 layers of sandbags atop the roof. One looking at many of these "temporary" structures felt impelled to remark: "Unless the earth gives way under its burden, they are built strongly enough to last 100 years." Where the protective works were any less ponderous, it still was not for lack of construction materials.

It is not the essential purpose of this commentary to emphasize that in a moving war, or in any type of military operations save those along a flankless front (the Korean front had that character during the truce-talk interlude) works with this weight and elaboration would not be possible in the support area. Further than that, even if the logistical problem was not beyond solution, such works still would not be desirable, since they are always attended by a road complex, the main lines of which sharply point them up as targets, thereby providing steering for the enemy air.

#### UN FORCES' DEFENSIVE SYSTEM IN KOREA

The more important question is whether the defensive system, granting its immobile character, was organized skillfully, and whether the entrenched works and bunkers forward of these fortress-like administrative installations made the best use of the available ground by engineering it in conformity not alone to the need for protection but to correct fighting and firing principles. On this question, which puts to critical test the still larger question of whether we are enabling doctrine, training, and practice to keep abreast of rapidly changing conditions, there is quoted in full the Command Report of one division commander for the month of May 1953:

The selection of positions is generally good, especially with respect to observation, terrain obstacles and natural routes of communication. However, the sector is very wide in terms of manpower and firepower. It is evident that with fronts so extended that frontline battalions must commit all their companies on the MLR and outposts, depth to infantry positions behind the MLR is provided by very limited counterattack forces. Such forces consist of minimum regimental reserves, a division reserve comprising elements relieved periodically for rest, and the division tank battalion.

The principal means of gaining depth (space and time) with respect to the main defensive position is by pushing forward relatively strong outposts whose mission is to hold at all cost. Although these outposts are all less than one mile from the MLR, the task of reenforcing them when under attack is difficult and normally requires elements from the MLR, thereby temporarily weakening the main battle position. However, such outposts in effect constitute islands of defense. They provide mutual support for each other, serve as patrol bases, and limit the infiltration of hostile forces against the MLR or into areas immediately adjacent thereto. Balancing all factors involved, I consider the deployment of the available forces in my sector to be good.

# CONFIDENTIAL

Abandonment of the major outposts would increase the risk of loss of some important centers of resistance on the MLR to a point where the hazard would be greatly increased. Their loss would threaten the whole position and seriously tax my ability to restore the line in whole. Further, with respect to abandonment of major outposts, a main consideration is its likely psychological effect upon the enemy's estimate of situation. I believe he would interpret such a withdrawal as a confession of weakness and an invitation to assault essential MLR positions.

The principal weaknesses are as follows:

(1) Limited strength prevents occupation of positions near the forward base of hills to obtain the best fields of fire, especially flanking and grazing fire.

(2) Many bunkers for automatic weapons are not well designed; few are sited or employed to provide fire to flanks. Generally they are used only to fire to the direct front. Almost nowhere are they dug down so that normal slope can be given the terrain after their completion. As a result, the bunkers for the most part have a distinct profile, clearly visible from the enemy slope, and they offer choice targets for enemy destruction.

(3) Trenches vary from too shallow to too deep. Many have long, straight sections that increase the hazard from enfilade fire during the close-in fighting. Very few have overhead cover except at points where fighting or sleeping bunkers join. Many of proper depth (6 ft - 6 1/2 ft) contain no firing steps. In most cases, no effort has been made to cover sandbags with natural earth to improve concealment. Few trenches exist on the reverse slopes; thus there is a lack of secondary firing positions to the flanks and rear.

(4) Fighting bunkers, in addition to many structural weaknesses, are frequently located so that they give a false sense of security for close-in fighting and become death traps. The same may be said for numerous sleeping bunkers which are integrated with the fighting trenches.

(5) Protective wire needs improvement. The most common weaknesses are (a) failing to repair existing wire, (b) insufficient number of bands of wire, (c) outside band within grenade range of trenches, and (d) dependence on concertina rather than single and double-apron fence.

(6) Communication wire is invariably poor, due to failure to bury it in trenches and approaches. This causes general failure of wire communications during attacks and is highly wasteful.

(7) The concealment effort has been inadequate and far below that of the enemy in quality. Many installations are openly exposed to the front. Others are poorly camouflaged. In this connection there has been little or no attempt to prepare dummy positions.

(8) Minefields are not well recorded. Apparently successive units have placed mines without insuring that locations were precisely plotted and made known to relieving troops. Enemy fire has further upset such locations. In consequence, mines are now considered to be more hazardous to us than to the enemy and there is a reluctance to lay additional ones.

The essence of improving the techniques in this field revolves around the following points, with due consideration for available units, manpower and firepower:

(1) Careful selection and development of positions, based on thorough study of observation, field of fire, concealment, obstacles and communications. Development of positions for actual all-around defense.

(2) Broken trench traces to minimize artillery and small arms enfilading fire. Frequent covered sections of trench and shelters to permit cover from enemy artillery and VT fires on own positions. Adequate depth to trenches, installation of firing steps, and restoration of natural earth and slopes insofar as practicable.

# CONFIDENTIAL

- (3) Sightings of automatic weapons to the flanks for maximum effect to provide final protective fire and maximum coverage of intervening terrain.
- (4) Construction of properly designed bunkers to minimize any changes to contours or profile of natural terrain.
- (5) Separation of sleeping bunkers to reduce absence of men from firing positions during periods of close combat.
- (6) Location of protective wire beyond grenade throwing distance and with due regard to best final protective line of automatic weapons.
- (7) Carefully selected emplacements for searchlights, anti-aircraft and anti-tank (tank) weapons. Dummy emplacements are also desirable.
- (8) Well defiladed communications trenches and routes of approach.
- (9) Buried or sand-bagged wire lines.
- (10) Good distribution and storage of all types of ammunition.
- (11) Reasonable sanitary arrangements.
- (12) Improvement of concealment, camouflage and dispersion.
- (13) Further effort to record existing mine fields.

A training memorandum outlining these techniques will be published. Furthermore, a selected piece of terrain will be organized as a model for the instruction of all newly arrived officers and senior NCOs. In addition a relief model of that area will be constructed.

It is recommended that expanded instruction in the techniques of organization of the ground be instituted at appropriate service schools. Newly arrived officers give little evidence of being well-grounded in this subject and state that they have received minimum instruction in the service schools.\*

These criticisms, seemingly severe in light of the facts that (1) the field army had been settled into position warfare for almost two years, and (2) the division sector complained of was as well engineered as any other, must still be rated moderate and conservative when weighed against the realities of the front itself. To one who had been familiar with the engineering of positions by the American Army along the Western Front in France, 1918, it seemed repeatedly that the most basic and valid lessons of that period had become long forgotten. This, though we have had longer experience with trench warfare in Korea than in France. The writer spent the months of April and May 1953, on this same division sector, and spent this time continuously working with infantry companies or platoons which had been put under direct assault by the enemy, chiefly in the line of outposts; approximately one-third of the time was devoted to the debriefing of patrols which had become heavily engaged.

Every fault in the works, and in the fire effects which were superinduced by the mistaken construction of the works of which the Division Commander complained, invoked the inevitable penalty in battle. And there were other inherent weaknesses within the system which he did not list that likewise cost high in men and power.

Of the 14 company and 13 patrol actions taken under close scrutiny, there was not one in which fundamental breakdown in communications did not occur in the crisis of the fighting, usually because of wire being shot away. This is a normal hazard in patrol actions; but chronic failure in company wire among positions vital to the integrity of the main system is hardly "normal."

The enfilading of our trenches occurred, almost without exception, whenever the enemy maneuvered to within our works. There was nothing to prevent

\*Command Report, 7th Infantry Division, May 1953.

# CONFIDENTIAL

it. Further, the profiles of the American bunkers stood so high above the trench that the enemy, once within our works, was able to use their sandbagged walls as breastworks from which to fire along the trench, thereby commanding it. When he became so placed, it was all but impossible to dislodge him with counter grenade and automatic fire, and the only tactics which availed was for one or two hardy spirits to crawl along the high ground behind the parapets and try to blast him from the flank. Usually, however, the enemy got to the high ground first.

Little or no attention had been given drainage, and any hard rain (lasting for a day or so) took sections of trench and collapsed bunkers. Nonbattle casualties from the latter cause were frequent.

Practically all OPs were extra lavish in their fittings, stood conspicuously on the skyline, and were unattended by any marked effort at camouflage or concealment. Like the average fighting bunker, they loomed so prominently that the enemy could scarcely have escaped knowledge of their locations.

Downhill communication trenches from the MLR to the outpost subridges were invariably dug so deep that it would have been impossible to fire any weapon from within them so as to cover the ridge slope. Yet in many instances they were excellently placed for the putting of flanking fire against an enemy force attacking upslope toward the outpost or for directing fire against an enemy which had already gained it. The main object of entrenchments, judged by their depth, was to provide fullest possible cover against enemy artillery bursts rather than to afford the garrison a reasonable protection without limiting its employment of its own weapons.

Bunkers had been constructed without particular regard to the slopes which they were supposed to cover or the weapons which would be fired from within them. So in many instances the height and outlook of the embrasure made the siting of the weapon excessively high. It could not be turned against the immediate downslope unless the firer leaned out and beyond the aperture. So, in effect, it was aimed only at ground along the flat, beyond the ridge foot, perhaps 500 to 600 yards distant, where its automatic fires overlapped the fires of the artillery and mortars. In many instances the rifleman in the trench was similarly interdicted by the depth of the cut and the height of the parapet. To put fire on the immediate downslope, he would have needed to get out of the trench.

Roads leading to the MLR, under full observation by the enemy, many times running parallel to his lines and often within less than 1000 yards of his position, were at best only superficially screened. At many points the screening had been either weathered down or flattened by the enemy fire; the appearance indicated it had been in that condition for weeks; but there had been no effort to replace it. Where the screening was up, the one layer could not have been sufficient to conceal vehicular movement along the MLR.

Placement of MLR fire trenches seemed to be arbitrary and according to the whim of local commanders, rather than standardized according to accepted fire principles. Sometimes the line followed the military crest; sometimes it was along the topographical crest; along still other ridges, it was somewhere between the two. But these variations did not seem to be governed whatever

# CONFIDENTIAL

by the dominant terrain conditions, for example, the topographical crest being too sheer for entrenchment, or the military crest being rejected because it was too far downslope. In fact there was no discernible pattern.

The majority of bunkers, particularly those on reverse slopes used for sleeping and warming, were excessively heavy in construction; the surplusage of sandbags atop the roofs weakened the timbers and actually tended to break the bunker down under artillery hits; but as the over-all weight of the structure was oftentimes far too heavy for its insecure moorings, the run-off of only a little rain from the bunker, washing away a few inches of soil from the downslope, would often collapse the shelter.

Many of the sleeping bunkers, of no use for anything except shelter in the hour of engagement, were distributed along the fighting trench on that side of the hill which faced toward the enemy. They were thus in direct line of sight to enemy artillery, and for this additional jeopardy to troops, they contributed little or nothing to the defense of the hill, since the reverse slope, as to its contour and structure, was just as useful to the purpose, and promised some defilade.

Works of the outpost positions were usually more soundly engineered than those of the MLR, with better placement and thickness of wire and less straight alignment of the trenches. But the outposts were almost invariably over-munitioned. In places, there were as many as 200 to 350 rounds stored for each recoilless rifle, although not by any circumstance within the imagination could that number be usefully employed by the garrison. For the LMGs, there would be as many as 6000 rounds at hand for each gun, though such were the limitations of the fields of fire that it was self-evident the gun would not be able to fire more than a few hundred rounds against an attacking force, before either the position became overrun, or the enemy was compelled to withdraw. These surpluses made of the position a possible magazine for the attacker without contributing anything to the strength of the defense; this was frequently proven by the course of engagement.

These were among the besetting conditions in the system of fortifications during the spring of 1953. As aforesaid, the field army had already been sitting on approximately this same ground for almost two years. Many of the newly arrived commanders, particularly those with engineering training, were appalled to discover that it was no better prepared, and that "the impregnable line, strongly organized in depth" did not in fact exist. Further, it was conspicuous that within the forward belt of defenses, the one tier which was most vulnerable either to conventional or atomic attack from the air was the front line proper. It presented a continuous and conspicuous target to conventional-type bombing, and its troops were poorly insulated against any of the effects of atomic missiles.

## ENEMY BELT OF DEFENSIVE FORTIFICATIONS

The enemy, whatever the deficiencies of his defensive system, was not similarly vulnerable. Here are some of the salient characteristics of the belt of fortifications on which he had labored for almost two years, handicapped by material shortages, lack of an adequate motorization, and the retracted po-

# CONFIDENTIAL

sition of his air defenses, but favored by the muscle power latent in his hard-driven masses:

- (a) Behind his most forward firing posts, the ridges were entrenched to an average depth of 20,000 yards; this was not in all respects a perfectly reticulated system, but he could have fallen back upon successive prepared positions for all that distance.
- (b) These trenches were a maze which presented few promising and seemingly profitable targets to the opposing air and artillery at any time; there were no easily identifiable gun positions, dumps, CPs, OPs, communication centers, etc.; there were few observable signs of human life or activity even during the after-dark periods of engagement; in its average go against this system, the friendly air could always batter down sections of the trench system, but no real advantage came of so doing; getting at any target more important than that was largely in the nature of a guessing game.
- (c) Rarely, indeed, were groups of personnel in any size seen within the trenches on the enemy side. Normally, the trench maze appears to have been manned only by occasional outposts and lookouts whose mission was to alert the garrison in the event of an attack.
- (d) The garrisons lived under the protection of the ridge mass. Tunnels were put into the ridge from the rear; the tunnels gave into chambers large enough to house a platoon, company, or even a battalion. (These conclusions are adduced largely from information supplied by our returned or escaped POWs who had lived for a time within these caverns amid the enemy garrisons.) Air bombs striking the ridge crests scarcely shook these subterranean shelters and shelling by the artillery was without effect. The tunnel entrances were sufficiently well camouflaged that it was all but impossible to detect them by air photography.
- (e) Enemy artillery pieces were fought from other tunnels put through the ridge near the crest. The guns were manhandled to the top after completion of the tunnel. When fired, they would be run to the forward aperture, and then drawn back into the tunnel when the firing was completed. Entrances to these shafts were so well camouflaged that it was all but impossible to observe them directly or to detect them through air photography.
- (f) Enemy AA guns were fired from deep pits usually dug adjacent to the foot of the ridge. The top of the pit was screened with material which blended quite well into the surrounding terrain. The pits sometimes appeared as a dimple-like spot on an air photo but could scarcely be distinguished from other common features of the landscape. The guns proper were rarely seen, even when engaging.

Though this description is done with a rather broad stroke, these were the essential characteristics of the system. By reason of the great extension of his diggings, his diligent use of camouflage and his recourse to deep ground cover, the enemy had better protection against any type of missile, conventional or fantastic, from his earthworks than did the Eighth Army. The two systems were quite unlike, but each line was immobilized by the conditions which it had accepted. Among the Chinese, the infantry advance was slowed to the turtle-

## CONFIDENTIAL

like pace of its cave-anchored guns, because with any penetration of the opposing line, as in the offensives against the ROK divisions in the summer, 1953, the assault waves moved beyond effective help from their own artillery. The Eighth Army became immobile because it was too understrength to defend from a trench system and still retain forward offensive power. By military theory, trenches are dug for the purpose of reducing the numbers of men required for the defensive, thereby adding to the general reserve, or striking force. Trench systems are supposed to be planned so as to enable the resumption of the offensive from them. As trench warfare commonly adds little to skill, improved organization, training, and moral power, it is axiomatic that every effort should be made to reduce the number of men employed in it, so that greater numbers can be trained for offensive action. But the Eighth Army in its first two years of position warfare had only sufficient men to garrison its trenches, and this thin line was always at least 50 percent deficient in fighting experience. This lack of flesh made it a paradox: it was a mobile army compelled to use the implements of mobility only that it might sit and survive.

Neither of these postures—the one enforced on the Chinese by their lack of air power and motorization, and their protective tactics of rooting themselves into earth, or the one accepted by UN forces because of unwillingness to build forces which would enable the organization of a sufficient strategic reserve when measured against the length of the line to be defended—is unthinkable in a future war between major powers engaging with atomic weapons, since the relative deficiencies of the two sides invite a broad comparison with what happened in Korea.

Greater mutual destructiveness within weapons systems is more likely to superinduce more rigid paralysis and greater inertia in both sides than to generate that war of more rapid and elusive motion, orderly dispersion, and quickly collected surprise which everyone talks about, but no one has yet proved to be a tactical possibility. To envisage that armies will seek the protection of earth as their only hope for survival against atomic weapons, and then to postulate that to operate in such a war, they will fight on more extended fronts, be marshaled in greater depth and, at the same time, develop greater hitting mobility is to entertain in one breath three mutually contradictory ideas.

But there is none the less immediate need for a complete re-survey of the possibilities of trench systems, of the logistical implications of any such total development in future war, and of the principles which will best conserve the fighting power of an army under the foreseeable conditions.

The main point is that deep protective works in the frontal area and readiness of movement in the hitting parts of a field army cannot both stem out of one system of warfare. They have never done so in the past, and there is as yet no intimation as to how any such miracle can be achieved in the future. The suggestion that we can modernize the machinery needed for infantry entrenchment so that great works formerly requiring days of man labor may now be thrown up in a few minutes does not begin to meet the problem. Recourse to deep works will still throw an insupportable weight upon any field army endeavoring to retain offensive mobility plus elusiveness of maneuver. Effectively deep trench systems cannot be concealed; they cannot be moved; their duplication must continue to require a major effort.

## CONFIDENTIAL

Of their value as protection for the field army in future war, there can hardly be question. The western front of World War I would have been highly vulnerable to atomic attack because its artillery parks, supply dumps and roads, headquarters, etc., were nakedly open. Back of the front line trench proper, little better than splinter-proof protection was ever afforded; to have provided more than that again would have excessively strained procurement. But the works used along the front to protect infantry against massive artillery concentrations would also have conserved life against atomic attack. The conventional heavily-timbered dugouts, the hillside creusets, and the vast underground galleries like those already existing on the Allied side around Arras and those which the Germans especially constructed on the Aisne, might save the field army of the future, if protection were the only consideration. But these fixtures were a growth which came of tactical paralysis, and in turn, they but superinduced greater inertia in the tactical body.

If atomic war is to be, as the prophets say, highly mobile, then the chief cover for the individual fighter will continue to be the foxhole, and elusiveness, rather than protection overhead, will be the main safeguard of the field army.

# CONFIDENTIAL

## DEVELOPING THE TARGET

The problem of how to find, evaluate, and fix suitable targets for atomic attack within the body of the field army, meaning its people, positions, and administrative installations, calls for special consideration in any study of the impact of the bomb upon defensive systems.

The reasons why should be fairly obvious, since the proposition has already been advanced that the bomb must revolutionize field tactics. But in all operations, mobility in finding and efficiency in hitting are complementary factors; the impact of any new weapon upon tactics does not reflect in ratio the killing power of the missile. If the latter remains constant, its efficiency as a killing agent must still, in the practical terms of the battlefield, be expressed in small fractions because of inaccuracy in target intelligence and imperfection in means of delivery. It is the familiar experience in war to see missile power in all categories far more wasted than not because targets and aim are about equally uncertain. What always astonishes the observer is that out of the great masses of deadly material which are exchanged, such an infinitesimally small part of it ever finds the mark. One can take another look at the figures for the Verdun battle. On the contending sides, approximately 850,000 men were lost in a battle which saw the spending of 42,000,000 artillery shells, many of large caliber. This was notably the greatest battle of attrition in world history, the pronounced object being to win by drawing blood in decisive amount from the opposing force. Weighing it out strictly as an artillery duel, the casualty-making efficiency of its artillery would measure out at less than .02 per round. That is to say, it required 50 shells to wound or kill one man. But even this figure is highly unrealistic. It takes no account of small arms fire, mortars, grenades, the bayonet, etc., which in aggregate probably caused as many casualties as the artillery fires.

Verdun was not an exceptional situation in this particular. The peculiar elusiveness of the target probably causes more battlefield difficulty than all other frictions combined. Of missiles in any caliber, hundreds of rounds are fired. And out of several hundred, only one will find a soft target.

So it is to be noted that the bomb will be subject to the same imperfections in delivery as have kept relatively low the killing and destructive effects of the more conventional missiles which are delivered by air power. Will it therefore have the same relatively low order of killing and disrupting efficiency? Is there reason to believe that because of the vagaries of target intelligence, etc., only 1 bomb out of perhaps 100 or more will have crippling effects upon the body of a defending army? If so, it is indeed a comforting thought, if only because of the relatively small numbers in which an atomic stockpile is counted,

# CONFIDENTIAL

when compared with conventional ammunition. One thousand bombs; perhaps 10 direct hits; each possibly doing critical damage to one regiment; it is still not a prohibitive situation. But to see whether this assumption has any basis in realism, it is necessary to look at various other factors relating to the bomb's possible employment in the attack.

We may take it that the air-transported tactical bomb is not the kind of weapon which lends itself to attack on targets of opportunity during the beginning of war. In that function, at least, it does not become a substitute for conventional bombing. To suit the characteristics of the weapon, the targets must be at least semi-static, instead of having the elusiveness of the Irishman's flea. That is to say only that the position and value of the target are not likely to fluctuate greatly over a period of 2 to 6 hours after the target is first reported. (It is impossible to be more exact because of such variables as the distance separating the general front from air bases where the bomb may be loaded.) If this is a valid calculation, then it is unlikely that the tactical bomb will be used, or at least given planned employment, against columns or bivouacs during the approach, either at the beginning of war or in succeeding phases. That does not mean, however, that the field army, in movement, can count on immunity to the bomb prior to contact. An atomic assault on columns might develop in this manner: attacking air, bomb-loaded, might be en route on a mission against main bases and marshaling areas; in transit the formation intercepts a large-scale movement or assembly; the decision is made to change targets and strike at the tactical body.

## AIR RECONNAISSANCE

It is not too great a generalization to say that for employment against columns during the approach, the tactical bomb is subject to the same limitations as are the more conventional missiles used for attack from the air. And there is the added limitation that should fissionable material be in relatively limited supply in the forward area it is not likely to be used experimentally in a highly fluid situation. What is the main difficulty? Simply this, that air reconnaissance, in its findings during periods of great flux, identification difficulties, and other confusions, has only transitory value which may be subject to total change within the next half hour. The search plane goes forth and sees a column of armor or of men. The location is described accurately as is the axis of advance. But before the reconnaissance element has returned to base, it is likely that the column has changed direction, hidden itself under roof or tree cover or displaced to extended positions within the hills. This was not an unusual phenomenon in Korean operations; and when the enemy columns moved only at night, interception by US air became largely a matter of luck rather than the consequence of systematic search followed by prompt hitting.

In part because of this lag between successful search from the air and the initiation of attack upon the indicated target, the danger or likelihood of systematic destruction of upcoming columns by atomic missiles would not appear to be excessive; this is particularly the case when the columns exercise normal prudence by making maximum use of night marches, avoiding absolutely entry into constrictive defiles during daylight hours and adhering to sound dis-

## CONFIDENTIAL

ciplines in such matters as camouflage, minimal use of radio communications, and compliance with the warning system. Conventional strafing is not a lesser danger than in the recent periods of conflict but there is no new dimension in the threat which would seem to prohibit marches in fairly close order or to require more extraordinary safeguards than those already mentioned.

However, in retrograde movements, columns will be radically more vulnerable and attractive to atom-bomb attack than during the advance, and for the following reasons: (a) the general pell mell character of withdrawals, (b) the tendency to relax security precautions therein, (c) the temporary freedom of the attacker to advance his own air bases with relative impunity, (d) the fact that every enforced extension anywhere within the retiring body becomes a dangerous drag upon the plan of the defender and the movement of his rear-guard, and (e) the tendency in withdrawals to hold to the shortest and straightest line of march. When these various points of vulnerability are considered as a whole, it would seem to be relatively clear that atomic attack against a retreating field army should be a highly profitable exploitation of the weapon, since the bomb does not have to land directly on a soft target to be greatly disruptive of the defender's intention. Any solid strike against the latter's right of way is likely to cause critical disarrangement. (While this study undertakes to examine the problem of defense against the bomb in a general way, rather than to analyze what might come of the present situation in Western Europe, it is pointed out that the NATO forces in the west hold a posture which, should war come, would necessitate in the initial phase a prolonged withdrawal by their columns. Early use by the NATO side of atomic weapons against the enemy interior or his advanced troop stations would therefore rebound against the retiring field army in its hour of greatest vulnerability, provided the forces remain disposed as at present.)

The putting on of an atomic attack, where its accuracy and effectiveness are in the main dependent on the prior reconnaissance of forces which have been moved up to battle positions, or have entered into favorable ground where they expect to engage, though still awaiting contact, raises a wholly different set of considerations. What are the accustomed means of "finding and fixing" as they have developed during the wars of the current century? First, as to reconnaissance of the field army by means of air observation, the evaluations which come of it are dependent on: (a) what is seen or felt by the pilot and crew; (b) air photos and interpretation; (c) the intensity of AA fires over areas which have no significance other than as field positions; and (d) persistence of air defense over these same areas.

Provided that all possible use has been made of natural cover, and that the defender has made optimum use of camouflage, not only toward the concealment of his larger and more conspicuous installations but in the habit of his individuals, then the more inertly the defense reacts to the presence of hostile aircraft prior to contact, the less any of these methods will contribute to enemy knowledge of the outline of the concentration area. This is a simple statement of a rather obvious fact—that when the defending field force has taken the precautions consonant with security, the best defense against reconnaissance is no defense. Flying at 5000 feet or over, what a jet pilot can see of well-screened defense works, particularly when they are of the bunker type rather than open entrenchments, will never be sufficient to validate a concrete

CONFIDENTIAL

estimate of situation. When, in addition to the concealment of position, the defense has trained its individuals that upon approach of hostile aviation, while in position, they are to scatter and either seek cover or go flat (so as to cast no shadow) and thereafter remain motionless until the air is clear, pictures taken from 5000 feet or above are no better than a guessing game. They may reveal something, but it will be an extremely limited exposure; it is always much simpler for the PI to be fairly positive about what he reads from the picture of an already predetermined target than to assume for the commander the responsibility of saying: "By the signs, this is unmistakably the major target area." Our own air in its Korean operations, November 1950, provides an example of this aberration. It saw signs indicating that some forces had entrenched along the ridges east of the Kuryong and north of the Chongchon Rivers; these it reported. But it missed in total the fact that the enemy had massed upwards of 100,000 men within this area, only a fraction of whom had deployed into works.

Both the Japanese in the Pacific war and the Chinese in the Korean war adhered quite generally to the defensive principle just described (and with a high degree of effectiveness) until there transpired such further developments as proved that the location of the position had become finally disclosed.

Lightness in works makes for lessened difficulty in concealment. Higher speeds in air reconnaissance means less time, less chance, for accurate, meaningful observation. It is a widening gap which can never be spanned by technical improvements in air photography, no matter the invention of cameras which take "perfect pictures" from 30,000 feet altitude during night operations. Considering these things, it might be argued that on an ever-increasing scale in the future, furtive methods in air reconnaissance will be succeeded by combined reconnaissance-and-hitting in which fairly large-scale air formations will be committed to more or less random exercises with the object of stimulating ground resistance and thereby compelling the defender to reveal his positions. But from 20,000-30,000-feet altitude, air pictures will not give away the position of a field army unless it is tightly closed, deeply entrenched in works which are plainly marked from the vertical view, and is lax about the conduct of its individuals. Heavy counter-air and AA effects over countryside which otherwise would not warrant concentrated defense is therefore the main possibility of disclosure. Whether these can be profitably avoided, or moderated, to achieve the same end sought by the masking of a front through the establishing of a lightly-held line on forward ground, appears most questionable, since the defending air must contend with the hazard of engaging while it can still fight or being destroyed at its bases, and the defending AA must do all possible to aid its battle.

Enemy agents are a second source of information as to the assembling and disposing of the field force. The limits of this study allow no extensive comment on that subject, other than the remark that in a war opening with an immediate retrograde on one side, agent activity is given a maximum opportunity because of the impossibility of exercising tight control over the movements of individuals from one camp to the other.

# CONFIDENTIAL

## LAND RECONNAISSANCE ARMS AND TECHNIQUES

This section is concerned mainly with the reconnaissance of the positions of a field army by those forces from the other side which also maneuver overland. In pre-mechanized warfare the usual plan was to send forward large forces of independent cavalry as promptly as war was declared, their mission being to gain liberty of movement for the infantry masses which followed them. As both the infantry and the cavalry had to be fed, and the food had to move by wagon or the railroad, neither could move very far ahead of the supply establishment, or be any great distance separate from the other. Much romance has been written about how well the cavalry served the infantry in former times by "developing the situation" but it has little basis in historic fact. More frequently it happened that cavalry outposts faced each other unsuspecting, while less than 3 to 4 miles apart, although the main bodies of the opposing armies were close enough together that they came in full collision on the following day; the field of Koniggratz is one prime example. Von der Goltz wrote of the mission: "Cavalry is really the eyes with which an army sees. It should find out the enemy's marching columns, camps, and outposts and then keep them constantly in view. Cavalry should circle the foe as with an elastic band, yielding to his pressure only when it is strongly exercised." As nicely stated as is this ideal, in practice, and particularly in battles fought after the rifle bullet began to dominate the battlefield, cavalry screens were of less service for exploration, and for developing the profile of the enemy strength and position than for securing its own main body against surprise. When the screen was too light in strength to attempt both missions strongly, security was made the overriding consideration. The reason why cavalry largely failed as the eyes of an army in movement is elementary—the horses couldn't stand the fire. And it was only in the measure that the screen could succeed in developing volume fire against itself that it could determine where concentrations were established. Oddly enough, after armor came in, despite its much thicker skin, it did hardly any better. The light, fast tank was intended for that purpose, and again much romance is written about how beautifully it serves the intended object. But large tank battles, and offensives-in-main in which concentrated armor is used to clear the way, have scarcely ever developed in that manner. Usually the light tank screen is riding just ahead of a heavy tank bludgeon with a rapid-moving break-through mission, and the light tanks hardly more than bump the screen of the other side before they are passed through by the weighty metal concentrated behind them. In short, light armor hasn't been given much chance to lock with static weapons along a general defensive line with the object of probing until the pattern comes clear, stirring all the long-range resistance possible and then reporting where defensive strength is concentrated. Light armor is not even fitted for the role if the defense is armed with anything stronger than .30-caliber weapons. Like the horse, it is good for security, but it is not a dependable offensive scout. The picture and possibilities for the immediate future are not radically different from what has been known since 1918, following the disappearance of cavalry and the propulsion forward of armor as the main element of field reconnaissance. Irrespective of the size and composition of those forces from the attack which have the mission of screening, scouting, probing, and, in general, developing the profile of the defender's situation, the accuracy

of the estimates which derive from its operations must continue to be pretty much in ratio to its degree of success in drawing volume fire to itself, and incurring such losses as are necessary in so doing.

Suppose, for example, that an armor-infantry screening group in the strength of one RCT is put forward for this object. Suppose there are six or seven such groups, all doing reconnaissance, all maneuvering on a generally parallel line toward the defensive front with each group advancing along one main avenue of approach. Suppose that at a given point one group draws infantry and SP gun fire of such intensity, possibly supported by tactical air bombing and strafing, that it feels compelled to check and later to retire. These findings of themselves convey to higher command nothing more conclusive than that defending forces of unknown size and intent have gone into action at a certain spot on the map. The unknown force's mission might be any one of a number of things; it could be a reconnaissance group operating far forward of the main body, a blocking force covering a retirement of the main body, an outpost helping to mask a general front displaced a considerable distance to the rear; it could be a center; it could be a dangling flank. Therefore the fires from the single contact fix nothing, despite the local action being sharp.

But if within the span of a few hours three or four such groups became seriously engaged by sustained fires coming from high ground, and each group attracted a shelling by field artillery in such volume as to indicate that more than one defensive battalion had gone into action at each point, there would then be warrant for concluding that the screen had bumped the line on which the defender would stand in main strength. If the screening effort is coupled with the intention to use atomic weapons as early as possible in a line-shattering effort before the forward maneuvering element has been hurt and slowed by the defender's steel, then it can be expected that the reconnaissance screening movement will be made in greater strength and pushed with greater determination than in former wars. Instead of appearing, half-extending, exchanging fire briefly, and then withdrawing out of range, they will be prepared to advance until they are definitely fire-interdicted, and then deploy fully, dig in, and hold their ground.

This means that the groups used for the pinning mission, which develops directly from the reconnaissance in force, could hardly be less than one regiment of infantry plus one battalion of artillery plus one battalion of tanks, with signal, engineer, medical, and other supporting complements. Each force will be self-sufficient and because of the nature of its mission will have a long supply train.

These highly mobile and heavily armed spearheads, although likely to be the decisive element of the field reconnaissance system, since they alone will possess power to compel the defending fire base to reveal itself, will probably be paralleled by other lighter screening groups. For the maintenance of contact along the general front, motor guerillas and armored patrols seem destined to play a leading part. Since fronts are not likely to be continuous, and the thin-skinned elements can be of most value by raiding against communications in the gaps or against less-lightly held portions of the line, they can be expected to point toward the weaker ground as the attack advances to contact.

Cross-country vehicles of the jeep type, accompanied by mother-truck (half-tracked) fuel suppliers and thin-plated fighting cars are among the likely

# CONFIDENTIAL

constituents of this type force. Since the mission is strictly to reconnoiter and help develop the profile of the defensive position rather than risk becoming compromised and held, these swarms will be primarily vehicularized and otherwise equipped for mobility, rather than for hitting power and protection. For that reason, they are not apt deliberately to attempt the breaching of the more lightly held AT zones when they bump against them during reconnaissance. The initial threat to the softer areas is that they may be penetrated early through one or several of the heavily-armored TFs mistaking the lay of the defensive system, getting in deep and becoming unable to back away. But the attack, as to its plan and intent, would hardly undertake deep penetrations piecemeal while still not knowing the strength and positioning of the defense. (It has, of course, been done; the North Koreans attempted it repeatedly, particularly in attacking the Naktong Line; it was invariably expensive to the attacker.)

A main task of the light reconnaissance swarms would be the scouting of the ground itself, as to its suitability for armored maneuver, for the future purposes of the main body. As to war in Western Europe, it must be assumed that the probable enemy possesses full working knowledge of the terrain and would be concerned only with those local situations (marsh, flooded area, etc.) which are subject to seasonal change.

It is taken for granted that the defensive position will be screened by its own mechanized and other highly mobile elements, and that the conditions of the withdrawal to the prepared ground will not inhibit establishing this screen. Nonetheless, it will be compelled to fold back from the forward ground prior to feeling the enemy main body because of the superior weight of the attacking metal. The heavy reconnaissance TFs of the attacker, by pacing the advance, will compel general retirement of these mobile elements to within the prepared line. The lighter swarms, being echeloned somewhat to rearward, may then press toward the lightly held interstices of the line with relative impunity.

Tactics of the defense should be shaped toward a sucking-in of these soft elements. This means that while they may be checked finally by mine fields or other static works, they should not be turned back prematurely by random fires.

Should these light reconnaissance elements become deeply enough entered into the defensive system that the way opens up for the mobile forces disposed to the flanks along the high ground to take them in the rear (and the placement of wire, tank traps, etc., covering the gaps normally should be sufficiently retarded to allow for this), the double attack would be the best way to pinch them off. The dual attack out of a defensive zone against a shallow penetration is always a difficult maneuver; more than in other movements, time is of the essence because the fires from both flanks must be conserved until the movement is well extended; otherwise, the entrapment is not likely to take place and the pinching-out forces are apt to be stopped by their own crossing fires. But when perfection of communications enables coordination from the beginning, surprise is probable, and from surprise, success becomes relatively certain.

Thus far there has been a brief consideration of how reconnaissance in force by an army may develop around two greatly dissimilar elements: (a) heavy groups which will seek engagement to make the front react with extended volume fire, and may seek to pin the forces manning it until its own main body is within tactical striking distance, and (b) light groups which will seek to avoid engagement while carrying out look-and-run missions which will take them to the weaker ground.

# CONFIDENTIAL

Much of the foregoing is of necessity highly speculative; it is appropriate to this study only as it provides light on the question of whether an attacking field army can so maneuver as to break a general front by hitting it with atomic bombs without unduly wasting its reserves of that weapon. To put the question in another form: "Does the bomb make possible a new and more efficient economy in the attack or is it subject to the same limitations, as to wastage in use, known to other weapons?"

## DIRECT FIRE RECONNAISSANCE

In seeking the answer, study has been limited to what might happen, should there be at the beginning of a war a pre-set withdrawal by one side for the purpose of giving battle on stronger defensive ground while the other side advances upon it almost immediately, intending to force the decision; it, too, is acting according to plan. There are good reasons for limiting the inquiry to this one line, while adding the further assumption that the defender has made good his withdrawal and gotten the greater part of his combat force back to the prepared ground in good fighting condition. What has been described puts a maximum load on the attack. To seek decision by full battle right on the heels of mobilization strains all communications to the limit and creates the greatest difficulties in coordination. Whatever must be regarded as a possibility under these conditions should be acknowledged as yet easier of accomplishment when forward movement and concentration are more carefully regulated under a less audacious timetable.

Furthermore, the full-length attack at the start is the rule rather than the exception in wars where mechanized power is the mainspring of the offensive. In World War II, the battles of France, Poland, Finland, Norway, the Balkans, and Russia all had this character, and each was in a very real sense an opening engagement, since it widened the area of conflict. The Japanese attack into Malaya and the North Korean assault upon South Korea are other examples of this phenomenon, that the opening attack by even a partially mechanized body in our time inclines to go pell mell, endeavoring to overwhelm the vital point immediately the first fire order is given.

From the historical view, it might be argued that the probable enemy in this case has been, more often than not, of a more cautious nature and is not likely to go all out at war's beginning. But there are as many of his campaigns in disproof as in affirmation. What might be concluded from the early fumbling which attended the 1939-1940 war against Finland is cancelled by the headlong advance which brought the disaster at Tannenberg; and the swift rebound after Stalingrad, by the same token, cancels Mukden. Moreover, it seems reasonable to believe that the probable enemy is as susceptible to the influence of his own weapon-power as are other people and that the boldness of his tactics will be in measure with operating radius of his major weapons. To review the wars of this century points up a significant question: When the attacking side is preponderantly strong in armor, so much so that its metal can be relatively sure of right-of-way over the armor of the defense, has it yet happened that this advantage was foresworn to throttle a general advance to the pace of marching men? The answer is an unqualified "no." There is that about the mere possession of superior armor which appears to predetermine the momentum of

# CONFIDENTIAL

attack, despite the frequency with which excessively rapid advance by the more mobile elements has itself led to imbalance and the separation and beaching of forces.

Not only has the attack been infinitely speeded up and given more staying power; it erupts with an initial violence wherein reliance on sheer power has largely displaced former precaution. What has gone pretty much unnoticed by the tacticians is that field reconnaissance, as a preliminary to the attack-in-main, had undergone an even more radical transformation than the form of the offensive. Pre-battle reconnaissance and the attack by the field army were once as separate as the huddle and an off-tackle buck in football; now they are both part of the same running play; one phases so swiftly into the other that the two are in fact indivisible.

Review the main literature on the subject of pre-battle reconnaissance as published during the past century; then continue the search right up to the present! It will be found that its processes are usually described in about these general terms:

A screen goes forth well in advance of the main body.

It prods, looks, interrogates, and picks up all possible information as to the general dispositions and strength of the enemy.

All that is perceived by its eyes and ears during this task of observation is transmitted to the brain of the main body.

Based upon the information which it supplies, the body of maneuver is then redressed to take advantage of the revealed enemy weakness.

This is an ideal, and indeed, a very beautiful picture. There is perhaps no point in pursuing the question of how many times pre-battle reconnaissance has really succeeded in achieving these perfect ends in the more than 100 years since the rifle bullet first began to dominate the battlefield. It is enough to note that the traditional description no longer bears the faintest resemblance to reconnaissance as it is conducted in front of a modernized field army launched in the attack. The danger from atomic weapons, which compounds the threat to every concentration, will for the same reason promote greater need than ever for maximum velocity in the overland attack, thus compressing pre-battle reconnaissance forces even more tightly to the main body.

Now what is the essential—the fundamental—technique of pre-battle field reconnaissance in this age of armor? It is the attracting of fire from the other side, and through this means, the exposure of the extent in width and depth of the defending position and of the probable strength contained therein. It is rarely anything more than that, and it certainly cannot be anything less than that. When along the Chongchon River, the Chinese Communists first came forward with little groups of decoys trilling flutes and sounding rattles, walking straight into the American lines, while still not a shot had been fired by the maneuver body concealed by the brush and rocks 200 yards or more to their rear, our troops were first amazed by them and later amused by them, regarding their methods as highly primitive. But this was quite modern stuff. The object was to bare the defensive position by tempting its fire before the attack had wasted any of its ammunition or strength. And the object was usually attained. Except for the substitution of music for hardware, what was done on that decisive North Korean field differed little from the standing procedure for "developing the situation" wherever battles are fought by mechanized or partly-

# CONFIDENTIAL

mechanized sides. No matter how exhaustive prior intelligence may appear to be, one does not actually know what is there until one begins to punch. In the limitless open spaces of the North African desert, effective reconnaissance was sometimes done at greatly increased range. But that terrain is an exception. Motorization, despite that in theory it gave vastly increased operating radius to the gas-propelled reconnaissance element, did not in fact achieve that effect because of the weight and impetus of the steel monster breathing hard on its neck. Perhaps the cause, as here stated, is a little over-simplified; the saturating violence of present-day firepower which beats a field army into earth almost immediately and leaves only its shirttail visible has more than a little to do with it. But there is no doubt of the effect; field reconnaissance prior to battle has become simply Round One of the fire fight. Despite such advances as the jet plane, radar, and radio, the fog of war remains just as thick as ever because of the rapidity of changes in situation. Contact is more difficult to maintain than in the time when the picketing of an enemy force was a fairly simple matter. And the darkest hour is usually just before the shooting begins.

What is written here is not intended to imply even slightly that fire—the giving and the receiving of it—is the only means of establishing general target information. Partial, collateral intelligence will continue to flow from a multifarious variety of sources. When the enemy is located on ground from which he cannot withdraw, and when there is ample opportunity to observe him there for a prolonged period, examining his works at fairly close range from the air and from ground level (as in the Pacific atoll operations) it sometimes becomes possible to estimate his approximate situation without recourse to direct engagement. But in a going battle, under the mobile conditions of today's warfare, direct fire reconnaissance will continue to be the major decisive means by which the attack explores and pins the situation of the defense. Though this statement is in conflict with doctrine, it is believed that research of the main battles of the past 14 years will prove the proposition correct: Guderian's crossing of the Meuse, the experience of von Bock's armies at Smolensk and in front of Moscow, the battles of Salerno, Tarawa, Omaha Beach, and Arnhem, and what happened on both sides of the hill during the closed siege of Bastogne are just a few of the celebrated actions which could be profitably studied by anyone wishing to develop a body of proof. Patton's advance to the Moselle trench is an object lesson. As another example, the threat of the Austrian Redoubt area in the spring, 1945, was taken with particular seriousness, despite our freedom to observe from the air, almost until the hour when American forces, getting into it, found nothing there. Most of the operations thus far mentioned were major battles. But the same statement would hold good of practically every action fought among the ridges of Korea.

Giving due recognition to the decisive importance of direct fire reconnaissance leads to a startling set of considerations about the further development of field tactics under atomic conditions. Assuming that tactics will be re-shaped around atomic weapons as the major killing or break-through instruments, and assuming that atomic weapons remain expensive and more scarce than conventional missiles, one paradoxical effect may be to require a large increase in conventional weapons, especially weapons of mobile warfare. If the bomb is to be used decisively, its employment against the tactical parts of a field army cannot be left to the odd chance that profitable targets

# CONFIDENTIAL

will be discovered. It can be assumed that the enemy will be aware of the perils of expansive and prolonged concentrations and, if left alone, may largely avoid them. It follows then that targets must be deliberately developed by means of attack or defense by conventional arms which are themselves considered more expendable.

Schematically, the situation which will govern grand tactics would seem to be this: marked superiority in conventional weapons by the side which also possesses the preponderance of atomic force would tend to produce battles in which conventional power is used to carry the action through to the point where the bomb can be used climactically. Rough equality in conventional arms used by both to compel concentration would put the test directly to the balance of atomic capabilities. Finally, a preponderance of strength in armor, for instance, in the hands of an enemy weak in atomic weapons could largely void the effectiveness of atomic bombs used against his field force because his greatly superior count in armor would enable him to avoid dense concentrations. It is the weaker side which must accept greater risks by attempting superior concentration at one point.

The effectiveness of atomic weapons used tactically may therefore depend far more than is yet realized on a high degree of mobility and a willingness as well as a capacity to accept high initial losses. There should be nothing particularly startling about this forecast, inasmuch as it simply extends the curve of weapons development which began with World War I. Greater mobility means more battle energy and energy means increased carrying power as well as moving power, and consequently increased protection as well as augmented offensive power. It is not by accident that the more mobile war has become in this past quarter century, the stronger has become the demand for greater destructive power and more perfect balance within the weapons system and the TE of tactical organization. Few, if any, old weapons have been eliminated during this cycle of expansion; to provide maximum impact to each new weapon, such as the tank, the trend is toward improvement and increased numbers in each supporting weapon.

Now as to the nature of direct fire reconnaissance, its progressions are so well-known to those who have experienced mobile combat as hardly to require statement. A moving body may come under initial fire from several SP guns; for the time being, the happening may mean little except that the force had best exercise caution. But let that fire be joined within a few minutes by rifles and automatic weapons firing from a wide front, and the attack knows that its movement has been anticipated and it is dealing with at least a serious block. Should the defensive small arms fire then become supported by light and medium field artillery in strong and steady volume, it is self-evident that the position has depth and it becomes a reasonable conclusion that the reconnaissance group has bumped against the MLR.

Any time that direct fire reconnaissance proceeds to this degree of engagement, it can positively identify highly profitable tactical targets for atomic attack and so long as delivery is reasonably accurate the wastage of missiles will be relatively small. There should be no reason whatever to doubt it. Depending on weather, cover, and various other conditions, the source of flat trajectory fire is not always determinable within less than a couple of hundred yards, when the exchange is irregular and in small volume. But in any true

# CONFIDENTIAL

fire fight, men know the height, the hill, or the copse from which they are receiving steady resistance, and while the data may not be good enough to bring in mortar or artillery shells on just the right spot, it is almost invariably good enough to enable counter fires, including air bombing, to have a somewhat damping effect. If there is any doubt on that score, we should review the records of our own fighting since 1941; it will be found that the situation could almost always be developed any time that we were ready to trade blows and that it usually remained obscure so long as reconnaissance was limited to less hardy methods. The large-scale trench raids of World War I were a tacit recognition of this verity; in Korean operations, long-distance patrolling into the enemy-held ridges had the same nature, purpose, and effect; despite all of the supposed gains made by the more remote forms of reconnaissance during the past 35 years, field forces still have to go out on fighting missions to get an assured feel of enemy locations; the air can do no more than make educated guesses about matters which infantrymen simply have to know.

Even so, one of the simplest and most basic tactical facts which confronts us, though it is nowhere stated in doctrine, is that when two forces begin to exchange flat trajectory fires, and keep at it seriously rather than attempting to disengage, at exactly the same rate that the fires build up in volume, the general target area presented by each side becomes more and more clearly revealed to its opponent.

This is true of day or night engagement, at any range within the limits of the infantry line's fire effectiveness, and over any kind of terrain.

But there can be no completed reconnaissance short of a sustained fire contact.

## "SOFTENING UP" THROUGH SATURATION BOMBING

Granted the conditions heretofore described, the wasting of ammunition which comes of mistaking the general location (or area) held by the opposing side is marginal and imposes no real load on operations compared to the drain which comes of faulty map data, miscalculation of ranges, mishandling of weapons, etc.

Even if the elimination of all such human errors were possible, and all fires into a precisely defined area were as perfectly delivered as the operating efficiency of the various weapons permitted, it would still not be possible to "saturate" the area with point-to-point missiles. (This refers to engagement between forces of any size which are approximately equivalent in strength.) This is true because war is not conducted on a billiard table. All fighting ground provides defilades and cover of various types; under fire, men will take all possible advantage of whatever object will interdict the bullet or the shell, and will even improve on nature by getting down into earth.

As the fight progresses, the count of visible targets—men or weapons—becomes lower and lower and such attrition as results from direct laying on a clearly revealed soft object plays little part in the battle. The so-called general area fires become a moral depressant to the side which receives them, but what they contribute to casualty rates, the crippling of communications, etc., is governed mainly by the laws of chance. Man and his weapon are a small

object compared to which the sweep of any countryside is vast indeed; the whole human family could be dumped into one bend of the Grand Canyon of the Colorado and the pile of bodies would still not rise to the rim. What makes the logistical load mountainous and renders all conventional fires relatively inefficient is that on the modern battlefield there is so much earth and so little flesh. Of this simple fact comes the greater portion of ammunition wastage, compared to which the useless expenditures due to wrong intelligence, firing on mere suspicion, or blowing it off simply because there is an excess in the forward dumps are relatively inexpensive.

When men are up and charging, and become revealed in large numbers even briefly against the back-drop of the battlefield, that is a quite different situation; point-to-point accuracy in weapons employment will yield results in proportion to the training and discipline of the force. But in the relatively static interim situations, when full-scale bombardments are most likely to take place, the over-all difficulty of scoring on a vulnerable target is about as it has been described here. The target area may be almost exactly identified; but so long as the army has gone to ground, and its men make prompt use of cover whenever fire opens, the tactical line is relatively secure against vital hurt. In mid-September 1918, Headquarters and the main installations of 357th Infantry Regiment became located in splinter-proof shelters formerly occupied by the command of the German division opposite, in a small vale southeast of Thiaucourt. This was after the St. Mihiel offensive. The valley was known as the Stumpflaager. The enemy line had been pushed to about two kilometers beyond this point. The Germans knew exactly where the American Headquarters was located. The small valley wasn't in defilade to artillery fire because the hills fore and rear were low and gently sloped; further, the splinter-proofs opened toward the enemy fire.

For the next four weeks the area was shelled regularly and heavily afternoon and night. The limiting slopes grew heavily pitted by the fires, and most of their tree growth was laid low. But not one shell exploded into the valley. This is a commonplace picture in war.

By way of contrast, a more modern operation in war might be considered, one in which all of the weapons of air, sea, and ground were combined to work the greatest possible ruin upon a target area which had already been exactly defined, and both target intelligence and the delivery of the fires had a near optimum accuracy. Because there are few operations which fit this description, the strikes against some of the Central Pacific atolls commend themselves to study. The initial pinning effect was not always achieved. In the landing against Majuro Island, for example (as against Kiska), our forces hit shore full loaded, only to discover that the enemy had decamped. Contact could not be kept constant during the weeks of preparation over the great spaces of the Pacific and therefore unmarked withdrawals were always possible. Even so, it is really surprising how rarely it has happened in our past experience that the blow landed in air because the enemy had made his departure undetected. In the strike against Kwajalein Island, we were certain that the enemy was there; we knew his approximate strength; subsequently, what our intelligence had led us to conclude as to the location of his lines, works, and protection proved to be substantially correct.

# CONFIDENTIAL

Kwajalein Island is about three miles long, with an average width of about one-half mile. The island is shaped like a boomerang and its surface is quite flat, except for an occasional sand hummock rising 10 to 20 feet above sea level. Except for palm growth and the scattered habitations, the island was at that time otherwise clear. From the description, we may take it that it was a nearly optimum target.

Prior to the infantry landings, this brief expanse was subjected to the most complete and intense sea and air bombardment prepared until that time against any land area. Observation conditions were perfect and the air-sea attack remained unopposed during the two days of all-out preparatory bombardment. Direct hits were registered by the air bombardment in every square of the operations checkerboard. All heavy gun works were destroyed by either the air bombs or the naval shelling. Roads were effaced. Trenches were collapsed. To the eye, the devastating fires appeared to have missed nothing. Battleships closed to within one-half mile of the beach emplacements and received no return fire. Underwater demolition crews did their work unmolested.

After the battle, there were exaggerated claims about the killing effects of the preliminary bombardment, as to how many of the defending personnel it had destroyed; there was no doubt whatever that it had destroyed operational unity within the garrison by eliminating all usual means of communication; also, it became well established that the shock effect of the heavy guns and bombs had produced emotional paralysis in about 30 percent of the garrison, to the extent that having refuted against the danger, they did not again emerge, having lost the will to take defensive action. The only point in dispute was as to the lethal effect of the softening-up barrage. Navy authority claimed that in excess of 30 percent of the enemy had been killed before the hour of the landings.

But it had happened that the Marshallese natives of the island had gone to ground, in air raid shelters, along with the Japanese defenders when the bombs began to fall. The shelters were distributed quite evenly over the island. They were about 30 feet long, with two or three compartments, baffle doors at either end, and 3 to 4 feet of earth protecting the roof. Only one shelter had been directly hit and partly damaged by softening-up fires. Unlike the situation elsewhere in the Pacific, the natives at Kwajalein were not confined to a civilian area; they had the run of the island, and during an alert, they were under instruction to go to whatever shelter was serving the nearest unit of the garrison.

Subsequently, as the American assault waves hit the beach at the lower end of the island and advanced against resistance which stiffened markedly less than a furlong beyond the shingle, the Marshallese had to pass through their fires, and the field barrage supporting them, or at least take the risk of so doing, to escape the Japanese and come into our lines. It is of record that some of them were killed or wounded while making this passage, and others became casualties when satchel-charged by our troops who mistook them for Japanese while they were still underground.

But at the end of the campaign, the loss to the Marshallese on Kwajalein Island, from all causes, including the preliminary air and sea bombardment, was only 4.2 percent of the population at the beginning of the battle. It is therefore a reasonable estimate that the loss to the Japanese garrison from the

# CONFIDENTIAL

preparatory fires could hardly have been more than that, since they used identical cover and did not come out until the direct assault. Yet this was "saturation bombardment."

In the course of the five-day battle for the island, 4398 enemy soldiers were killed and 174 taken prisoner. From nearby E nubuj Island, five battalions of field artillery (one of 155-mm howitzers and four of 105-mm howitzers) marched fire directly ahead of the infantry line throughout the assault. This was one of the most intense and perfectly distributed shoots in history, slightly more than 70,000 artillery shells being delivered against the target within the first four days.

While the battle was still on, and enemy bodies remained where they had fallen, two different approximately five-acre tracts enclosing representative defense works, were studied, to determine as nearly as possible from the physical evidence (proximity of craters, nature of wounds, etc.) what had caused death. The findings were that of the enemy troops which had given battle above ground, somewhere between 65 and 70 percent had been destroyed by field artillery fire, the others becoming victims of small arms, mortar shelling, flame, air bombs, etc. Those who would not fight and remained paralyzed and under cover were ultimately killed by satchel charges, flame, and grenades. A few crawled out to surrender when threatened that gas would be used against them.

Based upon these estimates, which were about as accurate as the condition of any battleground permits, the destruction of the 4398 members of the enemy garrison was accomplished approximately as follows:

Killed by preparatory bombardment	176
Paralyzed by preparatory bombard- and later killed underground	1320
Killed by field artillery (open)	1885
Killed by other weapons (open)	1017

There is one discrepant note in this breakdown. The over-all figure includes several small garrisons on the outlying islands. As their size was such as to be no more than a marginal item and they also were worked over by the major weapons in the attack, that circumstance does not militate against the general value of these working figures.

It is repeated that the target area was isolated and exactly defined and that in this one operation modern nonatomic weapons were given an almost perfect application toward the destruction of a garrison and its defensive capabilities. Moreover, the size of the land area lends itself nicely to a comparison of old methods with new; one tactical atomic bomb hitting dead center against Kwajalein Island and exploding would have embraced the battlefield from end to end with its killing power and destructiveness. This is not to imply that it would have extinguished the garrison wholly. What might have happened can be estimated from Fig. 10, taken from Training Circular 33.

It appears to be a reasonable surmise that as a substitute for the conventional softening-up fires, the atomic blast's destruction of personnel would have achieved more decisive results, though its impact on communications might well have been less, in that it would not have eliminated roads, except near ground zero, and ground-laid wire at either end of the island would probably have escaped damage. Further, it would not have collapsed the pits and trenches, as was done by the conventional bombardment, since they were placed mainly for

the defense of the island's extremities. The command and blockhouse area in the center of the island would have been right at ground zero and would have been eliminated.

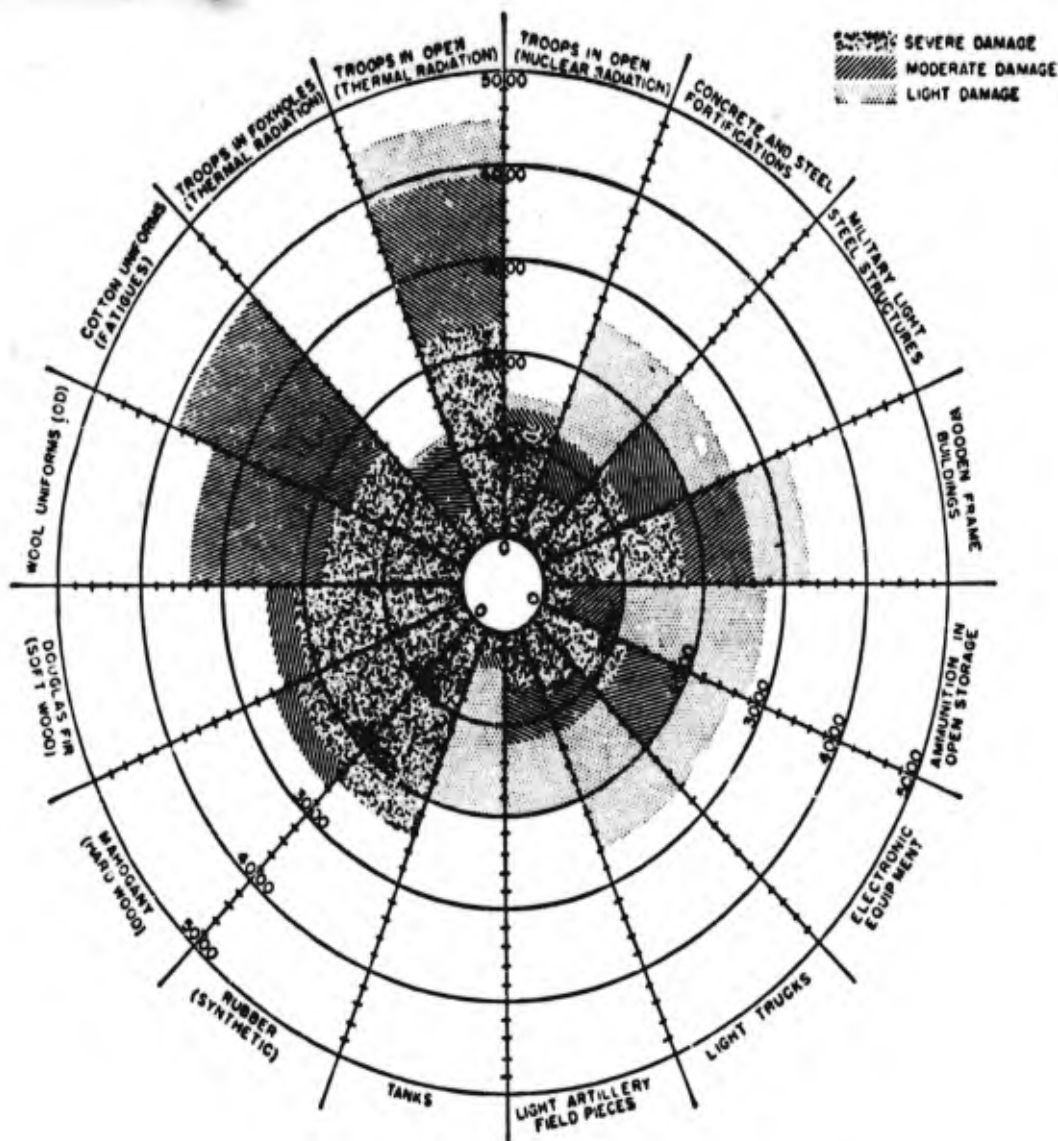


Fig. 10—Air Burst. Estimated distances within which damages to ground force troops and materiel are produced by a 20-KT atomic missile exploded 2000 ft in the air on a clear day.

**NOTES**

- Each concentric circle represents an increase of 1000 yd in radius.
- For clarity, the zero point of the chart is represented by the innermost concentric circle.
- There is no appreciable residual nuclear radiation from an air burst.

Had troops been caught in the open, the casualty totals would have been not less than was accomplished by the preliminary bombardment and artillery shelling combined.

Had they been pre-warned, and taken refuge in the air raid shelters, the loss of effective strength through shock and paralysis conceivably would not

# CONFIDENTIAL

have been less than occurred from the conventional softening-up bombardment. (Such shelters are not likely to be found anywhere except where troops are committed to static defense of a fortress position.)

Had troops been distributed in trenches and rifle pits, heads down when the blast occurred, the gravity center of the defense would still have become a vacuum, and what part of the garrison remained mobile would have been transformed into a hollow shell, with nothing more than local control. That same condition was largely produced during the first phase of the attack on Kwajalein, using conventional methods. But one of the largest naval fleets ever massed, an air fleet, and five battalions of army artillery had to combine to do it.

Comparable results can be anticipated from the area weapon whenever there is relatively positive identification of the defensive area.

Other than in island-hopping warfare, the possibilities of such identification appear to depend almost wholly upon the effectiveness of direct fire reconnaissance. There is need for further study of what this means to field tactics, as to how contact is brought about, engagement is undertaken, and whole or partial disengagement is produced prior to employment of the tactical atomic bomb.

# CONFIDENTIAL

## DISENGAGEMENT

How contact and preliminary engagement might occur, developing out of direct fire reconnaissance, and aimed toward the isolation of a target suitable for attack by the atomic bomb in an attempt at decisive penetration of a prepared defensive line, has already been described.

It is assumed that the position thus taken under attack is one of a succession of strongly organized defensive field bases, probably hinged upon high ground, and disposed for all-around defense, in the manner of a hedgehog, acropolis, or perimeter.

The proposition has been made that to be certain of the validity of the target area, the reconnaissance-in-force group would have to be highly mobile and contain balanced fighting power, and that not until it engages persistently with flat trajectory weapons, including the rifle and machine gun, will it accomplish its feeling-out mission. Likewise, the proposition was made that the group would be but one of a number of such groups and that the others would be seeking simultaneously to engage other defensive blocks along the general front, having a like mission except for the laying on of the atomic attack.

To engage with small arms fire, the attack group would necessarily move to within less than 1000 yards of the infantry line of resistance. There its forward element would be possibly 3000 to 5000 yards from the ideal aiming point for the atomic strike, provided the purpose is to produce paralysis in the defending command. If the defensive block is of divisional strength, the distances could well be double these figures.

Provided the attack force remains fully committed, these are still not immunity distances, according to western standards. But they may be wholly so from the viewpoint of an opponent who in times past has cleared mine fields by the expedient of marching infantry across the mined area and absorbing the necessary losses.

But once the defending block has been revealed, the need for a full impingement by the attack group ceases. The front can then be masked by a few riflemen and machine guns, while the heavier elements retrogress to safe distance. Or within the passage of a few hours, the group may be withdrawn as a whole. The defending side will become almost immediately aware of the cessation of local pressure. But this knowledge will be of no great advantage to it and the attacking side can so maneuver as to strip the local disengagement of seeming significance. The possible maneuver is shown in Fig. 11.

# CONFIDENTIAL

Considering that a is the defensive block which becomes the selected atomic target and b is the reconnaissance group disengaging and withdrawing toward the main body, the normal maneuver would be for the groups at c and d to continue close engagement and, if possible, intensify the action, thus creating the appearance that the main attack will be building up against an adjoining sector, and giving the defensive block at a concern about the security of its

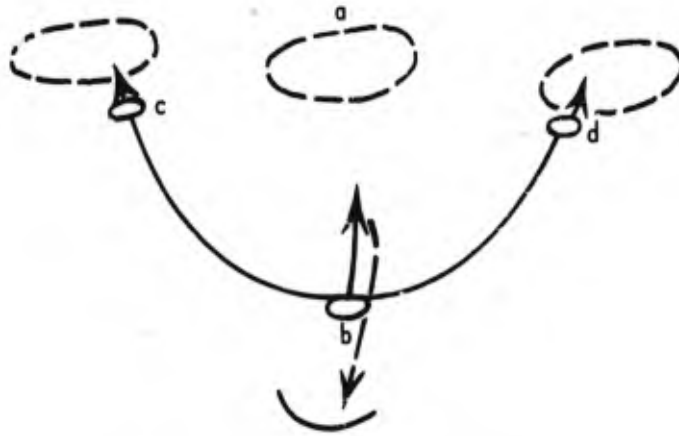


Fig. 11—Disengagement Prior to Attack

flanks. They will be at sufficient distance from the center of impact that if strength permits, they can continue the fire exchange until the atomic strike is put on.

Disengagement may occur at night, but on the other hand, there is no reason why it should prove insurmountably difficult during daytime. When a general defense is based upon the holding of a prepared line and the defender is at such disadvantage numerically that he cannot undertake the full-scale counteroffensive, it is the attacker who retains freedom of action, and even local pursuits by the defender engage an extreme hazard. This was emphasized repeatedly in Korean operations.

# CONFIDENTIAL

## THE NARROW FRONT

Some of the dangers and contradictions of defense over a wide front by a numerically inferior army, greatly disadvantaged in mechanized power, have already been discussed. The introduction of atomic weapons into field warfare would appear to accent these dangers and multiply the contradictions rather than to reduce them, if both sides are prepared to use tactical atomic weapons in any large number against the opponent.

Adding the atomic bomb, shell, or missile to a weapons system does not expand the power of any other weapon, increase its battlefield mobility, or make less vulnerable to the conventional shell and bullet the carriers and the troops which move and use them. The logistical drag upon the force as a whole will not be less because of the employment of area weapons. They will not be made more furtive; their thrust with the conventional arms will not be made more slashing; their motorization will not acquire increased safe range. They will be under the same necessity as of old to keep juncture and to fold back into a protected base whenever they have done their hitting independently. The maintenance of effective communication between every part of the force will continue to be the epitome of successful battlefield operations.

Considering these things, the picture of a fast-moving, free-hitting war by both sides rapidly developing in consequence of the employment of atomic weapons doesn't seem consistent with logic. It runs counter to the physical laws governing operation. When a numerically inferior army, moving mainly in road columns, operates on a wide front, it does not possess offensive mobility. Since it cannot shake loose from the grip of supply, its forward movement tends ever to reach the point of maximum extension where all mobility becomes lost. We have numerous examples of this phenomenon from World War II and Korean operations.

But if the attack and counterattack are not to take on a more elusive, slashing, and free-hitting character, the concept of operations on a wide front disappears with the dream of extraordinary mobility, and some other theory of defense must be put forward in its place. For only a great margin in mobility, plus superiority in firepower at the point chosen for battle, will enable numerically inferior combat groups, operating in some detachment each from the other, to stand off and beat back the mass of the opponent. Again, these possibilities were tested repeatedly in Korea, and the point was substantially proved.

There are but two grand tactical problems in wars fought between armies employing motorized and partly armored columns. The first is to keep the mechanized and motorized forces moving so that enemy country will be oc-

# CONFIDENTIAL

cupied. The second is to prevent this occupation by compelling the mobile forces to assume the protracted defense. The whole problem is one of moving and of stopping movement so as to occupy or prevent occupation.

But so long as an army can maintain itself on the ground which it has chosen to defend, and so doing, covers the main lines of communication connecting it with its bases, the mere occupying of territory by its opponent will not prove decisive, and may even contribute to the opponent's over-extension.

If the wide front is impossible, then what are the virtues of its opposite—the narrow front with the defense arrayed in true depth?

One might think of the army as standing in column with its battle groups deployed and established as a shield to cover the vital routes leading from its rear, the main object being retention of the integrity of the force rather than keeping inviolate a political area. Admittedly, the idea could have appropriateness only when one side in war is initially at great disadvantage; it must play for time; the opening odds prohibit a general advance with the object of destroying the enemy; the defender's rate of buildup is such as to make prospective for months that his great problem will be the maintaining of his lodgment and the avoiding of another Sedan or Dunkirk.

The one justification for the initial sacrifice of territory which comes of narrowing the front is the ultimate saving of men and the preserving of the army. It means trading space for time on the largest possible scale. As with any invention, it is the child of necessity.

To give it a name consistent with the controlling idea, which will at the same time help to materialize a picture of what is intended, it might be thought of as defense by beachhead. Except for the difference in the scale of the undertaking, the operational pattern resembles what would be done by a landed force which has had time to dig in and make its perimeter defensively tight; while facing attack from three sides, the force is without immediate prospect of being reenforced strongly enough to push out, break the investment, and then roll back the flanks.

This has happened in recent wars. Anzio was one such incident. The first phase in Korea was another. Had we not possessed sufficient power to stage the Inchon Landing, defense along the Pusan perimeter might have been long protracted, and would have been consistent with economy of force, so long as there was no viable alternative.

The concept is radical only in that no army in modern times has of its own initiative and prior to battle pressure attempted such a formation during defense on a total basis; but it is to be noted also that none has been confronted by a set of circumstances which made the choice ineluctable. There is nothing new or untried in the proposition that an army should organize itself primarily toward the maturing of decisive strength when on the defensive. The defensive order was pre-eminently the tactical order of classical and medieval warfare. The cavalry under Alexander was based on his hoplites, or heavy infantry, and the Roman hastati (infantry) was based on the triarii (veteran reserve). Today's set of problems has little in common with the fighting done by men using spear, sword, and shield. But before rejecting the suggestion that new weapons and new conditions have reacted on the protective idea, requiring it be given first consideration, it should be noted that in Korea, precisely because of the numerical inferiority of our field force, we were on the offensive only

# CONFIDENTIAL

four and one-half months during more than three years of war. This we had to experience before we would ever believe that it could happen.

The order of defense which is here envisaged, only as a possibility, that its seeming advantages may be profiled against its more negative aspects (and they are numerous), might be imagined as a giant grid system.

The field army is drawn up roughly in the shape of a spearhead. This is to say that the line, instead of fronting perpendicular to the enemy's anticipated axis of advance, has both of its flanks refused, though not extending so far back as fully to enclose the rear of the army and the main bases (Fig. 12).

Its defensive strength is distributed fairly evenly around the arc, according to the circumstances of the ground and the location of the more decisive objects which the defensive front covers.

In short, it is not a solid line. Ground which offers first-class opportunity for defensive observation, reasonable protection, and first-rate fields of fire is organized for defense by an infantry garrison whether of battalion, regimental, or larger size.

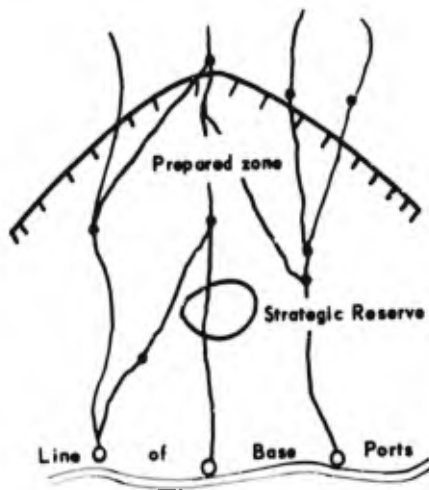


Fig. 12—The Defensive Salient

The less suitable terrain stretches which are in between are organized as antitank zones to repel enemy armor. Some of the protection will be afforded by works (antitank ditches, etc.) and mine fields; the rest of it, through the fire of antitank weapons. The general scheme of defense should incorporate both the physical blocks, in varying form according to the opportunities afforded by the ground, and a mobile counterattacking force kept well in rear and toward the more exposed flank so that any attempt to turn the works can be attacked in flank or rear.

Echeloned behind the front-line battalions are yet other battalions, also established on prepared and protected positions, which together comprise a secondary line.

The depth may be as great as the availability of troops and the expanse of the general area to be covered will permit. But length of front is regulated primarily by the necessity for having all-around depth in the defensive zone itself. The essence of the system is a general and roughly equalized distribution of local reserves around the whole perimeter.

## CONFIDENTIAL

Each forward battalion is complemented, at the minimum, by a support close at hand (within one to three hours' road distance) approximately equal to its own strength.

The garrisons in the support and reserve positions could conceivably be equipped and mounted for greater mobility than the frontal forces, since they are the chief instrument of the counterattack.

Also, because cross-country surprise is less likely to be their portion, and the instant alert and movement into fire positions is not apt to be required of them, they can go to deeper shelters, and even to greater dispersion, for protection against atomic weapons. This is simply a matter of providing additional protection where it is least likely to prove a critical tactical handicap; the reserve will be as likely a target for atomic attack as the frontal garrisons.

The strategic reserve of the field army is yet another thing. Drawing its main strength from armor, it stands far back from the point of the general defensive formation, in position to move out and around the open flanks, as a main counteroffensive opportunity presents itself.

Penetrations of the defensive crust, unless exploited to the point where the entire order is in imminent danger of collapse, are dealt with through the forward and lateral displacement of the local reserves. The strategic reserve can hardly be committed to the frontal battle, short of absolute crisis, without invalidating its own main purpose. Once that is done and its forces take their place in line to stave off collapse, all tactical choice passes over to the enemy. True, it did not so happen in the March 1918 (Michel) battle on the Western Front or again in consequence of the December 1944 attempt by the German Army to attain decision by attack through the Ardennes. In both cases, such reserves as could be improvised were committed to the front. In both cases, what at first seemed a successful, or at least greatly disorganizing penetration by the enemy, was won at excessive cost and became the prelude to his final defeat. But again, in both cases, the attack was staged in the face of a superiority of combat effectives on the part of the defender, potential in the Michel battle, actual in the Ardennes. Our future problem contemplates no such advantageous balance between the two sides.

Thus if the attack aimed at penetration and break-through is to become pocketed and made incapable of multiplying its damaging effects, the main chance would seem to be through the availability of local reserves which can repair to the threatened ground more swiftly than the enemy. A critical break-down in communications, paralyzing to decision and action at the highest level, can be averted only if there is prospect of an almost immediate repair of the tear in the fabric. As already said, the reserves will be set up in their own fully organized defensive positions. From these, they will advance as forces of the counterattack and their prospect of achieving the maximum effect through surprise will be in proportion to the celerity with which they move and strike. Unless they are fully motorized, their value in the counterassault will be greatly reduced.

It is not envisioned that when break-through becomes an active threat the reserve will react along only vertical lines, the redeployment being limited to those forces directly supporting the frontal blocks which are under pressure. Such rigidity in operations would be by its nature a piecemeal commitment, increasing losses at the decisive point without in likelihood stabilizing the

battle. The local reserves echeloned to right and left of the irrupted sector also react to the threat, displacing obliquely forward to blocking positions where they cover the communications of the flankward blocks which would otherwise be taken in rear. So doing, they will also establish the sides of the "pocket," their temporary advantage being that they can get their light tank-stopping weapons, machine guns, multiple mounts, etc., forward more quickly than the attacker can bring up his artillery. The latter's great superiority in numbers is his recognized advantage. That cannot be offset except through comprehensive evaluation and organization of the defensive position prior to the time of battle. Given that, when the defending troops engage, their familiarity with the ground should double the power of their weapons.

These are broad propositions. They outline a possibly tenable order of defense under a specific set of conditions: (a) the narrow front held in true depth; and (b) perfect familiarity of troops with the ground and the complex of tactical situations likely to arise thereon through long practice in training exercises.

But granted it offers some hope under the stated conditions, it is an impossible ideal for an army which can expect to begin a war with an almost overwhelming task of extrication, followed by a defense in line which sheer necessity might fix upon it at almost any point along the road back. The forming of a viable defense depends upon relative freedom of action in the hour when the pressure mounts.

That we still think of a whole system of defense confiding itself to some natural obstacle indicates how deeply scored is the impression made by the past 35 years of operation in which we could lean on the flankless front but did not have to reckon with the atom bomb.

Just as it comforts a man to be behind a three-inch sapling when under artillery fire, it eases the mind to think about the space protection afforded by a river line and the greater difficulty in closing which the river inflicts on the enemy.

The comparison is not inappropriate. In 1945 the Rhine did not avail the German army one extra day when its numbers and weapons had become unequal to defense over an extended front against our heavier numbers.

A natural water course always presents a somewhat sinuous line and important cover—drainage lines, man-made structures, and forest patches. These work also for the attacker. As a result, defense of any river line, including the Rhine, requires a great number of effectives, both for the covering of an irregular front and to guard against surprise. The defending artillery has no advantage in ground; its prime disadvantage is that, unlike the attacker, it cannot mass. Fields of fire, so necessary to defense, are seldom favorable along river banks, and observation, particularly in the season of low-pressure weather, is exceptionally difficult.

What is here suggested is the substitution of defense through mastery of routes of communication for the concept of defense through alignment—organization in column instead of by extended order. This means one great perimeter composed of many small perimeters organized in multiple layers—a checkerboard of defense posts each provided with antitank weapons, artillery, and its own motor lift.

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## IN DEPTH

The alternative to attempting any variation of defense in line is to deploy a field army in such way that it need not shift its gravity center if its defensive crust is penetrated; its whole fortune cannot then become undone through one mistake in the employment of its strategic reserves.

In Korea, during the two years of the sitting war, we did not move one step closer to testing any such concept experimentally, the continued shortage of infantry strength of itself preventing it. What was called "organization in depth" was in fact straight linear defense by an exceedingly thin infantry line, with interspersed AA guns and an occasional tank. The "depth" was the weight of the artillery and armor behind this rifle screen, and the extension of entrenched and weakly garrisoned outposts into the subridges in front of it. But there was no extensive work on secondary positions, no such thing as a continuous and well-developed secondary line, and no all-around character to the frontal positions. Any infantry company driven from its position perforce fell back on unprepared ground.

What we lacked during the final phase, the enemy had—true depth. Such was the welter of labyrinthine digging behind his forward pits, and such his cleverness at concealment, that from our regimental OPs in most sectors, it was all but impossible to determine where his true position lay. As stated in an earlier chapter, the enemy could hardly have done better had he prepared specifically for atomic war; by no stretch of the imagination could the same thing be said of the American works and dispositions. They were an obvious target and the humanity within them was at all times vulnerable.

The change here suggested comes much closer to what the Chinese did than to anything we attempted. In its larger terms, it means husbanding the strategic reserve so that it may in time become the nucleus of the counter-offensive rather than spending it in counterattack missions which could be within the capabilities of much smaller forces provided they are handy to the battle. It is a truth too little regarded that in the real clutch of battle, companies fight companies, rather than divisions taking on divisions, as such. How quickly any fire may be brought under control, and what proportions it is likely to assume, depend upon the speed of the alarm and the promptness with which the engines arrive. Five machine guns reenforcing a position at 2300 may be more decisive than 50 guns brought up at 2359.

Thus as to a strategic reserve, it should be used according to what its name implies, rather than employed like a tactical fire brigade.

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The object already stated can be accomplished only if the time-space relation between units in the defensive array is such that when the breach is made in the forward line its effects are kept localized.

When this condition obtains, the forces deployed on either side of the interrupted sector can be held steady without undue jeopardy. (See "Local Reserves.")

The mission of blocking is done by march ordering some part of the local reserve echeloned to rearward. While establishing a block across the path of the attacker, this force also provides a base upon which the fractions of the units which have become unhinged under direct hit by the enemy may re-assemble.

Upon execution of the defensive maneuver, the enemy penetration is transformed into a salient, costly to hold and of no real advantage to the attack unless it can be exploited immediately. The type of defensive organization here imagined would have the quality of a rubber sponge, in that while giving to direct pressure, it would tend ever to bound back to its original form.

The defensive blocks along its outer side could be much more lightly manned (and more lightly armed) than would be required if they were hedgehogs in a true linear system, a regiment serving in place of a division. That is so because a retrograde movement in one sector will not react upon the general position, which is so constructed, owing to its depth, that it can absorb salients and put their garrisons at immediate disadvantage. The over-all strength of the field army comes of the readiness of its maintenance and repair elements rather than of the die-hard tenacity in every frontal element.

But if a defense is to possess any such regenerative power as this, its dispositions must develop around two basic propositions:

1. The reserve at all points must be approximately equal to the force in line (or yet stronger) and balanced against it in time-space considerations.
2. Preservation of the integrity of the front comes of the availability of numerous local reserves located within perhaps 5- to 10-mile proximity of the forward works rather than from a general reserve distant 50 to 100 miles, as in linear defense.

The interval between the frontal force and the nearest reserve cannot be stated in miles or yards, although there are several governing principles. As to the dangers from atomic attack intensifying as the distance separating the force in line from its reserve is decreased, there is no apparent reason to believe that a 5-mile spacing between front and reserve is any more apt to present enemy air with a profitable setup of target opportunities than a 10- or 20-mile separation. The artillery reach is quite another matter. It would be ill-considered to have reserves in such proximity that they are subject to normal fires by light artillery that has joined action against the front. But in reserve positions, it is usually possible to outpost forward slopes and keep the body of troops in defilade accommodations during periods of bombardment.

When front and reserve are stacked against each other, the increased hazard through enemy use of the tactical bomb is just as real as when they are cheek-to-jowl in line, since a near miss on one position may mean a direct hit on the other. But beyond that consideration, tactical spacings need not be regulated upon this threat alone. The value of the ground, and what the ground offers as a defensive locality, must as ever govern the choice of positions, and in atomic war, fields of fire, observation, cover, flank protection, ease of communication, etc., (in brief, the traditional governing considerations) are not

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less important than before. The only substantial safeguards against the enemy cutting a through corridor by knocking out successive targets in depth are (a) use of camouflage in all installations; (b) staggering of positions; (c) setting up of dummy positions; (d) situating where troops have a main protection from the ground; and (e) entrenched works.

But under atomic conditions, as in operations of the past, the strength of any position will come of having a true balance between the size and proportion of the ground and its works and the strength of the garrison which is defending it. Ten men may for some time hold a small outpost hill against a battalion; but the same ten men would have no chance effectively to resist attack by the same battalion on the larger hill behind the outpost, though it is the stronger ground. Equally, the company, if deployed into the cramped works holding the ten men on the outpost hill, would have its strength largely sacrificed when put under attack by the battalion. This is a lesson seen emphasized over and again in the last two years of Korean operations, particularly in the garrisoning of outpost redoubts in the subridges forward from the MLR; there must be an equating of men to the spaces in which they move and fire when the attack comes. To concentrate them excessively is not less wasteful than to have too few in relation to the maneuver room of the ground to be defended. Garrisons must be in proportion to the area which is to be defended; otherwise, the defensive becomes inoperative, not through lack of weapons, but from inability to put them where they are of practical use. In atomic warfare, excessive concentration of defensive forces is not likely to be a besetting tendency. But by the doctrine which underscores the virtue of dispersion, a too great thinness may be attempted. Carried to extremes, that will not only superinduce moral weakness in the infantry line but will impair the power of such weapons as are present and fighting. Again, it is said that in any war of the future involving atomic weapons, the man-to-man spacings in the infantry line, in outpost or in main positions, cannot be greater than those used by the American regiments of the Eighth Army.

The protective measures mentioned earlier are as valid for infantry fighting against armor as for protection against atomic bombing. As for protection of field guns, tanks, or multiple mounts, it would seem less profitable to encourage deep pitting than to practice frequent displacements to already-prepared and relatively shallow pits, which is to say that there should be several alternate positions for each battery and rotating use of them. Deep pits will radically reduce the mobility of the whole field army, and it is as idle for the field artillery to consider any such expedient as for the infantry to take the entrenchments at Yucca or Frenchman's Flat as a model of what might be done profitably; an extreme penalty would be paid for deep pitting during the period of inclement weather, and while deep pitting might save some guns from atomic attack, in the end it would cost more men and materiel than it could save because it would thwart quick redeployment to the point of main threat.

In Korea, during the two years of position warfare, the field artillery of the UN side operated pretty much according to these principles; it would seem not less sound for operations of tomorrow. Because of infantry shortage, however, the AA mounts tended to become boxed in along MLR positions, sacrificing mobility for the sake of greater protection.

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The enemy tried an opposite policy. His field guns in the main were fought from shafts tunneled straight into the ridges, the piece being retracted to the cave after each firing. The AA mounts were worked from deep circular pits behind the ridges, the gun being below the earth level when in the nonfiring position, concealed by a camouflage screen which simulated natural cover. These stratagems gave the guns an unusual degree of protection. They also gave the army an abnormally sluggish character. Fire arcs were extremely limited and the artillery fire had little depth, rarely being used in counter-battery or against any target farther back than the battalion CPs. When the infantry was put into the general assault, it could do no more than break the opposing crust, because the guns held stationary, and in their rigid position, could not support the infantry in deepening the penetration. True, the enemy guns for the most part were nonmotorized and had to be manhandled from point to point. But it was primarily the sealing in of the gun, rather than its lack of SP characteristics, which made the battle stagnate.

In the nature of the case, the largest measure of protection from the atomic bomb will commonly be found in the same terrain which presents the best all-around defensive opportunities to a field force when it is opposed only by conventional weapons. This means that fields of fire, superior observation, coverage of approaches, etc., have lost none of their traditional importance. The killing radius of any explosive weapon is in proportion to the flatness of the ground not less than to the power of the explosive charge. Seeking the high ground, and keeping troops distributed as well as can be done within sound tactical limits around its several facings, is a sound doctrine toward keeping casualties minimal under the impact of the bomb as it is for preventing the enemy from closing upon the hill mass by exploiting an unguarded approach.

For these reasons, troop distribution in the defensive array, at the reserve positions as well as forward, is according to the possibilities of the ground in operations against infantry and armor, rather than according to any new formula based upon what is known about the killing radius of atomic weapons.

The same rule applies to the construction of fire trenches or any other defensive works from which infantry weapons are to be fought. They should be sited and engineered primarily with the object of enabling the defending garrison to make full and efficient use of its weapons when under attack by field forces, and to have that reasonable amount of protection afforded by earth-banks against flat trajectory weapons which is consistent with this purpose. If the works are unduly elaborated to give additional protection against high angle or vertical fire, and the efficiency of local defensive fires is sacrificed to that object, the defense is made doubly vulnerable.

Distances between front and reserve will vary from one situation to another, since escarpments are not always where one wishes. Likewise, in a well-roaded area, where there are alternative all-weather routes, the separation may with impunity be greater in space though approximately equal in time. That necessity is often imposed by the simple facts of geography. In relatively flat country, good defensive positions are usually few and farther between, but roads are frequent, and in populous areas, highly serviceable. In hill or mountain country, where good fire positions bump one against the other, there is invariably a pinch on communications.

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So to review the possibilities of penetration by atomic attack as they have been considered up till now, it would seem that local reserves would have to be within one- to three-hour march interval of the front. Allowing for the time lag which attends operations when traffic arteries are glutted and trunk lines are overloaded, that should still enable them to reach the scene in the hour of decision.

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## **TACTICAL CONSIDERATIONS**

The essence of soundness in field tactics during defense over a narrow front against an attack employing atomic weapons is that a maximum of deception be coupled with extreme flexibility and mobility in the handling of local forces.

Since these words are themselves but a pale and unsatisfying substitute for specific ideas which may be applied to the use of forces in the hour of need, they become roadblocks to progress when unattended by theories of the possibilities of movement and the delivery of fire by main weapons.

## **GENERAL DEFENSE TACTICS**

Broadly, the field army, if it is to preserve itself against the threat of the new area weapons, must seek the solution to but two main tactical problems:

1. How to avoid fatal loss and rupture from these weapons.
2. How to employ itself so that area weapons may be used decisively against the enemy.

The answers remain highly elusive and as yet one may do no more than explore toward them, questioning whether doctrine has anticipated the main frictions of the future battlefield and possibly describing new characteristics in defense which would give it an increased cushioning against the increased violence of tomorrow.

Again, it is desirable to consider in what manner the attack may develop, the better to understand the enlarged burdens of the defense.

When the major tactics of the enemy are directed toward eliminating one or two main defensive blocks by employing the A-weapons, and his object is to achieve a decisive penetration and entrance into the rear area, the exploitation is likely to be an effort to widen the corridor sufficiently to command at least two main supply routes within the corridor. That is so, if only for the reason that one main road is too easy of interdiction by air and long-range weapons to sustain a major effort.

Provided that he succeeds in eliminating one defensive block and in sealing off the shoulders of the corridor during the first 24-hour period, his situation becomes favorable to this general design should he be assaulting a line of positions rather than a defense which is based upon a grid system wherein frontal forces are backed up by reserves at least equal to their own strength. Once the enemy has gained control of the local area, his exploiting forces are then in position to turn flankward and attack the communications of the blocks

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to right and left. There is nothing new or radical about this possibility in maneuver; it was done repeatedly in World War II and was normal procedure with the Chinese Communists during the Korean fighting. However, it is assumed that these positions have been organized for all-around defense and are balanced against just such a contingency. They do not therefore become automatically insolvent through being threatened or directly attacked from the rear, and so long as resupply by air remains practicable, they are an element in restricting the penetration and in pinning it to a salient if the support forces get up in time.

Even during the so-called mobile period of warfare, under the predominant influence of armor, tactics have more times than not held to this relatively rigid pattern. There were vast exceptions, especially in the early days of World War II, when audacious movement of itself, attended by relatively small amounts of fire, wrought a nearly total demoralization of forces. But as the combat line became fitted with weapons which could kill metal, and with the evolving of circular defense the battlefield produced competent evidence that envelopment or the cutting of rearward lines was not necessarily fatal, the armor-infantry attack became more and more conventionalized in any situation where it could not bring a vastly superior force to bear. Operations resumed their familiar shape—salient and then re-entrant. Nothing that happened in Korea changed any of these appearances but rather confirmed them. It was a war of countersalients against salients except for those brief periods in which one side was able to apply superior weight either in men or metal, or both together, at the pressure point. Envelopment in itself was rarely the key to battlefield success unless it was attended by a superior volume of applied fire. At the end, the possession of a large superiority in armor availed the Eighth Army no offensive mobility whatever, owing to its lack of an infantry reserve. The armor could have cut a salient at any time and could have gotten astride the rearward lines of the defended ridges to right and left. But this would not have produced dislocation or demoralization of the flanks; the seeming threat would not abort the position; nothing could achieve that effect except the killing of the people which garrisoned it or the delivery of fires which seemed certain to threaten that end. There was thus re-emphasized what would appear to be one of the main lessons of World War II, that superior offensive mobility has lost its main magic as a demoralizer of modern forces and is tactically persuasive only when it enables the delivery of a decisively superior volume of fire at the critical point. This is a tenable proposition so far as the employment of conventional arms is concerned; the introduction of the new area weapons into field warfare gives a new dimension to the problem. In the defense as in the attack, the main object in tactical search is how to employ old weapons so that the new and more decisive ones will have the greatest possible opportunity.

## ALL-AROUND DEFENSE

None the less, in any defense of a wide front, where there is a deep penetration which succeeds in overrunning and eliminating a main strong point in the line, the defender is in heavy trouble, particularly if he is dealing with a

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mechanized opponent. Not only does he have to find the resources with which to hold and beat back a mobile force which has become lodged upon the high ground and is probably astride its rearward approaches; under the pressure, he will also have to withdraw the fighting elements from the adjoining antitank zones, if not abandon them altogether. The gap thereby widens. The flanks of the neighboring blocks become compromised or turned. Under these conditions his best course is to redeploy at right angles to the attacker's line of advance and compel him to march flankward instead of moving straight ahead. If this can be done, the defender may gain time in which to refuse the flanks of the penetrated positions, utilizing the weapons which have withdrawn from the anti-tank zone.

The maneuver might be imagined developing in approximate conformity with the following figure:



Fig. 13—Penetration and Containment

But one difficulty is that the so-called all-around defense is never in perfect balance even when the dangers of envelopment are clearly recognized. If for no other reason, terrain itself is rarely adaptable to any such design. Fundamentally, fighting power must face forward. Gun positions, works, etc., are addressed mainly toward the front, and the rear is almost invariably more vulnerable because it encloses the most sensitive installations. The main exception is when some terrain feature such as a cliff formation, swamp, or flooded area makes attack from that direction all but prohibitive. It is a desirable object but topography is not often that accommodating.

To examine the purport of this situation is to find another seeming element of weakness in the theory that a defense by positions in line in the face of a mechanized attack using the tactical bomb or missile as a break-through instrument remains a practical concept of operations and can be safeguarded through the existence of a highly mobile strategic reserve. It has been considered that the location of this reserve would be from 50 to 100 miles rearward of the MLR; that in the event of a rupture of the front its function would be to dominate road junctures and lateral highways rearward of the irrupted area; that by so doing it would deny the attacker freedom of action and keep his forces confined to a salient until they are worn down by air counterattack and the fire of field weapons from along the shoulders of the bulge.

But when a line is formed of a chain of hedgehogs or perimeters organized for all-around defense, even though they are in part mutually supporting, each to its neighbors on the flanks, they are necessarily tactically tight positions. That is to say that they have a fortress-like character; it is the fighting power within the defensive block itself which is the main protection of the roads and wires connecting it with the rear, and if this power is broken or forced to dis-

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place rearward, the heavy weapons which block the avenues off its flanks are not likely to remain in the forward ground and from that ground beat back the assault. This was seen as a main characteristic in the Korean fighting. Once the enemy either overcame a defensive block or moved around the flanks, he had little difficulty in impinging on the communications of positions to the left and right, even though they remained otherwise tactically solvent. And if he did not actually get astride communications, his fires, by taking out wire and interdicting roads, seriously restricted operations. When it became possible to threaten a superior concentration across the avenues of withdrawal, he was in correct position to abort the defensive blocks to flankward by converging pressures from front and rear. That does not mean that he invariably succeeded in the object; many times he failed because his own forces became tired in the attempt and a more rugged soldiery took full advantage of weapons possibilities from along the high ground; but none the less the maneuver was properly aimed.

## Reserves

A general reserve, located at nearly equi-distant interval, as to time, from the several main segments of a main defense line, does not constitute a mobile cushion against this pinching-out process; the latter achieves its critical effects without the need for building an operational base deep inside the defensive country. So long as its resupply of fuel, ammunition, and men can be maintained, it can break the defensive array by pushing the advance along the defender's rear instead of striking immediately for great depth and go at the main bases. The multiplying of area weapons, whereby a whole battle line may become enfiladed step by step with the attacking field army doing a mop-up chore, greatly intensifies the critical nature of these possibilities. A breach widened beyond the stretch of a strategic reserve but makes it another casualty of the battle. It is vital that exploitation of any rupture in the defensive array be stopped short of that point.

There is, of course, the opposite picture of future defense—an as yet vague and characterless concept which finds expression in such words as “thin fingers of resistance... highly elusive in the counterattack... protection developing out of an extreme mobility...” War is still made with heavy weapons and heavier vehicles. Its new and less conventional fittings have made it none the lighter, nor have they in any way lessened the grip of supply upon all hitting forces. Until that basic condition is changed, the forecasts that a new elusiveness and extreme mobility will energize defense, giving it a guerilla-like character in that its operational parts are not joined, is an attempt to do with words what is believed there is no possibility of achieving with materiel.

## Grid System

The problem is to pocket the attack and make it incapable of multiplying its damaging effects. There is at least some ground for considering whether that cannot best be ensured by the availability of strong local reserves which can repair to the threatened ground more swiftly than the enemy. Only so is a critical breakdown in communications likely to be averted. But one cannot, through thinning, achieve greater thickness. The idea of the wide front is in-

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compatible with greater depth and a sufficiency of local reserves, though it is not yet so recognized in doctrine.

A grid system of defense is not the perfect answer to the threat of atomic attack upon the position of a field army; and indeed there is none. It offers certain possibilities but it also raises serious questions. The greater number of its possibilities can be resolved in the proposition that against area weapons the field army should employ area organization of the defense and area tactical methods. Many of the questions for which it provides no answer would be inherent in any order of defense which could be devised against atomic attack. The dimension of the blast area and the mass paralysis which the weapon can be expected to produce within that area are beyond effective neutralizing through any new scheme of defensive organization. The most that may be done is to determine how best to roll with the punch.

The bomb lands fair on target in one sector of the defensive line. Immediately, two interlocking problems confront the high command toward the solution of which there is as yet not one constructive or promising suggestion.

Evacuation of Casualties from the Struck Area. Such is the dimension of this imposing task that it suffices to say that the apparatus for it is not now present in divisional or army organization. It is far beyond the scope of existing evacuation and treatment facilities. The survivors in the immediate neighborhood cannot attend it because they will be tactically disorganized, and either in shock or loaded with those who are so suffering. The unified tactical forces to flanks and rear cannot be encharged with any such responsibility because of the threat to their own ground and the redeployments necessitated by the general situation. To recognize the problem in its full dimension is to see a main reason why additions to the frame of divisional organization may be required.

Reconnaissance and Definition of the Struck Area. This is fundamentally a matter of the restoration of communications and of knowing what is taking place on the ground itself. By radar, or other means, there may be an accurate pinpointing of ground zero, followed by a calculation of the extent of the area across which varying degrees of damage have been done. But for the further tactical purposes of the field army, this is the lesser portion of the intelligence which is required toward the readjustment of operational procedure. It is of first importance to have that kind of information which will facilitate the delivery of interdicting fires (by conventional weapons or A-weapons) forward of, within, or possibly to rear of the struck area. That implies not only getting precise definition of the dead space but restoring contact with all fragments or isolated units around its perimeter. Until this is done, the ground tactically is a thoroughfare for the attacker but a dead end for the defense.

The better way, needless to say, is to avoid being hit on target or at least to seek every means available toward that end. Under a grid system of defense, greater deception and concealment of position should be possible than when the field army is drawn up along a general defensive line. A more or less continuous battle line, like a concrete highway, can be almost precisely defined from overhead observation. Not so a thick belt of eccentrically entrenched hills, the significance of any one of which, as to whether it is garrisoned ground, a mockup or an alternative position, cannot be understood until it is explored at close range by earthbound forces. The essential is to promote confusion about the exact location of each component part of the vital

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target area. When blows cannot be wholly averted it is wisdom to reduce their shock as much as possible. In Korea the Chinese evolved a new system of defense around this controlling idea. Yet more ingenious variations of it are within the realm of the possible. Some of the parts which are automatically suggested are:

- (a) Construction of false positions forward of, within, and to the rear of the defensive belt.
- (b) Effacement of line in the antitank zones by the dummied positions, irregular use of camouflage, etc.
- (c) Employment of the masked front.

The function of the latter is hardly more than that of a line of outposts. It is lightly manned and weaponed, but its ground is still within artillery reach. Its purpose is more to suck in the enemy reconnaissance-in-force than to parry and turn it back; its method is to make a strong show of resistance, aided by the artillery, while holding ready to withdraw quickly on order; its object is to set up a situation favorable to counterhitting by the atomic weapons.

There is the suggestion here that all tactical maps should be subdivided into squares say of approximately three miles width, each square having its own code designation. The tactics evolve out of what kind of action is required at a given hour for a particular square, i.e., the abandonment of it, retraction from it into another square, lateral displacement of forces deployed on either side of it, atomic counterattack into it, return to it by the field force, etc. There could be a controlling code number for a group of blocks within the same general area, say, for example, in multiples of four, so that when concerted action of a particular area was required over a wider area in greater depth, control and response would be simplified. In the accompanying figure,

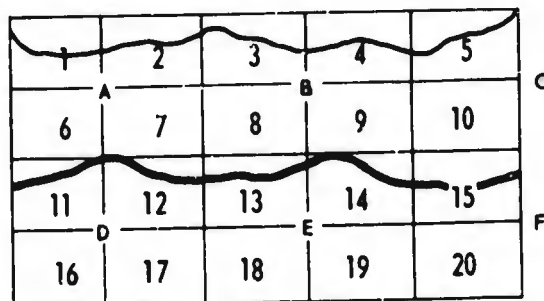


Fig. 14—Use of the Masked Front

the forward light line represents the masked front, and the heavier line running from 11 through 15 is the fortified ground held by the battalions. In the event of a limited penetration of position (or square) No. 3 next the right flank of square No. 2, or an immediate threat thereof, there would be directed the withdrawal of forces deployed in 2 and 3, with no immediate lifting of artillery fires, the displacement of these forces either laterally or toward the main body of defense nearest their rear, and the alerting of the A-weapon force for the counter-stroke. The twin objects of the forward screening body are to mislead enemy reconnaissance in force and supply the information leading to its destruction. It will not always succeed in this endeavor. Suppose, in the example cited, the enemy column penetrates the screen under the cover of inclement weather

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and advancing down a main defile along the boundary of 2-3 and 7-8 begins to threaten the front 12-13 in force. Command then has the option of engaging the enemy with conventional fires on that ground, or withdrawing all forces from sector 12-13, while alerting adjoining sectors, countering the penetration with an atomic blast, whether by bomb, missile, or shell. To preserve the integrity of the front by denying vital information to the enemy, the use of the atomic counterstroke is indicated. This would seem to be the very essence of sound defensive tactics in the atomic era—to withdraw, hit with the heaviest weapon, and then advance again. But to give them any possibility of effectiveness, considering the time factor, control over atomic fires at the corps or even the division level would seem necessary. Another point is that infantry withdrawals, if they are to be swift and sure, must be ordered before there has been any truly heavy engaging with organic infantry weapons.

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## SOME FACTORS IN CONTROL

### VALUE AND USE OF THE LIGHT PLANE

The decisively important service of the light plane as a link and beacon in all of these undertakings can hardly be exaggerated. So great is its potential (along with the copter) that one can scarcely imagine the problem being solved unless the role of the light plane is explored and exploited to the limit. In fact, there is no practical substitute for it. High-speed aerial reconnaissance will not be able to develop the desired body of information. Any form of surface reconnaissance, not excluding the use of tanks or armored scout cars, would be asking a turtle to do the work of a whippet. Again the words, "There will be no time."

#### Reconnaissance of Blast Area

Comprehensive reconnaissance of the bomb blast area is the number 1 mission of command, prerequisite to the uttering of any plan looking toward re-organization. Provided that the bomb has struck a vital target, it becomes impossible to imagine unity being restored through the general area, and particularly among the tactical groups deployed along the periphery of the damage zone, until the problem has been defined. Moreover, the highest level cannot readjust to the situation, and order the corrective action, until it knows the extent of the danger. The determination of what has been stricken is the first step toward knowing what can be saved and by what means. The closer the bomb strikes to the gravity center of a command, the more essential it becomes that reconnaissance be prompt. Thereby the command is put in greatest danger and with it the hub of the informational net which holds tactical organization together. This is the solar plexus of operations, since every counter maneuver is a race with time, and whatever the enemy can do to thicken the fog of war and prolong it means hours gained by his side.

#### Communications Net

The decentralizing of the communications net and the establishing of alternative message control centers, etc., is therefore indicated. Instead of all installations going by the rule that a straight line is the shortest distance between two points, thereby accepting the risk that all circuits may be blanked out at one time, it would be more secure to diversify, run some lines diagonally and not perpendicularly to the probable frontage of the attack, operate always with a forward and rear CP, and have both CPs tied in laterally to equivalent and

# CONFIDENTIAL

higher commands. As the defensive zone will have a generally static character and it is assumed that there will be an interval for relatively effective preparation, the concept is not operationally impracticable. The same reasoning provides a new and more cogent argument why the artillery command should remain physically separated from the division command, operating on a different communications axis. Saying this does not overlook that in conventional warfare there are some definite disadvantages in the prevailing system.

## Radar

Radar will be of some use to adjoining commands in getting the location and measure of the blast area. It should enable a quick rough estimate of the proportions of the tactical vacuum and of the size of forces which have been liquidated, unhinged, and neutralized. But it can contribute little more than that to the collection and reintegration of forces within the neighborhood which still might be useful if directed and re-assembled. Moreover, responsibility for this task can hardly be passed to the command on either flank or assumed by it, even as an emergency measure, since it will become the likely object of heavy and immediate pressure.

## Chain of Command

Training Circular No. 33 says: "Atomic warfare increases the possibility of the instantaneous and complete destruction of entire command structures including communications facilities as well as personnel. The chain of command of all echelons must be designated and thoroughly understood. All commanders must be prepared to assume command of higher units on minimum notice." They are supposed to be so prepared at all times even in conventional warfare. But the question is whether the circular goes far enough toward meeting the requirements of the envisaged situation. Is there not sufficient reason to consider that in all field organization, there should be a pre-set substitute command-staff mechanism, possibly two or three layers deep, so that if existing authority is liquidated, essential work can still proceed with minimum doubt and confusion?

To say that "all commanders must be prepared to assume command of higher units" seems therefore an understatement of what is required by the new conditions. Staff officers must be equally ready to take command when otherwise an element would go uncommanded. The introduction of the idea of multiple command-staff mechanisms into the frame of organization could become an instrument toward indoctrinating all officers with the understanding that readiness to take over an otherwise uncontrolled situation is the hallmark of fitness for a commission.

## New Dimension in Command Task

In the past it has been almost impossible for the CP group to be destroyed without someone seeing and knowing the when and the how and then getting the word promptly to all concerned. Filling the vacancies could follow routine procedure. But that has been radically altered by the introduction of the tactical bomb. A corps, division, or regiment may suddenly be shorn of its command

echelon without knowledge of it, and beyond the likelihood of swift, accurate verification. Moreover, this blow is apt to fall in the hour when the organization has the greatest need of direct command. The problem has a new dimension; the solution also will require one. We may perforce come to some such simple rule as this—that any survivor in the line of command who has reason to believe that the control echelon has either been eliminated or is for the time being neutralized will act on that assumption and forthwith take command until properly relieved. That is a quite different thing than waiting to be told. Proximity to a few light planes and a personal grasp upon a working field telephone may well become the main keys to authority in this order of emergency. A possible conflict in orders is far less to be feared than the lack of direct command in the face of catastrophe.

There are at least three eminently practical reasons why the task of survey becomes a light plane mission: (a) the light plane can fly above the area with safety at as early a moment as troops may enter it afoot or be entrucked from the rim; (b) from the air the survey can be done in a fraction of the time needed for the same mission by a number of ground parties: the air survey will have better perspective on the whole and will conserve the strength of the field force, saving not only man-hours but men; and (c) the mission ties in directly to the other tasks of the light plane essential to the reintegration of the command, the initiation of which need not await completion of the reconnaissance and report back to command.

What the nature of these undertakings will be is suggested almost automatically if thought is given first to the bomb's impact upon communications and of what their repair will mean to the reuniting of the command. Telephone lines will have gone out between physically sound battalions or regiments and higher command. Some radios will still be working but the relay points will have been obliterated. So far as the unit's own resources are concerned, that leaves only the use of runners for the renewal of contact—a time-wasting and a not too dependable process.

The light planes therefore patrol forward on a search and liaison mission to all tactical units outside the devastated circle coincidentally with the initiation of the reconnaissance of its interior, if not earlier. These are but a few of the techniques within their capability by which the mission is accomplished: (a) they will serve as radio relay stations for units made radio-isolated by the blast; (b) they will make message pick-ups and drops to units out of contact and lacking other facilities; (c) they will guide lost parties coming out of the blast area or otherwise unhinged by the event; (d) they will carry higher commanders forward to direct reorganization and maneuver; and (e) they will help resupply troops with such communications equipment as is acutely needed. All of these techniques have been tested and adequately proved under battle conditions during Korean operations, and what is here suggested is merely a further extension of a well-established principle.

So described, the mission makes the infantry system more heavily dependent on its artillery partner than ever before, and it also indicates a need for light planes (and helicopters) in larger numbers than under existing tables.

When direction by radar fails, or the equipment is lacking, it is believed that by simple triangulation, using the sightings of units which are tangential to the critical area, the place where the bomb falls against a defensive front

# CONFIDENTIAL

can be pinpointed accurately enough to enable this restorative and reunifying operation to proceed within a few minutes following the explosion. The reconnaissance mission is quite a separate thing and ties in as directly to the relief-medical-salvage program as to the task of getting the fighting body joined and going again.

## After-Dark Ground to Air Communication

For after-dark communication between ground and air, in the post-blast period when other means of communication have gone out, there is a requirement for luminous panels and a simple code which could convey such basic messages as: "Unit sound and holding position," "Unit immobilized by casualties," "Situation here still unknown," and "Preparing withdrawal," etc.

These need not be one-purpose panels as luminosity would not lessen the panel's value for conventional daytime signaling. In fact, one panel or a pathfinder light, shuttered on-and-off dot-and-dash, might well prove the most convenient facility for ground-to-air communicating when all else had failed. The need for schooling in code of junior leaders and a greater number of ranks is indicated.

Should the various surmises within this study prove to be approximately correct, introduction of the tactical bomb into the field attack seeking decisive penetration will tremendously increase its velocity and must proportionately increase defensive reaction to it. That means that all vital information must be transmitted more rapidly, a chief contribution to which would be the reducing of transmission time. Today fighting is from maps which have been squared, and even ranks are accustomed to the use of coordinates but we have still not taken utmost advantage of that fact in message sending. What are the main points of information the commander needs to regulate operations? Usually these: the position of each of his units, the position and strength of the enemy, the action of the enemy, the action and condition of his own units. Now translate these into code; each unit has a code call, LV, XM, and so on. Each location has a number. Actions: A = attacking, B = holding, C = retiring, D = moving, E = out of control, etc. Condition: V = strong, W = weak, X = exhausted, etc. Thus as to a combat message from front to rear: LV 93 B EN 94 fifty A 93 W. Written out it becomes: "First Battalion holding an enemy attacking its direct front, his strength estimated as fifty machines, his condition weak."

In an earlier chapter it was suggested that the withdrawal and reassembly of all deployed units peripheral to the blast area might become SOP. That would of necessity mean that the tie-in and reconnaissance parties would be dealing with forces already in movement.

In night operations particularly, this would become a source of considerable confusion to command and to light plane operations if radios are not working or it is necessary to observe radio silence. This is an additional reason for standardizing and putting into training practice some alternative means of quick unit identification, such as the use of special luminous panels or multi-colored pistol flares. The even simpler and readier device would be the use of a torch for off-and-on code signal.

# CONFIDENTIAL

## SCREENING

Disposing the field army to defend in depth over a relatively narrow front, formed as a shield covering the MSRs which link the field army with its main bases and ports, would not preclude that it engage in screening and holding actions against the enemy advance in the opening stage of war.

Toward full preparation of the defensive zone, once that zone has been delineated, it is desirable, if not essential, that the main body of the field army repair to the chosen ground during the training period so that works may be completed during training exercises and troops will gain a working familiarity with the terrain and its tactical problems through comprehensive maneuver.

## FORWARD SCREENING

But with the arrival at this state of readiness by the defender, it does not become necessary that his tactical forces thereafter continue in a sitting position within the prepared zone, either during the period of watchful waiting, or when the enemy begins his march. During the training period, time and economy of force permitting, it is conceivable that other entrenched works might be constructed well forward of the zone chosen for the total stand, to deceive the enemy as to the ultimate design. Such works would be of possible value to the screening-holding element during the period of general attack, but because of the distance separating them from the critical defense zone, they would not avail enemy forces except as partial and temporary cover against overhead attack.

It is out of the firmness of the defensive position proper that the field army develops its main possibilities of effective maneuver. Having full knowledge of the final mission, the command will be relieved of several main doubts as to how and where it should risk limited commitments, by what routes reconcentrations are to be accomplished, and in consequence, where each committed element stands in relation to its own rear and the general object.

The composition and purpose of the forward screen covering the frontier has already been described in general terms. It is not a diehard force. The pioneer elements have a check-and-run mission. The tactical elements (infantry and armor) will do light screening all the way back until they fold to within the prepared zone, which is already garrisoned.

During its withdrawal from the frontier, the pioneer force should be capable of peeling off detachments to attend the already-prepared demolitions at main bridges, causeways, etc., and establish physical roadblocks in defiles con-

# CONFIDENTIAL

venient to these same objects. The demolitions and blockings are accomplished after the tactical screening force passes through the engineer detachments at each point. Unless the explosives are emplaced, or are stored convenient to the scene, and unless blocking materials are deposited handy to previously identified natural blocking positions prior to the outbreak of war, the time interval during the retrograde is not likely to avail such operations. For the same reason, the bonding of roads with radioactive materials during the fall-back should be considered infeasible.

On the completion of a demolition or a block, the pioneer element retires through the tank-infantry screen, continuing its withdrawal to the next obstacle line while the screening force holds in place until the renewal of contact with the enemy advance guard. Since the enemy will doubtless deploy amphibious tanks in his advance guard, no blocking of a river is likely to avail the retiring screen a very long wait. Exactly the same considerations inveigh against the practicality of any elaborate retardation plan: the cross-country and amphibious characteristics of modern vehicles which are likely to be employed by the advance guard would make it largely a wastage of materials.

The formation which the screening force should assume in conducting limited defense around these local blocks is in the shape of a funnel, with armor echeloned to rearward and enclosing the infantry body. Outside the funnel, a jeep swarm would patrol along the two flanks as a further shield against local surprise. In any well-roaded country such as Western Europe, the conditions are greatly in favor of tactics on this order. But because of these same conditions, they will have at best a fleeting value.

The general idea is expressed in the following diagram:

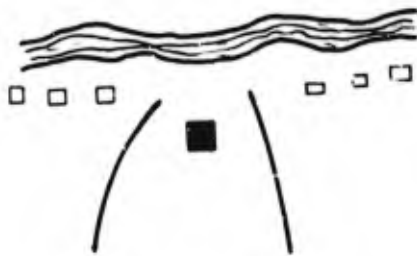


Fig. 15—Screen Block at River Crossing

## SECOND SCREEN - BLOCKING PURPOSE

Where the original screen completes its missions of blocking, observing, and keeping contact, a second screen deployed from out the defensive zone takes over, or it may be more advantageous to operate with a series of such screens, each giving way to the other. Also, the screens operating on a parallel to the general front might well have this difference, that they would deploy with their open flanks echeloned to rearward, since the principal object no longer is one of delaying the enemy march into open country but of preventing his arrival in concentrated strength against the face of the defensive salient. This concept is suggested in Fig. 16.

In this diagram the nose of the defensive salient is a and the position of the initial screen in its final phase in relation to the second screen which has deployed from out the defensive zone is b to c.

The screen in neither case is envisaged as a line of riflemen deployed evenly across country. Rather, it is a chain of blocking parties, covering along roads and linked by radio, in addition to being served by observation craft. Basically, it is composed of motorized infantry, supported by armor and multiple mounts, with an engineering attachment in each group to take care of blocks and demolitions.



Fig. 16—Phased Screening

The screen's mission is to parry the pressure as it comes on through the open country to both sides of the defensive salient. Its tactics are directed to misleading the enemy rather than to stopping him. In general, it uses the same methods as the original screen, though exerting a heavier counter pressure, with the ultimate object of forcing temporary concentrations in the enemy forward movement which would be favorable to atomic counterattack. This is a gatelike movement of two wings, both of which are hinged on the salient. The strength of both wings should be heaviest in the sector next the salient, and the elements to the extreme flanks, while lighter, will need extra cross-country mobility if they are to perform their mission and survive.

It has already been said that the main object of the screen is to mislead the attack. Strength on its inner flanks is intended to divert the opposing field army and send it looking for soft spots. The resistance should be substantial enough to produce compaction in the enemy force and set up the desired targets for the A-weapons. That is the prime purpose of resistance along the main thoroughfares. The vital areas will lie outside the salient and forward of its screening forces as the enemy maneuver develops; that is, the enemy can be expected to deploy in main strength toward the vacuum areas on both flanks of the defensive zone, as if seeking double envelopment. On the other hand, should the screening produce the effect of canalizing the enemy attack toward the front of the salient, that of itself should bring about compaction along the main roads.

As the atomic counterattack gets underway, the screening forces fold back into the salient, and when further retardation and screening are called for, they are done by other forces deployed from out the defensive area.

**OVER-ALL CONSIDERATIONS**

**CHARACTERISTICS OF LINEAR  
DEPLOYMENT AT START OF WAR**

Under existing conditions the beginning of war is not likely to be preceded by a declaration of war or signalled by any order for an all-out national mobilization. No other major short-range warning is apt to occur than the reconcentrating of 40 and upwards divisions in proximity to the threatened frontier; it is hard to imagine that the attempt at initial invasion could be mounted on any lesser scale than that. But once such a concentration is effected, the attack has sufficient body for the first round of the battle and can meet the probable tactical requirements of the first month, by which time total mobilization will be well underway and support divisions will have reached the front.

For these reasons the defender is at heavy disadvantage if his troops are in the main concentrated along a forward belt in proximity to the frontier. He becomes excessively subject to feints and alarms, for example, the willful use by his adversary of periodic concentrations having no other object than to jangle his nerves and get him off balance, as was consistently practiced by the German army in the early period of World War II against states not yet engaged. When such maneuvers are discounted and there is no reaction by the defense to the apparent threat, the danger grows that in the hour when the real thing is launched the defense will be taken totally unaware.

There is a further compounding of the problem when a defending army is thus arrayed. When the emergency arrives, it must do all things at one time under conditions of utmost confusion. The tactical force, while engaging forward, must look to its rearward exits and avenues of withdrawal. Far separated from its base ports, it is in no position to counter the dropping of an airborne block somewhere in the intervening space. Such troops and labor elements as have been charged with executing a barrier and demolition plan cannot proceed to their mission with single-minded attention to one object—doing the work and getting out. They will be in the middle of a going battle and their commitment and that of the tactical force are more than likely to become mutually compromised.

**CHARACTERISTICS OF DEPTH DEPLOYMENT**

Defense in depth over a narrow front (the beachhead concept) could not well be evolved, after war's beginning, out of any such situation. Its essential purpose is to get maximum defensive strength from numerically inferior

forces; that would require that their strength not be largely wasted in futile defense of the zone next the frontier. The contact there would be maintained by a relatively thin screen of infantry and armor with such attachments as are essential to the main objects of watching, warning, and reconnaissance. The screen would not be charged with strong delaying action in place, but would roll with the punch. Apart from this mobile screen, the forward zone would be occupied only by the engineer-pioneer troops needed to trigger the demolition plan, including the blowing of bridges and canal locks and the fracturing of rail lines at the more sensitive points, etc. The demolition plan for the forward zone should have such simplicity of design, in terms of pre-set installations and personal work assignments, that it can be executed in full within 72 hours, since more time than this is not likely to be afforded. The mission so described will not block the attack or put any heavier embarrassment upon it than a brief delay. That there may be at this stage a temporary stacking of targets helpful to the counterattacking air is only a marginal possibility. Otherwise the demolitions in the forward zone will have no truly critical consequence. They are worth doing only because it is foolish to leave to the enemy anything which will hasten his march.

There has been much conversation, not yet galvanized into action, about a true barrier plan for the forward zone in Germany next the Soviet-held frontier. It contemplates such elaborate measures as the bonding of roads with radioactive materials and the laying of mine fields across every avenue of ingress. These are rightly considered desirable delaying expedients by a field army retrograding from an already compromised tactical situation and needing time to save itself; yet when they are given a closer look there is some reason to conclude that the time element of itself makes them impractical. To bring off the installation in the emergency hour would call for a vast stockpiling of materials well in advance, as well as the organization of a standby pioneer corps strong in numbers and with an extraordinary military élan. Were all other requirements met, the field work would still be a 30-day undertaking and no such interval is likely to be afforded. But the reality is that until now none of the basic material and manpower requirements have been met.

An elaborate barrier plan next the frontier would not be essential to the preservation of an army which has the greater part of its fighting strength already deployed toward a defensive zone covering its base ports and anchored to the main terrain features protecting the traffic arteries leading to these ports.

In the nature of the case, a prime advantage attending this order of defense is that it can be relatively well organized under the prevailing conditions of peacetime training without drawing undue attention to the defensive design which is intended with the coming of war. There is no way to feint concentration toward a prepared line, whether of hedgehogs or of small perimeters; the position speaks for itself and makes transparent the intention behind it; one might as well think of concealing the movement and storage of supply essential to the installation of a barrier plan forward of the line.

On the other hand, troops distributed in depth through a countryside have a natural and unwarlike posture. Relatively, their quartering is better equated to the normal resources and attitude of the country. They have the look of a training garrison rather than of an army on guard.

# CONFIDENTIAL

During the training cycle and in the course of local maneuvers, they can prepare field positions which would fortify the key terrain around the circle of their normal operating radius. These would be simple field works, though deep enough to ensure lateral protection against heavy blast and strong enough to endure through several seasons.

To ensure a maximum of deception, there should be no standard pattern to these exercises, as to when the work is done and how the work is apportioned between one sector and another. The more casually it is done, as an activity related to other average aspects of field training, such as small unit maneuvers, river-crossing exercises and the simulating of roadblocks, the less is the prospect that the over-all design will be detected. There is no need in the beginning that local commanders be apprised of the final meaning of their work, so long as there is concentric guidance in detail which is based upon a top level plan. Troops can be given to understand that they are being partly schooled in the type of pioneer-engineer work which will be needed up front in the event of war.

The greater part of these works necessarily would be established on high ground. In an intensely cultivated countryside, one of the main difficulties is to prepare works without imposing a major hardship on agriculture. This problem is lessened by a grid system of defense, since it makes possible a wider choice of position. It would probably be found that many of the key terrain features are either forest clad or are otherwise unsuitable for farming.

For the reasons already set forth, troops composing the main body deployed next the frontier would need to be phased back most gradually and according to an eccentric schedule. Their movements should neither be kept highly secret nor unduly publicized. The retrograde, if accomplished over a considerable time cycle, and attended by some substitute arrangement, such as the putting forward of units supposedly having the mission of instituting a barrier plan, need not be understood in its full significance. That in any case the frontier would still be covered by a screening force, in which the more obvious mobile weapons would predominate, hardly requires statement.

So placed, the defending field army has not only already chosen its battlefield but is already approximate to it and is set for its shock. The time margin needed for last-minute preparation is provided by the distance separating it from the frontier. It can enclose the screening force and pioneer elements as they withdraw. The interlude prior to full contact between the two main bodies can be used to mine the likely avenues and fields to the defender's immediate front, blow bridges, tear up rails, and demolish gasoline stores, etc., in the civilian area outward from the perimeter. It cannot be heavily compromised by refugee hordes, since it is standing and not withdrawing. It is less vulnerable to fifth column sabotage because it is already commanding its own ground and its position is fairly compact. Except for such hurt as is dealt it by the enemy air, it will not be blooded until the hour when the main battle begins. Meantime, it will have had a useful waiting time in which to relocate its reserves and test the efficiency of its communications.

On the debit side is the undeniable fact that the concept offers nothing helpful to any prospect of a getaway program for the civilian nationals (dependents, et al.) living in the forward zone. They would be thrown largely upon their own resources in a time when all facilities would become congested to

the limit. The risk that many of them would become hostage to the enemy and would be used to gain immunity for his centers against strategic reprisal is fairly obvious.

But this is a risk which is inherent in national policy rather than deriving from a particular concept about how best to ensure military survival in the general area now held. It would be impossible to formulate any plan or policy which would both incorporate a main chance for the evacuation of civilian nationals and give the defending army a free hand so that it can attain maximum effectiveness of maneuver according to the ground.

For the purposes of this memo it suffices to point out that present policy, not less than present doctrine, is prohibitive of narrow front operations.

**PROBLEMS OF THE BATTLEFIELD**

The system of defense heretofore described is in effect a protecting shield established in working tactical relation to a tier of base ports and covering to the fore and along the flanks the MSRs connecting these ports with the interior. The ports will be the probable targets of the atomic attack by the enemy as promptly as he develops through reconnaissance and pressure the outline of the defensive position. Concentration of air and antiair strength by the defender in support of this coastal area is therefore indicated.

**DEFENDING BASE PORTS**

Preserving this vital communications zone is the commanding task of the defense which cannot be compromised either by spreading the defending air and antiair so as to guard a greater number of population centers as such, or by committing the field army as a whole to defensive battle along the line of some natural obstacle in the hope of decisively exploiting a temporary check to his force. Above all, the defense cannot afford the risks of a general linear commitment, though the battle may seem temporarily to develop in a manner favorable to such enterprise. It is wholly probable that the nose of the defensive salient would be anchored upon some of the features of just such an obstacle, for example the west bank of the Rhine. Or, depending on the number of divisions available for providing greater depth to the defensive zone, it might even develop as a bridgehead committed to holding a defendable arc beyond the east bank. The point is that in either case its strength would be echeloned to rearward rather than spread thin in an attempt to cover the entire Rhine moat. Such a posture would not prevent the enemy crossing the river at points beyond the flanks of the defensive system. (In any case, there is no sound reason to believe that a defensive belt running parallel to the Rhine could be kept inviolate with less than 55 to 60 fully trained and highly mobile divisions committed to the forward area.)

But the existence of the closely integrated defensive salient might be expected to produce these major effects on the enemy deployment:

- (a) Force the enemy to accept the necessity for a wider initial extension than would conceivably be his choice if his army was pointed toward breaking a defense in line;
- (b) By so doing slow down his advance in the opening phase;
- (c) While compelling deployment on a wide front at the beginning of battle, require subsequently that he concentrate his force to deal with the salient;
- (d) Through the compaction thus produced, as well as because of the temptation offered by the open flanks, bring about the setting up of targets highly profitable to counterattack by air.

On either side of the barrier system will be relatively undefended country serviced by a modern road net. It is therefore conceivable that the mass of the enemy army would turn aside from the trunk plainly marked "no thoroughfare" to seek the open highway. The forces of the salient thereby would be denied an opening chance to bring down the enemy through impalement. In the turning movement a flank would perforce become exposed to them. But except for opportune and small-scale sallies by armor from within the salient acting against the open flank, the turning movement would provide no real opening to the defending field army, since if it maneuvers away from the general position, it will give up its prepared ground and increase the jeopardy to its own rear.

The line of base ports is the decisive object sought by the enemy maneuver, whether he proceeds with full weight on the flank or attempts double envelopment. The farther his march along this road, and the more rapidly he forces it, the greater will become his difficulty of maintaining the energy of the battle through supply. That is probably the main lesson from our major wars of this century, that the chances of victory or defeat are multiplied directly by any increase or decrease of road capacity in the area of operations, and that unless road capacity is equal to the requirements of the attack, ultimately the attack must be abandoned. Countermeasures to an advance in main via the open flank therefore include the following:

(a) Road and railway demolitions by motorized engineers along the line of advance (in a pre-set defense they can be schooled and scheduled to such an undertaking).

(b) Counterattack by the defending air against columns and communications hubs, using both conventional and atomic weapons.

(c) Gradual rearward displacement by the forces within the defensive salient so as to thicken the shield toward the threatened area (defensive works will be previously prepared as far back as the coastal strip in general extension of the lines formed by the salient).

(d) Counterattack by the mass of defending armor which is in the best tactical position if laagered around the base of the defensive salient.

Thus briefly described, the instruments of counterattack might seem incapable of breaking down the enemy main effort, and it could well appear that the defending field army is deprived of a main purpose in the hour of greatest crisis. Here again is the controlling idea that the position is fundamentally a beachhead with the same basic problems which devolve upon a beachhead in the initial stage of development. There is not enough power present to exploit an opening into enemy country. The commanding task is the protection of the lodgment until the enemy's opening advantage can be reduced through the arrival of supply and support forces from overseas. Thus if the defensive plan would seem to be excessively rigid, it is a characteristic arising from the over-all situation and not from a particular concept of how to meet it. All beachheads are by nature rigid until the power buildup becomes sufficient that troops can break out without undue danger of having the gate close against their backs.

At Normandy Beachhead we had to depend upon air power mainly and a little armor to hold off and beat back superior enemy forces along the flanks while the field army was making good its lodgment and dealing with the local pressure. Lacking command of the air, we could not have done it. For much the same reason, a field army holding the West Europe bridgehead by means of a rela-

tively narrow salient could hardly hope to stand unless its supporting air could operate in strength along its flanks. This does not imply driving the enemy from the skies; it does mean that the defending air would have to be strong enough to prevail in proximity to its own bases. Given anything less than that, the defensive problem becomes insoluble. But given that much, air power employing the new weapons can give decisive breadth to the narrow field position.

Judged by past performance, the enemy field army can be expected to:

(a) Form press gangs from among the local population and use them either as a buffer to absorb fire in the direct assault upon field positions or by mingling them with his formations on the road hoping to win immunity from atomic counterattack; and (b) use towns and cities as his chief operational centers and supply bases because of the advantages in commanding a road net, the protection which walls give his armor, and the safety from atomic reprisal which he would hope to gain by living with a civilian population friendly to our side.

The tactical advantages which would thus be gained are not only obvious but sufficiently decisive that unless there is prior decision on whether the new weapons will be put to unrestricted use in such an event, the lack of it could be fatal. There is scarce need to speculate about whether the enemy would base upon cities and throughout his march move pivotally from one built-up area to another, using them as command, control, and supply points, and also as laagers for the protection of his mechanized forces. That was a chief characteristic of his defensive method in World War II during operations within his own country. At Karkov, Vyazma, Smolensk, Rostov, and Stalingrad (to mention but a few from scores of examples) his hedgehog was hinged upon the city itself. Thereby his armor was given some protection and the advantage of interior lines. The more the walls were battered down, the better he became able to use the rubble as defensive cover.

For so long as the enemy's offensive mobility develops preponderantly out of his use of armor, there is no reason to believe that there will be any radical digression from this tactical method. The new area weapons are an additional argument why he should continue. If his main operational centers are to be destroyed, the counterattack will have to be put upon cities more than upon key terrain features. He will deploy his infantry forces to the high ground covering these operational hubs, but the cities themselves will be the nerve centers of his fighting establishment. The fact that the A-weapons may be used against his field army and that he may gain a measure of immunity against these weapons by living with a civil population of the opposing side is a new and cogent reason for continuing a system which has already been proved successful.

### **COUNTERATTACKING CITIES**

Since his attack will pivot upon cities, atomic counterattack, if it is to be made truly disruptive of his organization, must prepare to aim in the same direction. That is to say that if moral scruples were to be cast aside, the array of decisive targets presented to the tactical bomb in the defense of the field army would not be greatly different than the pattern for strategic bombing in the heart of enemy country.

This thought may seem shocking. However, while it may be natural to shrink from the idea that friendly cities may have to be A-bombed to check the offensive power of enemy armies, to reject that possibility is not helpful of a solution. Whatever form may be assumed by the defending side, whether it attempts defense on a wide front or ultimately sees the necessity for greater density than is yet envisaged, it will still in all probability be confronted by this problem. The countryside contiguous to any beachhead-type perimeter and the main cities within 10 to 40 miles of its outer defenses comprise the area and the objects within which the enemy's offensive power cannot be permitted to establish a sanctuary. If they are permitted to operate as open cities not subject to bombardment, particularly by atomic weapons, the enemy grip upon the countryside is not likely to be loosened and the defensive perimeter can hardly be relieved of continuing pressure. Its counterattack possibilities will be restricted to minor targets, having been denied the major ones.

But suppose that the defensive zone has been adequately defined and is prepared with defensive works well beforehand. That of itself gives definition to the foreground—the battlefield, the zone in which the enemy field army will have to be brought in check by atomic counterattack. The defender must be ready to use scorched earth action against all parts of this zone—mining roads, demolishing bridges, flooding flatlands, and even obliterating cities. These last will not be too numerous. Their evacuation by civil populations upon order should follow the outbreak of war. The choice is one of either preparing to regulate such a movement, and staging it when it will leave some advantage to the defender, or by failing to anticipate the problem, witnessing a greater ruin to these cities through the indecision of their populations.

These things at least would seem to be relatively certain: (a) the majority of civilians will attempt to flee the cities ahead of the advance of the enemy; and (b) this will be a last-hour movement if nothing controls it save the instinct of the refugees.

In the latter case the likely eventuality is that a refugee tide will inundate the defensive zone in the hour when it has greatest need of freedom of action, with the further possibility that the enemy may be able to use this mass as a screen for his deployment. These are not abstract speculations concerning problems hitherto unknown. Such tactics were used against us during the Korean War and Russia employed them against Germany, 1941 - 1945.

Made a part of planning, the task would still be formidable. But the movement could then be organized toward maximum use of alternative routes outside the flanks of the defensive zone. The program would also cover such essential arrangements as the alerting of peoples in the critical area, information as to the object, traffic control, mobilization of transport, etc. This does not mean that what is in planning could be confided to them: it does imply that the arrangements will be such that when the hour comes, they cannot fail to be aware of the mandatory nature of the evacuation.

Thereafter it will still be within enemy capability to bring other friendly people into the target area, announce their presence, and expect thereby to gain immunity from atomic counterattack. In that event, the decision on whether to use the tactical bomb will have to be taken in cold blood.

What should be sufficiently clear, irrespective of what type of defense is presented, is that cities in the forward zone, if not made subject to atomic

# CONFIDENTIAL

counterattack, will become fortresses giving greater stability to the enemy's defensive position; their possession will give him greater freedom to concentrate the preponderant portion of his power and attention upon offensive opportunity. In brief, the tactical bomb, if used only against secondary targets, such as bridges, yards, supply dumps, or deployed infantry and armor, may slow the attacker's advance but will not fracture his front. Being able to base defensively upon cities with relative impunity, the enemy would also come to use them for the massing of his offensive concentrations.

Moreover, this proposition does not cut equally in both directions. It is perhaps true that cities which are within the defensive salient would become profitable targets for the enemy's attack with A-weapons in the degree that they are used as centers for the supply and direction of military operations. But there is an essential difference between our use of a city in support of operations and the method of the enemy. Whereas we tend to use them for headquarters facilities, supply depots, and message centers with tactical forces disposed forward toward the most advantageous high ground, the enemy bases his defensive perimeter directly upon the city, employing it as a stronghold, surrounded by a ring of outer defenses from which his armor can move out and engage in the open field. In this particular, there is a parallel between the enemy method and how the Marines fought at Koto-ri, Hagaru-ri, and Yudam-ni in the Chosin Reservoir operation.

It is not to be expected that this affinity of the modern army for a population center will be cured or radically altered simply because the field use of A-weapons has given it a fresh hazard. To break away from cities altogether and disperse all installations through open country may be a sensible ideal on surface, but it is still impossible to attain. Today's armies move by the road, and the city, being usually the hub of a road net, is the most sensible and economical control point. To think of separating an army from its natural moorings is as difficult as to believe that all defense industry will be cleared to open country because its present concentration is a positive danger.

As a working principle, however, decentralization within the field army of the future is clearly indicated. Its manner of basing upon cities will be more circumspect than heretofore; for example, than in Korea, where every headquarters set up as a shining target. There will be wider separation between main installations. Supply depots will be made smaller and more numerous. In basing upon a city, forces will dispose around its outer perimeter rather than concentrate next its heart.

**THE AIRBORNE THREAT**

That one of the effects of the introduction of atomic weapons into field warfare will be to encourage the strike in depth through use of the vertical attack seems a likely development: weapons which promise greater speed in penetration, while at the same time enabling a radical reduction of the initial force, need to be complemented by tactics which will exploit with least loss of time and minimum expenditure of force the extreme vulnerability of the rear area. Otherwise, there will not be maximum confusion to the defender.

Establishing an airhead as a magnet for the assault rolling overland would appear to become doubly attractive when it means that, being jumped into enemy country, the strike force is initially in sanctuary and cannot be liquidated by atomic counterattack during the most vulnerable period when the airhead is forming.

However, to make the point simply emphasizes the doubt that in an atomic war, Russia and satellites vs the West, this advantage in the airborne attack would be weighted equally on both sides. The Russians believe traditionally in "scorching" their own earth when necessary to deprive an enemy of it; World War II demonstrated that there has been no softening of this doctrine under communism; the Red Army's usage of its own people was frequently excessively brutal. If the defender should be equally willing to take extreme risks to avert a great danger, and if further that attitude is hardened by a ruthless disregard of the value of human life on his own side, the atomic weapon, whether in the form of a bomb, shell, or guided missile, becomes an effective and highly available counter to airborne penetration. Two atomic bombs, one dropped at Ste. Mère Eglise and the other on the St. Martin de Varreville causeway area, would have smothered the Normandy airborne invasion on D day. During Operation MARKET-GARDEN (Holland) the atomic bombing of Nijmegen and either Zon or Veghel would have collapsed as a whole the forces bent on consolidating the corridor.

An airborne drop conventionally seeks to enclose nodal points of communication and/or major defense bases and installations. Or if not enclosing them, the drop zones may form a pattern tangent to the center and be vulnerable to counterattack without directly jeopardizing the civilian community. Since, however, the road and rail hub is its objective, this separateness is transitory and fleeting. Very quickly, the attacking forces are joined with the defender's people, military and civilian. This is so whether the attack is made with divisions dropped end-on-end or with divisions landed abreast.

# CONFIDENTIAL

## Atomic Counterattack by Defender

Any atomic counterattack against an airhead during the first H to H-plus-48-hour period would conceivably be more destructive of the defender's force and position than of the tactical body dropped against them. The tactical targets within the irrupted area are much too scattered and attenuated. Indeed, at that time, it is all but impossible to give definition to the target area, except insofar as it is possible to fix through air reconnaissance the locations of the main drop zones. The forces which have been dropped will already be marching out, and in the usual nature of the airborne-against-rear-area mission, a concentration as large as one regiment is not likely within the circle representing an atomic bomb burst. The DZs themselves are cleared of supply and of identifying markers and material as quickly as possible; it seems likely that promptness in supply dispersion, and the use of all other means to "evaporate" the airhead will receive more critical attention in the future than ever in the past.

## Defensive Intelligence

The buildup of defensive intelligence under airborne invasion will vary greatly according to the terrain, the weather, the proximity of the defender's line-of-communication tactical groups to the drop area, and the time of the attack—whether it is staged at night or under daylight conditions.

But based on past experience, and what is known about the essentials of the tactical and logistical problem in the airborne attack, the flow of information can be expected to develop more or less according to the following cycle:

- (a) Higher HQs will hear that a strike is underway while the lift is still enroute to target though if the approach is made via an open flank they may not know it until the planes are unloading.
- (b) The general area which is to be exploited by the attack will be known to higher HQs within perhaps one hour after first troops have landed.
- (c) Local forces in the neighborhood of the attack will sense the developing of the main points of pressure during a two-to-four-hour interval following the drop, provided that these are tactical bodies committed to the defense of the area and not merely communications zone soldiers trying to get out.
- (d) At least 24 hours will pass before higher HQs (which would initiate the air counterattack) will be able to plot on an overlay the boundaries of the defensive perimeter held by the airhead force, estimate its tactical strength with reasonable accuracy and describe its probable ultimate objective.

The time factor thus described—and it is believed to be an accurate projection for the future based upon the mean of operations in the past—limits the prospect. Until the last stage is reached, the airhead is not a suitable target for atomic counterattack. Even then, considering that the enemy by that time will either have become close-pressed by containing forces or else will have gained freedom of action over a vital part of the rear area, higher HQs is likely to feel a considerable reluctance about ordering this form or reprisal.

In brief, it amounts to this: the defender cannot obtain positive intelligence or react swiftly enough to smother the airhead with atomic weapons in

# CONFIDENTIAL

the initial stages; in the subsequent stages, he cannot use the bomb decisively against the airhead force without also obliterating the target area.

Whether, immediately following the assembling and tactical deployment of the air-dropped force, the occupied area is a satisfactory target for an atom bomb strike is a question not subject to unqualified answer. The unlikelihood that a defense can react quickly enough to permit it has already been briefly stated. But there can be contemplated some such development as the decentralizing of authority over atomic weapons specifically assigned to rear area protection, a convenient relation of these weapons (the shell or the guided missile) to the scene, and the willingness of the commander on the spot to take a supreme risk.

But so far as the counterstroke through the air is concerned, even to consider the possibilities of the airhead becoming fastened on the rear requires several major assumptions. For one, it is assumed that the enemy has air superiority over the battlefield or the attack could not be mounted. Second, it is assumed that the defense is not wholly without air power, and from its more distant bases is capable of deploying planes singly against targets which are within reach and are of decisive character. Third, it is assumed that because of these general conditions, the attack will seek invariably to enclose a major air base (possibly among other objectives) and will endeavor to make it operational by bringing in fighter planes at the earliest possible moment so that the field force within the airhead will be assured overhead cover. There is one other point in qualification: how fighter planes are introduced into the airhead is likely to depend on its distance from the front. A relatively shallow penetration may be better served by fighters basing upon the rear area. As the speed and range of fighters increase, so will the depth of the airhead which can be covered by rear-based fighter craft.

## Vulnerable Period for Counterattack

These considerations would seem to suggest that the period during which the airhead will be vulnerable to atomic counterattack will be short-lived at best and cut to the vanishing point if the defender scruples against killing any of his own people in an hour of great emergency. Decision by the defender must be almost coincidental with the assembling and attack outward by the airhead force or the main hour of opportunity will have passed.

Only during the opening 1-4-hour period is an atomic strike against DZs likely to be of decisive consequence; thereafter, the dispersion in the airhead force will have become so great that to cripple it mortally, the atomic counterattack would have to center fire on the very objects the field attack seeks to envelop and conquer. It has already been suggested that airhead operations will become decentralized to the limit possible and formations and supply will be cleared away from the DZs promptly. More comprehensive use of camouflage and use of natural cover for the protection of supply by airborne forces is therefore indicated, not simply to safeguard the materiel but to cloak the gravity center of the position. This, even though the target is not apt to be easily approachable in the airhead's formative period. The lift will arrive under fighter cover and relays of fighters will deploy into protective positions above the zone until the field force is rolling. Whether the air screen can be

continued in decisive strength beyond that time will depend upon how much air power is needed to support the frontal battle. But even when the fighters are overhead, the drop area will still be as vulnerable to atomic attack as any target defended by locally-based fighters; there is no such thing as complete interdiction of enemy bombers. The occasional Communist bomber strikes against Seoul and the Eighth Army front were nuisance raids, carried out by third-rate aircraft. But still they got through, and had they been loaded with atomic bombs, their destructiveness would have been vast.

### Objectives of Airborne Strike

In the main, the objectives sought during an airborne strike under atomic conditions are not likely to be such as to present highly favorable targets for atomic counterattack.

The more profitable objectives would seem to be these: (a) successive control points along a main traffic artery or embracing parallel MSRs; (b) air bases; and (c) base ports.

Main supply depots are listed last for the reason that it is assumed the defender's supply system will perforce be made so highly decentralized that any one base or depot, lost to the enemy, will not be a critical deprivation to the defense. An exception will be the base port areas where it is hardly possible to avoid large concentrations of materiel in close juxtaposition to other critical installations.

Of likely development under atomic conditions is the use of airborne forces for blocking at a river line to rearward of the battle zone during the attempt at decisive breakthrough. This is but one variation of the concept listed as number 1. While airborne forces have not heretofore been used in that manner—deploying into river cover to choke main crossing points—the increased velocity given the penetration maneuver might make this a highly acceptable means of enveloping an army brought to the breaking point by the breaching of its front. The river trenches of Western Europe are highly suitable for such a maneuver, which would likely take the form of numerous small drops, possibly of battalion size, each group covering a bridgehead. What this threat implies toward the strengthening of AA coverage and other security arrangements about the defiles of the rear area is reasonably obvious.

All of the objectives previously listed are of a character which would necessitate indiscriminate bombing of friendly civilians and probably of allied military components during any attempt to eliminate the airhead through atomic action. From this standpoint, counterattack against an air base seized by enemy forces is the most favorable possibility. The vertical attack against a road system, to deny it to the defender, is not apt to produce acceptable targets for atomic counteraction even after its outline has become sharply defined. The sensitive (control) points are the highway centers (towns) and intermediate bridges. These will be seized at the earliest moment by the airhead tactical forces. In the taking of a town, these forces will distribute their main battle groups on the highway axial lines around the outer circle, establishing a perimeter of roadblocks; any strike against the heart of the built-up area is not apt to be greatly disruptive of their communications or destructive of their forces. As for strikes

# CONFIDENTIAL

against intermediate bridge structures, causeways, etc., they are marginal ventures and will rarely produce more than a temporary embarrassment to operations.

Vertical attack against a base port is an unlikely enterprise unless the battle reaches the pursuit and sealing-in stage, following decisive defeat of the defending field army. To envisage any situation with that degree of desperation is somewhat easier than to imagine that atomic counterattack against the airhead would in such circumstances be a feasible, profitable, or psychologically acceptable venture.

Finally, the form which airborne enterprise appears most likely to take under atomic conditions is the dropping of small packets of guerillas under night cover into hilly country adjacent to main supply routes for the purpose of sabotage, pillage, attack on convoy, and the terrorizing of the civilian community. The more compact the defensive order, and the more thoroughly it is committed to the front-to-rear protection of a limited system of communications, the less it will invite this form of harassment. For except in extremely mountainous and wooded country, the operations by independent guerillas are more apt to materialize as short-term nuisances than to have a truly decisive effect upon main operations. All recent experience would seem to point in that direction.

Viewing it from the position of the defender, there is no reason to think that the quick linkup and independent airhead type of operation will not still be feasible and will provide the main payoff in airborne operations.

**SOME MORAL FACTORS**

The doctrine of the unlimited offensive dies hard. As originated largely by Colonel Grandmaison, whose theories almost led the French Army to destroy itself in 1914, it premised that an intense desire by an army to press forward and get at the enemy and a strong will to fight in its individual soldier were virtually indivisible motivating forces.

Military commanders tend to believe that there is a vital connection between these two ideas and that it is only by keeping offensive ideas uppermost in men's minds and offensive measures foremost in an army's actions that ranks will be given a sustained determination and will respond aggressively to the will of the commander.

Hence there is a convulsive shudder at any mention of the protracted defense as if repeating the words doomed an army to a withering away of the spirit. When the high command is quoted on the subject of how we will defend in Western Europe, it feels duty-bound to say: "But we will attack!" There is a connotation here that good soldiers must think at all times of offensive action. But if that is sensible, then it is false to think that how one meets a particular situation in war should be determined only through an objective reckoning of the total circumstances. In the history of war we are frequently told that the passive defense leads almost inevitably to ruin; but it is less emphasized that the continuing offensive may in 99 cases out of 100 be bracketed with it. The reason for this is that the art of fighting depends upon the closest combination of the offensive and defensive. In the one, power is conserved, regrouped, and increased; in the other, it is almost invariably expended. Successful war consists of a series of lurches, the art of correct fighting depending upon the closest combination between defensive and offensive action. Successful battle comes of how far, and in what proportions applicable to the particular problem, the combination can be maintained. When a side is radically disadvantaged in numbers, as related to the length of the front to be covered, and it does not possess a vast weapons and moral superiority combined with decisively greater ability to concentrate and regroup, its action will necessarily balance heavily toward the defensive side.

**OFFENSIVE SPIRIT DURING PROTRACTED DEFENSE**

In Korea, protracted defense became a tactical necessity during the months of the Pusan perimeter. Later, it was a political necessity during the two years and more of the armistice negotiations. Out of three years of

war, there were less than six months in which the American soldier was engaged in offensive operations; of these six months there were only two and one-half months of general advance; the rest of the time it was a nibbling attack, battalions going forward one or two at a time, with the objective limited to the next hill forward. Under these conditions and particularly in the two years of protracted defense accompanying the peace negotiation, there were apprehensions that the American soldier wouldn't wear well under the strain of fighting in place, with sustained deprivation of large offensive opportunity.

But he did! Rotation as conducted during this period was more of a strain upon the fighting man than a relief. Insofar as his basic training in the United States is concerned, he reached the front as well schooled for combat as the time allowed in the training cycle would permit. But after he joined a combat unit, the over-all situation imposed on troops, largely in consequence of the constant fluxing of the personnel, due to rotation, scarcely permitted time for any additional training whatever. The man was green when he got forward; it cannot be truly said that, on the average, he was seasoned and battlewise or even trenchwise by the time he had completed his tour. It was the typical experience of the average infantryman that he did not get to know or see his unit as a whole until perhaps five or six weeks after he had joined it on the ridge it was defending. He was folded into a half-squad holding a particular bunker or section of trench as soon as he reported. Beyond the men of this group, he became identified with nothing and with no one in particular except his platoon leader or company commander, until the hour came when the unit fell back to the reserve. It was not unusual that he would be asked to patrol into enemy country his first night in the line before he had had any opportunity to feel strongly identified with the group. Even so, this same average individual gave a splendid account of himself in the in-fighting. Under attack (these facts were determined by thorough research of 13 company and 7 patrol actions in which the men had been fully engaged; the units had taken heavy losses and the survivors' experiences were recorded in detail) he did not tend to refuge in the bunkers except when the position was under intense artillery fire. When the position was hit, he stayed in the trenches and fought. When it was overrun, he usually retired in fairly good order and was still responsive to control. On patrol, though he was out-guessed by the enemy a greater part of the time, showed a decided lack of scouting quality, and did not exercise great initiative, he was very rarely outgamed. There were numerous patrol failures—instances in which leadership would funk its mission or the following would behave badly—but they were more than redeemed by the episodes in which the body as a whole, beset by a deadly surprise or otherwise shocking situation, handled itself bravely, and if extrication became impossible, went down fighting. The conditions of that front were supremely nerve-testing to the American soldier; in meeting them, he showed greater depth than there would have been reason to believe that he possessed.

Even prior to the protracted defensive developing from the proceedings at Panmunjom, the Eighth Army was so insufficient in reserve strength that it could not commit itself to large-scale offensive undertakings. Its several corps could not maneuver as such by disposing extra weight toward one flank that it might be enabled to move as a whole and so produce envelopment. To mount such an attempt, the other corps would have had to be stripped peril-

## CONFIDENTIAL

ously thin. In this circumstance, the army as a whole gained ground through use of the localized counterattack. Battalions or regiments advanced in echelon, the taking of one or two ridges by relatively small formations being followed by a like small-scale advance on the left and right. What was most frequently described to the nation as a "corps offensive" was usually a series of staggered local assaults by units smaller than a division, in conformity to a pre-arranged general plan. The battalions and regiments thus committed were helped forward by their artillery and air. Otherwise, they were going it pretty much lone-handed and were most times aware that such was the case.

It is a fact of prime importance that these conditions did not weigh heavily on the spirits of the men called to fight the local battle. They were no less ready to fight because the whole army was not charging forward with dash and vigor, eager to be at the enemy. Their own offensive power was not less thoroughly extended because the offensive possibilities of the larger body were strictly limited. The record shows that some of these companies took losses between 70 and 80 percent and still endeavored to gain ground in the counter-attack or continued to stand on their defensive hills. This was not always the case but it occurred a sufficient number of times, both during the mobile period and while the front was static, that it must be regarded as a significant sidelight on the basic quality of the American fighting individual.

Since their performance was in general as good as anything done by American troops in the past, and the showing of patrols, though occasionally marred by laggard performance, is still as decisively marked by positive forward action as were operations during the trench raiding of World War I, it is impossible to show, on the basis of Korean findings, that an aggressive spirit is a product either increasing or diminishing according to the rise or fall of offensive power within an army. In the defense and counterattack around Porkchop Hill and Dale Outpost in April 1953, seven American infantry companies were involved. All took high losses, but the percentage of individual cases of outstanding heroism, and the level of effective weapons usage and resolute, collected group action were as high as any standards to which American troops had hitherto attained. The record shows that some of these troops, by the afternoon of the second day, were so thoroughly spent that they could not eat and lacked the physical strength to get heavy weapons such as the flame-thrower and HMG forward and into action along the frontal slope. But under the dirt shower raised by the enemy artillery, they were still trying to clean their rifles and carbines.

It is altogether right and necessary to proclaim that there can be no success, in particular when circumstances compel an army to undertake the protracted defense, unless there is constant cultivation of a willing and informed aggressive spirit within its individuals. Man, particularly the virile, youthful infantryman, cannot long sit still without feeling frustrated, and he cannot be committed, by the army to which he belongs, to a doctrine of defending in place, warding off blows, parrying them and sidestepping them, without actively returning them in extra measure as he sees his opening and catches his opponent off balance, and still remain confident that his cause is a success and will in time become triumphant. The point is almost too obvious to require elaboration. What for the past 13 years has been called "Maginot thinking" is directly degenerative of the spirit of a soldiery. When men became instilled with the

# CONFIDENTIAL

belief that in the situation they are likely to face, their army will not be capable of forward and decisive action, it is inordinately difficult to make them feel equal to their personal tasks or to harden them toward seeking greater danger when the refusing of it would mean the loss of a tactical opportunity.

But this is something far different from cutting the pattern according to the cloth and keeping the offensive spirit alive under the rigor of a necessary holding action.

From all we have seen of the American soldier until now, and in particular, from what we have learned about the American soldier in Korea not only during the protracted defense but in retreat and on the offensive, there should be no reason to doubt that when his army must of necessity assume a defensive posture to ensure its own and the national future, his individual response will not be impaired by the wait, he will be capable of understanding the reasons for his situation, and he will be not less willing to fight forward effectively when the situation permits.

Furthermore, it would seem self-evident that just as troops gain fighting power from long experience and comradeship with each other, they will also acquit themselves most ably when they are fighting on ground that they know and are repeating maneuvers with which they are relatively familiar.

The order of defense which has been here envisaged would partake not at all of the static character of a stand within a fortress, or upon such a heavily emplaced belt as the Maginot Line, or yet again of a rigid trench system such as the 1952 - 53 line in Korea. Further, it has greater positional flexibility than any defense by means of a line of acropoli or hedgehogs, wherein each position has been organized to the hilt, with a protective covering which includes deep pits, elaborate mine fields, fixed rocket batteries, etc. The more deeply a field army digs in and the heavier becomes the sheer weight of its defensive installations, the more complete becomes its commitment to a decisive battle upon the ground chosen. Rigidity of position ensues whenever the outcome of a campaign is staked upon developments along one barrier system. Every defensive position, just as every defensive battle, should be based on an offensive plan which through force of circumstances cannot at once be put into operation. That one basic idea should control the organization of all position warfare.

## MOBILITY WITHIN THE DEFENSE

Consider the conduct of American troops in small siege operations such as Bastogne, Belgium, and Yudam-ni, Korea. These were not static defenses. There was always high mobility within the defensive circle, though its radius was quite limited. The defensive works were rudimentary. The garrisons remained light on their feet, ready to shift weight toward whichever sector of the circle was immediately threatened.

These examples are not cited with any intent to imply that Americans will always be able to stand against such extraordinary pressures as were met at Bastogne and Yudam-ni, or to suggest that defense along a beachhead perimeter in Western Europe would make any such requirement of the great body of defenders.

# CONFIDENTIAL

There will be an occasional such eddy in the battle; it is to be hoped that the garrison will prove equal to it. What is here emphasized is that even under siege conditions, when a defense is truly mobile, the periods of standing-to and fighting back from within works are about evenly balanced with the periods of actively attacking forward to exploit the openings left by the enemy as he overextends during his assault. There are more than enough opportunities for forward hitting to satisfy the hot blood of the most aggressive soldier.

In any situation the posture and doctrine which are best for the individual are also of most profit to the army. Can there be any argument about which is the stronger attitude, an army compactly organized in defensive columns with its reserve power ready to bound toward an opening, or an army on the extended front with its reserves concentrating on the main task of plugging holes in the wall? Is the coiled spring less ready to exert its power outward than the spring already stretched? Is a boxer less ready to hit when he is covered and on guard than when he is extended and at the point of going off balance?

These are not idle comparisons. An army, like any other dynamic body, must store power in order to spend it more perfectly. The Third Army, breaking out of the Normandy bridgehead to roll through Brittany and advance upon the Seine, is perhaps the most shining example from recent times of this principle in operation. Not only was the Army stacked-up prior to the breakout, but there was a condition of acute compression throughout the defensive base which gave impetus to the attack and relative safety to the maneuver. Having more than adequate power to protect itself, the main base could better guarantee the protection of the approaches leading to the enemy. That enabled the army of the attack to strike at the enemy's rear without unduly chancing uncovering its own line of communications. The story of how that battle developed showed once again that in mechanized warfare the enemy must first be held, and that it is from the holding operation that the rear attack should be developed.

But an army deployed on a wide front because of the numerical inferiority of its tactical forces has no such possibility unless it is dealing with a morally weak adversary led by simpletons. In fact, it does not possess true counter-offensive mobility, even though it has local advantage in firepower. The best it can do with impunity is to maneuver its smaller fractions forward to limited objectives, advancing its line with a slow ripple, rather than with a shock wave, with resultant heavy attrition. The Eighth Army in Korea during the first half of 1951 examples this truth. As an army it lacked offensive mobility because it lacked reserve strength. Nowhere along could it achieve a sufficient build-up to maneuver a corps as a corps. So it had no choice but to nibble away, advancing one or two battalions at a time.

To equip and weapon garrisons for the counteroffensive while planning to operate them on an extended front would seem to be working at cross purposes, or attempting to ride in two directions at one time. It means lowering their chance of being effective at the one thing which they will certainly have to do for the chance of shining more brightly in an opportunity which they cannot rightfully expect to meet. It is an accepted truth that no army can afford to plan, weapon, and indoctrinate for defense only without courting ultimate disaster. To repeat, the preservation of moral and tactical balance in war depends upon the closest possible combination between defensive and offensive action,

and successful battle comes of maintaining the combination to the possible limit. During our time we have seen great nations bow in defeat because their military mechanisms had become fatally unbalanced in either one direction or the other. France fell in 1940 because it had weighted its security structure preponderantly on the defensive side; in the years which followed, Germany's great war machine was toppled because it had been built fundamentally for the offensive unlimited.

But to set forth the principle thus does not carry the implication that a particular situation in war can be met other than in its own terms. When the strength of two sides is so unequal as clearly to indicate that one side must fight primarily on the defensive, if it is to survive and hold the decisive portion of its ground, it is vain to speak of its counteroffensive capabilities or to organize any important part of its power and planning toward that end. Rhetoric does not suffice for the lack of an adequate number of strong battalions.

However, an army in this situation must possess the capability of counter-attack; lacking that, it is doomed to defeat through attrition. Moreover, this capability for swift, short movement combined with strong hitting should be present in every tactical element, or the whole position may be compromised because one unit could not go three miles to seize a key hill on a decisive day.

# CONFIDENTIAL

## TACTICAL ORGANIZATION

### FUTURE FORM OF ORGANIZATION

When new and more powerful weapons are added to a fighting system, consideration of how tactics will evolve out of the new weapons balance raises the question of what form tactical organization is likely to take.

True enough, the size and form of military organization partly reflects the state of development within a countryside at a particular stage of civilization and also the inventiveness which its scientific and industrial progress make possible. Armies bulk large in our time, and great wars are waged on the basis of total national mobilization, because the rise of modern transportation facilities, in particular the development of the hard-surface highway, has made frontiers accessible at many points while at the same time enabling mass movement toward them. The development of weapons which may strike ever deeper beyond these frontiers is a complementary phenomenon. It has paralleled the growth of vulnerability within national target areas until at last a point is reached where the vastness of the immediate threat to all interiors is so clearly recognizable as to create doubt that the field army can look to a more than brief future as the decisive force in war.

Even so, the shape of armies, the strength in people of its formations and dispositions planned for the battlefield, the firepower balance within each tactical unit, and the projected working relation of any one arm to any other are largely determined by what has been experienced in combat present and past.

It is a paradox to be noted carefully, however, that whereas major tactical changes in the past have been largely forced upon armies by the requirements of defensive security during active warfare, it is habitual with armies during the intervals of peace to reorder and strengthen mainly toward the hope of achieving a more perfect balance of power in the sustained offensive.

Today's trend provides no exception to this record showing that armies, reviewing their own fighting history, are ever prone to digest its lessons upside down. There is perhaps better reason today than formerly for this preoccupation with the new possibilities of the offensive to the virtual exclusion of defensive considerations. The new weapons not only have preponderant offensive character but the prospect of ultimate victory appears to ride with the side which is best prepared to give them prompt, effective, and total offensive use. But one consequence is that there is minimal re-examination of tactical organization to see whether its form is suitable to defensive requirements of a vastly different character than any which field armies have hitherto faced.

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One illustration will suffice. Except for the strengthening of the artillery and the addition of organic armor, the field division structure is little different than in the closing scenes of World War II when the predominant threat was against its front rather than vertically against its entire area. Being heavier and bulkier, the division is even more wedded to its avenues of movement than formerly. If greater elusiveness and speed of tactical movement in hitting forces is an indicated requirement (and this cannot be stated as a certainty), the fighting structure still has not loosened up administratively. It is a more obvious target than ever. For its operations it requires more road space, the concentrating of larger and more imposing administrative installations, and the utilization of a greater number of easily identified markings such as air-strips within its boundaries than ever before.

The artillery organization was designed primarily to afford heavy fire concentrations against major enemy positions along a closely joined battle front. Under atomic conditions it is to be questioned not only whether artillery can longer afford the physical massing of its own elements, thereby to provide a highly profitable target, but whether there is likelihood of opposing fronts long remaining within reach of one another by conventional artillery fires.

Adding the atomic gun to the artillery array further complicates the already complex search for the new artillery equation.

## Role of Atomic Artillery

What is the role of atomic artillery in relation to the uses of the conventional arm? Since presumably it is deployed as an equalizer, to break down the mass of the enemy attack before it becomes closed on the line where it can exchange flat trajectory fires, its purpose is to supplement fires which in former times were delivered by the air arm rather than to provide a more devastating curtain fire directly in front of the defending infantry than can be delivered by conventional field artillery. Having that mission, it is almost certain to be used, should war eventuate. Its mere presence therefore makes highly improbable that an onsetting war between sides furnished with atomic stockpiles can be limited to the trading of conventional fires. The atomic battery, rather than the conventional battalion, becomes the vital object which, if destroyed, makes the infantry struggle unequal. The immediate seeking out of it by the enemy, using the most efficient area weapons within his arsenal, would therefore be the course of prudence. It is not easy to distinguish gun calibers from high-up observation; too, we have had little experience and less success in the concealment of artillery positions. The increased hazard to all artillery concentrations is for these reasons made apparent.

## The Infantry Division

Standing infantry structure has evolved largely out of the experience of two world wars and reflects the needs and possibilities which were made apparent by their peculiar conditions. Defense in line and quick exploitation by road columns on the offensive following break-through are the twin controlling ideas, one deriving mainly from the first war's prolonged stalemate, and the other from the example set by the German infantry-armor penetrations in the

# CONFIDENTIAL

early phases of World War II, which speeded the triangularizing of the American division that the field army might have greater mobility in the attack.

But is the infantry division as now established also suited to a war in which (a) the flankless front is probably unattainable, and (b) attack by road columns becomes prohibited? One of the main requirements which would seem to be indicated, if tactics are to remain sound, is to prevent the enemy from obliterating communications over a decisive sector; one step in that direction is to give greater operating independence to smaller tactical bodies than we have done previously. Quite possibly, a body the size of the World War II task force will achieve greater economy of operation than the modern division. But to suggest any such thing would mean also that the whole organization of the American rear, as far back as the base ports, would require a new streamlining.

As now established, the American field division, and for that matter, the echelons behind it, do not have the facility and services for the mass evacuation of casualties occurring at one time over a considerable area. The chain of evacuation, and the numbers of personnel who are available to implement it, are adjusted to the mean requirement of operations against an opponent employing conventional fires. The system is suited to battle situations in which casualties, in high-and low-pressure periods, occur in approximately equal numbers along an extended line which is served by numerous evacuation routes. At the lowest level, the process is self-initiated by members of the fighting body in the usual situation. In conventional warfare, the infantry-artillery weapons system accounts for upwards of 90 percent of total casualties. So long as the chain of evacuation continues to function (i.e., the tactical body remains in contact and is still being served by its rear) the unit may take up to 20 percent casualties, or even more, and still fight forward. When routes are closed, and the unit becomes laden with that proportion of wounded, it is effectively immobilized. That rule-of-thumb, though it applies to an infantry company, is not less suited to the larger tactical commands. When one-fifth of the body is down, the rest of it experiences tactical paralysis. It is not so much the shock effect to survivors but the physical overloading thereof which superinduces the condition.

The differences between the past and the possible future situation is that one-fifth of a major command may be taken out at one spot in one second, multiplying the physical overload on the survivors immediate to the scene, and also greatly compounding the shock. That can occur within the division structure; or it could take place farther to the rear. But neither the fighting body nor its administrative support is equipped, trained, or organized manpower-wise to cope adequately with any such emergency.

Averaged out, division density under normal conditions of defensive deployment is not such as to enable proof by numbers that its concentrations are unduly susceptible to atomic attack. A division front may run anywhere from 6 to 12 or more miles. Its depth to the corps boundary may vary between 6 to 10 miles, and sometimes more. As a round working figure, a 50-square-mile holding zone is close enough to reality for practical calculation, and though it is larger than the average division zone in our recent wars, it still means a population density of 300 persons per square mile. Again, as a round working figure, the tactical bomb, dropped within a division area, should

# CONFIDENTIAL

prove a relatively effective neutralizing force over perhaps two square miles, or a little less; merely dropped at random, if troop distribution were equalized, one bomb would kill, wound, or shock one-twenty-fifth of the command and two bombs would pile up casualties in the weight of one battalion.

But this is the theoretical rather than the actual situation. Troops are never equally distributed over the division area front to rear. Large sections of the area such as swampland, the bottoms, and the forward facings of the rearward hills are frequently totally untenanted. Simply to point out that this increases the chance that the bomb, dropped against the general position of the defensive front, will not strike pay dirt is one way of saying that when it successfully finds the soft target its ratio of average effectiveness will be greatly in excess of the figures already discussed.

There are substantially about nine or ten imposing main targets within the average division area. Though staggered in depth, they are usually positioned in a calculable geographical relation to the main roads leading into and from the defensive sector. The infantry battalions are in alignment on high ground at the forefront. In the fully prepared defensive position, fresh road construction essential to the serving of the battalion with its heavy supply will delineate the position sufficiently to enable identification by observation from the air. Rearward of the target front composed by the infantry perimeters is the artillery base, usually established on low ground for better protection, and frequently in proximity to the tank park, the bivouac of the infantry reserve, infantry regimental headquarters and forward supply dumps. In the next tier back are division headquarters, service and supply echelons, communications control centers, and perhaps the divarty command. Farther back still is the division administrative rear, the railhead, field hospitals, and so on. The distances separating the outer rim of one concentration from the next line back are likely to vary from the minimum of one and one-half miles to double that distance, depending upon the terrain, the number of MSRs cutting through the division sector, and various other factors. There will of course be smaller troop groupings in the intermediate ground. But the concentrations will almost invariably be heaviest along a vertical line running midway from the center of the infantry front to the division headquarters.

In the average situation, the defensively deployed infantry division, considered as a tactical target for atomic weapons, is therefore roughly T-shaped with the infantry front forming the top bar and the lifeline from it to higher commands composing the stem. The stem is not exactly an imaginary line. Most frequently, it is the most serviceable highway within the division sector. A division forms its battlefront and builds up its possibilities of maximum support thereof around a road structure, even as the positioning of the road itself is largely determined by the dominant terrain features. And if the road happens not to be there, it becomes necessary to build one toward the same ends. Thus the pattern of deployment in its general aspect must remain relatively set for so long as tactical organization retains its present form.

The degree of density within the division sector is greatly variable, running to extremes when the front is thin and the division far stretched out, or when the sector is in the process of a buildup toward the mounting of offensive operations. In the latter situation, the measure of compaction may be two or three times greater than when the division is engaged in relatively pas-

# CONFIDENTIAL

sive defense. It is commonly understood that under atomic conditions all extra concentrations will involve, while they last, an additional hazard of atomic bombardment, rather than being as they were formerly, simply an added safeguard to the defense. The movement of a division is never a simple operation. It is difficult and tedious enough during a relief when the division takes over a vacated position. In the situation where it perforce builds up on a sector already garrisoned, using routes which are already sustaining a heavy traffic, it is yet more retarded and its housekeeping and control problems are much more complex. So while it is expressed as an axiom that under atomic conditions concentrations will have to be brought off with greater celerity than ever before—either that or run the danger of extinction—there is no clarification of how this can be achieved if the main tactical bodies to be moved have the old weight and rigidity.

Military organization must possess not only offensive power but protective power and these two essentials must be so ordered and related that the mobility is in no way impaired. In the balancing of security against hitting requirements, however, the main question is what kind of battle situation and what varieties of physical danger compose the main threat to the organization's tactical life. Until there is a careful reckoning of the most likely possibilities, the size and shape of organization, optimum, are not determinable. There can be no argument about whether, the transport lift being in proportion, a small tactical unit can hit out faster than a large one, or for that matter, withdraw with great relative efficiency, keeping itself intact. So long as weaponing and mobility are in proportion, mere size in the division structure per se does not more greatly ensure the power and enduring of the field army. There were times in the Korean fighting when it seemed that a light division would have increased the security of the Eighth Army. The main opponent in Europe operates with relatively light divisions. The planning at SHAPE for the Army of Europe also envisages a lighter division than the one we know. It is by no means certain that they are wrong nor is there yet final assurance that major tactical organization, to meet the requirements of future war, should adhere to the division pattern.

Any front serving a field army which is largely motorized and mechanized is virtually impossible to screen from overhead observation because of the fresh traces which it perforce visits on the landscape and equally because its heavy parts cannot be completely camouflaged or put under tree and roof cover. Moreover, once its general location and frontal alignment are approximately determined by the enemy, average map study will enable estimate of where its support and administrative axes are likely to be placed. The Communist Chinese attack upon the Eighth Army in the Battle of the Chongchon was a demonstration of this rather simple truth. The enemy did not have accurate intelligence of the defensive distribution within the divisional rear areas. But having felt out the front, he moved with almost infallible instinct against the most sensitive installations rearward and wasted little motion in his groping. Had he been equipped for air warfare, his solution might have been even simpler.

The larger and more ponderous the major tactical component of an army, the more rigid become its dispositions and the more certain it is that the pattern over a broad and deep area will conform conventionally to the dominant

terrain features. This means that size of itself assists the enemy in this somewhat empirical method of determining the target data.

The comment has particular reference to the present US division. Its size, structure, organization, and weaponing are predicated on the conditions of a definite period in warfare and were regulated to meet requirements set by those conditions. They can be stated approximately as follows:

1. The division would have greater relative tactical mobility than any opponent it would engage.
2. It would also have superiority in volume of fire and greater flexibility of fire than the field opponent.
3. In war the chief threat to the division would be the conventional fires of the enemy field army.
4. The secondary threat would be conventional air bombardment.
5. The division would be prepared to engage enemy armor in relatively limited numbers.
6. In the normal circumstances of battle the division's opponent could be expected to stay close engaged for protracted periods and generally until the issue was decided.
7. In that situation, the division would have the advantage of superior fire concentrations plus greater tactical mobility.
8. These elements, by ensuring battlefield success, would give it sufficient defensive security.
9. The division front would almost invariably be the area of greatest jeopardy, and battle would turn on the rates of survival and fire efficiency within its forces.
10. The chance of the division becoming unhinged by some paralyzing blow from the air against its administrative establishment would be remote.

In short, the structure is that of a fighting body which is prepared to move freely and engage fully and through the power exerted against its opponent at close range in sustained fighting contribute its measure of success to the general enterprise.

Its triangular form signifies that it is primarily an offensive instrument. Divisions were cut that way to give the field army additional velocity forward, to ensure that its reserve power would not be wasted in protracted defense, and to enable the highest possible ratio of its weapons to bear at all times on the enemy. The old square division had relative virtue in the static situations of positional warfare, wherein, at least in theory, the protracted defense conserved force by enabling at least half the available tactical body to remain in hand for ultimate decisive action. While unwieldy, the old square division husbanded reserves, though it gave the commander increased difficulty in their use and in otherwise regulating the battle. All things considered, it is a reasonable proposition that square organization would have been as well adapted to the last two years in Korea as was the triangular division. This, because it was positional warfare and the opposing side had a low order of mobility.

It by no means follows, that in form and in size, the heavy triangular division of today is any better suited to take on an enemy more mobile than the Chinese Communists in the kind of war which is likely to develop tomor-

row than would have been the comparatively light triangle division of World War II or the square division of 1917. All three were designed to operate on a well-joined front in which the depth of the division itself, and the tactical dispositions which were permitted within its own structure, would be sufficient in average circumstances to keep the sector reasonably inviolate and thereby preserve the situation of the field army. All three were shaped toward the ideal of the flankless front, which presupposes an unerrupted rear. All three were composed to take on an enemy who would be fairly massive and who could be broken down along one main line by the conventional methods of fire and movement. All three were organized toward one main problem—the centralizing of control toward the end that all resources behind a limited zone of fire would be energized and directed toward the support and supply of the relatively thin defensive belt forward, retaining comparative freedom of action in so doing.

In other words, tactical organization as we have known it in this century had evolved fundamentally toward the objects of linear warfare wherein the problem is a relatively simple one: the army moves forward and deploys; thereafter its deployment protects its rear organization by offering to the enemy a front which must be attacked.

#### **IMPACT OF AREA WEAPONS ON FIELD OPERATIONS**

To shed some further light on the question of whether the impact of area weapons such as the atomic shell and rocket upon field operations will extend the cycle initiated by the advent of armor until at last the form of war undergoes almost total change through the disappearance of long-sustained linear engagements, we should examine in greater detail wherein the threat to communications promises to transform the fighting problem.

##### Mobility

As already described, the defensive organization within the modern field army develops around a road network serving the army's fire front and connecting it with the main bases and the ports through which supply and reinforcement arrive. Mobility within the tactical parts of the army necessitates relative freedom of movement over its own supporting road system by the great body of transport which serves the fighting front and its administrative rear. The head cannot move if the tail is held, and further, the retention of defensive security also depends upon freedom of movement within the army rear. When there is constant, or relatively frequent interdiction or a continuing threat thereof, either because of the operations of guerilla forces or the destructive effect of new missiles which can put traffic hubs or large sections of highway and rail line out of use, the possibilities of offensive movement become limited; and at the same time that offensive power wanes, the struggle between field forces becomes less decisive of the over-all result in war. As the opportunity for breakout diminishes, the defensive front, becoming better measured by the enemy, becomes for certain reasons more susceptible to its attack from overhead, despite that time itself permits an expansion of protective measures.

### Korean Example

Korean operations provide a classic example of this basic condition. That there was less evidence of it in World War II was because we did not undertake prolonged defensive operations, based upon earthworks, on any large scale except in the Italian theater where the roads were canalized by the rugged terrain. In Korea, as promptly as position warfare ensued, the more mobile and numerically weaker side had to proceed at once to the construction of a comprehensive road net, there being no other way to ensure that the tactical and logistical situations could be developed advantageously.

Because of the enemy's lack of air operations over the fighting front, no penalty was exacted for revealing, in this way, the outline of the general position. Though we got away with it, the enlarged danger was at all times obvious to anyone who surveyed our front from high altitude. The new branch lines were like so many arrows pointing the way to main installations. The same thing would have to be done again in any war wherein we have to assume the protracted defense even though the front is not continuously engaged; otherwise the front could not be supplied and supported. And if the opposing side can take the air above the contact zone, the general pattern of the defensive position will become revealed.

### Displacement of Men and Supplies

Arising logically out of the need for extreme mobility, plus increased protection, plus greater concealment, which would seem to be required by modern weapons systems, is the displacement of masses of soldiers and their supply via tracked vehicles which, even though lightly armored, might go far toward protecting their occupants against heat radiation, fragments, and deadly debris from the blast. Then we might partly eliminate the give-away tracing of the ramified road net serving the field army. Then we could use all-over cross-country mobility as a chief element of protection, and possibly would find it more saving of forces than any system of field fortifications. Then we could get along with that fast-moving new form of war which has been so freely predicted, in which all field forces are highly elusive and the clash of armies resembles guerilla operations, though on a vastly expanded scale. Were these ideal arrangements as easily possible in practice as they are in theory, we might approach that model form of operations which was described by Maj Lamar M. Prosser (January - February 1952 issue of Armor): "Forces must concentrate only at the critical moment of action and disperse rapidly thereafter. At this critical moment, and only then, should the force offer a profitable target to atomic weapons. The swiftness of the concentration must introduce the element of surprise and so reduce the danger of atomic annihilation."

It is so easily said, but unfortunately, no one has advanced any new theory about how it might be done. Provided the prospective enemy of the United States agreed to reduce the size of his field force by four-fifths and a war could be conducted throughout on that scale, freedom from the bind of the road system might become a more practical military objective. Short of some such miraculous solution, common sense would seem to reply that to armor and to put on tracks the bulk of a national army, thereby giving it added protection and

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greater freedom of action, is simply out of the question. A mechanical army requires a mechanical base of action—workshops, repair depots, etc., and the elaboration of such a system would be expensive beyond anything within our national capability.

What is indicated is that we will be no less roadbound than in Korea. The need for a greater bulk of protective materials will increase the load on the field army. That of itself will require amplification of existing road systems, if supply to tactical forces is to be evenly distributed. The side which is greatly inferior in numbers must incline toward a generally defensive and protected form of action, if it is to survive. This means tightened defense over a smaller area; it also means increased dependence upon the road system; it may well mean going to lighter and less rigid forms of tactical organization. There is no practical way of escaping identification of the frontal position with the highway system which serves it. There are possible ways, however, of making this identification more difficult by using a more flexible system of defense. But that means also a less rigid form of tactical organization.

Major Prosser's words were quoted because he has stated in concrete language what many others have expressed as a generalization. It is well and often said that in future war the field army to survive must avoid concentrations, except at the decisive moment. What is overlooked is that the field division, operating in unity, is by its very nature a concentration, and cannot prepare to execute a vanishing act on moment's notice without ceasing to be, for the time, a division. Further than that, when two field armies join battle fronts, each coming within artillery reach of the other, concentration takes place throughout the zone of hostilities. It is concentration in the sense that both sides are presented with profitable targets, even for conventional fires. It is also concentration in the new sense that any hit by an atomic missile against a commanding ridge or hill is likely to pay well. Hence if the atomic threat makes concentration prohibitive, except for brief periods and when the weather is inclement, war cannot develop as a sustained clash along a general line; and the form of tactical organization which would be appropriate to such a war must certainly become a main question.

The artillery of the modern division packs great weight and at the same time is the broadest and most open target within the division area. Its present proportions developed from the deepening of the defensive zone in war, the proved effectiveness of artillery concentrations as a destroyer of infantry, the elaborating of defensive works, the need to give the foot line greater protection against automatic fire and the ascending scale of engagements between artilleries of the opposing sides. Still more artillery was added to help preserve infantry against the rising authority of the tank. By adding tubes and increasing range, the artillery has maintained its preeminence as the chief killing agent of the battlefield. From World War I up till and including the Korean conflict, artillery fires have accounted for approximately 70 percent of the loss through death and wounding in battle. Still, despite the deepening of the fire zone and the building up of power until it is possible to maintain intense concentrations at 15,000 yards distance and more, artillery has not altered the decisive character of in-fighting or made it less necessary for infantry to grapple at close quarters. Opposing infantry lines in Korea were as close together (at some points less than 100 yards) as in the siege of Vicksburg. Also,

close infantry contact in the modern battle is as prolonged in time as in the wars when artillery was incapable of indirect laying; the joined fight in fact lasts longer than ever, and the present form of tactical organization as well as the way that power is balanced between the several fighting arms, are both in general adjustment to that presupposed condition. The artillery structure is not only suited to a war in which the opposing battle front is definable and reasonably solid and prolonged engagements at close ranges are ultimately decided by the weight of attritive fires combined with maneuver; it makes the continuing of war in that form necessary, if its own authority over the battlefield is to be maintained and its present manner of organization is to prove self-justifying.

There is one other way of stating the problem. Presupposing an interval of 5 to 10 years in which no world conflict develops, the stockpiling of atomic and thermonuclear missiles by the opposing sides and the perfecting of a greater variety of methods of delivering them against the cities of the national interior, the base ports serving the field army and the military bodies along the defensive front then become the dominant considerations governing the form of the ultimate conflict. The essential purpose of the atomic gun, the bomb, and the guided missile is to influence the contest decisively at long range by breaking up massing toward the forward zone through interdicting main routes and by obliterating military bodies before they can close. Granting that the aim, like any other in war, is subject to large-scale trial and error and therefore cannot be perfectly achieved, so long as the opposing sides have not exhausted their stocks of area missiles and means of delivery, the movement and countermovement of opposing field armies to the point where their fronts become locked and solidly engaged becomes nigh unthinkable. Both would then be asking for destruction. If there is reason in this hypothesis, then the breaking of a battle front by prolonged concentrations of conventional artillery is altogether conceivably a thing of the past.

#### **HISTORICAL DEVELOPMENT OF THE FIELD ARMY**

Before going into any theory about what is likely to be substituted for field warfare as we have known it, and what form tactical organization may take to adjust toward the requirements of the new situation, it may prove profitable to re-examine the influences which have determined the evolutionary progress of the field army over the past one and one-half centuries. The history of development—of cause and effect—accents one main point, that the growth has been gradual and has reflected the changes in conventional weapon power as proved upon the field of combat. Organization has gone from one form to another largely according to what promised the greatest economy of force, in battle through the retaining of operational unity, and in training by saving man-hours. The balancing of strength between one arm and another and of service-administrative facilities and numbers against the size of the fighting force as a whole has taken place in relative consistency with the governing principle.

But it has been a gradual ascent for 150 years. In the more recent period, the rise of what is now called conventional air power, and not less, the advance of armored power as the chief instrument of offensive mobility,

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were acclaimed by their especial prophets as revolutionizing influences which would fundamentally alter the shape of conflict. But it did not happen; the changes were absorbed because of the still limited lethal radius of the bullet, shell, and bomb. Such organic changes as occurred within the field army corresponded in the main to the improved possibilities of its conventional weapons system. As during the preceding century, organizational progress was a steady movement from one plateau to another; this was because the appearance of each new agent which superinduced change was as an acorn, leaving time to measure it before it became an oak. Protection thrived at the same time that missiles became more deadly. The cloud, scarce the size of the hand of a man, has many times appeared over the battlefield. But never before could it be recognized as something ecliptic, darkening the whole system of relationships within tactical organization.

Until the closing of the Napoleonic period, no new invention disturbed the close order harmony between the three conventional arms; infantry, cavalry, and artillery. The effective range of the infantry musket was about 100 yards and that simple fact governed tactics and the stand of one arm toward the other. There was no undue threat to gunner or to horse and consequently infantry, cavalry, and artillery could fight together as a cohesive body next to the beckoning finger of the commander. Artillery pieces were worked within or even ahead of the rifle line. Cavalry was deployed next the infantry ready to exploit any opening offered by its shock attack.

The first rifle was introduced during the Peninsular campaign. It was no more than a portent of change. The invention in 1814 of the percussion cap by Thomas Shaw led to the substitution of the hammer and nipple for the cock and pan. That was followed by extensive improvements in gunpowder and the bullet. The Minié rifle, a French invention, had by the late 1840s increased the range of infantry fire to a little less than 800 yards. Such was the impact of the cylindro-conoidal bullet upon the old close-knit unity that the tactical arms were pushed apart into separate lines, each working at considerable distance from the other. The cannoneer could no longer stand beside the infantry marksman. The guns had to displace rearward and seek wall or embankment cover. Because of its soft mass, the cavalry was even more vulnerable. It could no longer stand by in readiness to deliver the collapsing thrust when the infantry assault made the opposing line waver. When the separation in space disjointed the time relation between the two deployments, the cavalry charge lost its decisive value, and the arm remained of use mainly for scouting, screening, and mopping up.

As the increased range of the bullet made cooperation between the tactical arms more difficult, it also lessened the commander's control over his forces. He could no longer time and direct in detail the commitment and movement of his elements; he became limited to intervening with his reserves. The heightened range, the separate deployment of the arms and the lessening of control all served to prolong the duration of the fire fight. The farther that artillery was compelled to retire, the more it had to lengthen the range of its own pieces. By the end of the nineteenth century, the artillery had to begin thinking of indirect laying, or else be driven out of the battle zone altogether.

During the American Civil War field brigades were maintained at about the same size as line regiments today. The field telegraph had appeared to

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simplify strategic control but the field telephone was still decades distant. Within the tactical command, the possibilities of control were limited by what the commander could see with the naked eye and what he could order by messenger. Because there was no indirect fire by the artillery, ranks could stay close until they deployed over the last rise of ground. That tended to make the mass manageable by high command right up till the moment of crisis in the attack. The size of divisions, though subject to extreme variations, tended toward ponderousness. In the Union Army under General McClellan, the division was supposed to contain 10,000 infantrymen, one regiment of cavalry and four batteries of artillery—a disproportion between guns and line which today seems not only ludicrous but helps explain why the large infantry body could remain reasonably subject to sight control. By the order of 3 May 1861, which called up the first three-year volunteers, the division was formed of "three brigades, and one major-general with two aides-de-camp." According to the tables of the time, that would have counted a division just under 30,000. But the actuality rarely approached it. Writes William Addelman Ganoe, the army historian: "A brigade frequently was only 1000 men or so. The name of a unit meant nothing." Stonewall Jackson's "Army" in the Valley, as an instance, was about 20,000 men. Artillery organization remained small because it—the gun itself—was not flexible. The infantry trench remained the almost exclusive target of fire from the batteries, the essential task being the softening of the opposing works prior to the infantry assault. In consequence, there was no great expansion of the arm and its ammunition requirements did not necessitate a vast buildup of transport and the rearward establishment. Divisional strength was invariably authorized and reported in terms of officer and man effectives assigned to the combat arms, a limitation which reveals how modestly inconspicuous were supply and administrative requirements compared to present-day organization.

Nor was there radical or dramatic change in the half century which followed, either in the weighting of the artillery structure within the division or in the evolution of the latter as a comprehensively balanced body of arms and services capable of all the functions and cooperation essential to independent and prolonged operations against the enemy. The invention of the Maxim gun toward the close of the era, compounded the possibilities of accurate, rapid, and sustained bullet fire over a greatly deepened bullet zone. While increasing the need for stronger protection, the birth of effective automatic fire also enormously increased the defensive potential. Extended range, greater fire volume, improved accuracy at extreme range, all pointed to additional rearward displacement of the artillery and a great expansion of its numbers and capabilities, not alone to neutralize the threat to the infantry attack from automatic fire but to maintain a level of effectiveness in its own fires when the guns had to come to indirect laying.

But the portents of change all went unheeded. As the machine gun was embraced by military organization, there were no signs of increased vigor in the only arm having any offsetting possibility at that time. Artillery fortune and action were both at nadir during the Spanish American War. The divisions had a strength of about 5000 with no organic artillery reported in the tables. The battle reports are almost barren of effective artillery intervention though there are frequent accounts of fires by Hotchkiss batteries and Gatling guns.

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In one battle report by General Wheeler, the guns are mentioned only at one point when they tried to shoot down a balloon. In 1904 the Chief of Artillery, US Army, said in his annual report:

"So far as this office has been able to ascertain by careful inquiry, no better methods have been practiced by our artillery in recent maneuvers than have been obtained for the past 50 years. Thus strong are the fetters of tradition. Field artillery should have a definite ratio to infantry and cavalry. Each division should have at least nine batteries of artillery. Field artillery during time of peace should be organized into tactical units, corresponding at least to what would be required for a division in field maneuvers. The General Staff has only recommended about two guns for each thousand men. In my judgment the experience of the Russo-Japanese War is conclusive that the foreign practice (more guns) is better than the one proposed for our service."

Despite the greater number of guns possessed by the Japanese and Russian armies which had fought in Manchuria, however, the embryonic tactics which had begun to develop around automatic firepower had had upon artillery chiefly the effect of forcing it to dig deeper into the mud. The influence of the bullet spray upon tactics within the zone of flat trajectory fire, and the extent to which it would compel deepening of the defensive and administrative organization, were not more than barely glimpsed. Quite quickly it was demonstrated that the main problem of the battlefield was the strengthening of artillery cooperation to counter its domination by the machine gun. But the proof was ignored during the ensuing frantic search for more effective protective measures combined with tactics aimed at producing greater elusiveness in the fighting body—ends which, being in large part mutually exclusive, gave a unique complexion to the war.

General Ian Hamilton wrote: "The Japanese guns are so deeply dug into ground that they have become almost as immobile as guns of position." Their rigidity became the great drag upon an almost excessive freedom of maneuver stimulated by the desire to maximize automatic power, or conversely, to elude its withering effect. As frontal attacks could not be altogether avoided, and preparation of the infantry attack sometimes required days, heavy earthworks were raised on every battlefield, and maneuver, much as in the 1950 Korean war, developed as an effort to get around their flanks. To place a pinning fire on the enemy front was the other half of this enterprise; for if the frontal fire failed to hold him (as was frequently the case) he sideslipped before the flanking force could produce envelopment, withdrew and prepared another defensive position. For protection, the artillery sought positions behind undulations and hills, firing over them. Though the guns could not be sunk into the trenches, artillery operations assumed more and more a static quality. On defense the artillery tended toward direct fire because it could not change fuse and range quickly enough to cope with the rapid shifts in the infantry assault. In the attack, when opposed by artillery, it progressed steadily toward indirect fire as the war wore on.

Because positions were not continuous and open flanks were within reach, the war closed before there was any widespread realization that the enlarged killing power of bullet-firing weapons now dominated the field of war and would give preponderant power to defensive arrangements. This would of itself in

time superinduce greater power and depth in defensive organization whereby to accumulate reserve power necessary to the mounting of the attack. But the influences at work remained unseen.

Between the end of the Russo-Japanese war and 1914 every army in Europe prepared for a war of mobility, the offensive à outrance, surprise, maneuver, and elusiveness. No one, absolutely no one, foresaw that the new weapons systems would bring on a war of entrenchments, prolonged deadlock within two opposing lines of deep works, and an unprecedented elaborateness and ponderousness in tactical organization. Then came World War I. The great size of national armies, made possible by the rapid expansion of the modern railway system, was the other prime factor in a new set of operating conditions which excluded open flanks. The new war rapidly deteriorated into a giant siege operation, and the longer the stalemate endured the more cumbersome became the tactical apparatus designed to break it. "It was no longer a question of covering battlefields with men but with bullets and shells and so completely were they covered... that the main task of breaking the enemy front was handed over to the artillery."\*

The United States Army of World War I used a square division with an actual fighting strength usually in excess of 25,000 men. There were two brigades of infantry with two regiments each, one artillery brigade composing three regiments, and two machine gun battalions, one being included in each infantry brigade. American artillery organization acquired these new dimensions not out of American experience but by modeling upon what the French and British had arrived at after almost three years of trench warfare. From the battle of the Aisne in September 1914, onward, the importance of artillery had increased daily; confronted with the deadlock, higher commanders saw no better answer than to thicken artillery numbers and multiply rounds until defending earth and men were battered into submission. The infantry attack was built not upon bullet-firing weapons but on the artillery barrage, success being limited to the range of shell fire; at the far limit, the rifle and machine gun again took over, though with indifferent results because of the fraying of the attack during the initial advance. The square division was conservative of these ends though the ends themselves were extravagantly wasteful. Its size enabled the feeding of more infantry reserves into the battle. The expansion of the artillery made possible the providing of a thicker fire curtain forward of a heavier and hence more vulnerable mass.

Multiplying artillery power many times over, the effects also transformed artillery tactics. Indirect fire became the rule with almost no exceptions. The guns concentrated more toward each other, not alone for the massing of fires, but to provide more space for more guns. All infantry movement had an artillery accompaniment except for small-scale trench raids. During the periods of immobilization along the front (which was most of the time) the war was a duel between opposing artilleries.

As mass increased, so did depth of front. Artillery range increased apace. Heavier organization and longer reach were both required to neutralize the opposing artillery, break down light railway lines and supply dumps, and shell concentration-communication centers far to rearward. Artillery ammunition being the main weight in supply tonnage, rear organization as far back

\* J. F. C. Fuller, Maj Gen, "Our Future War," Sifton Praid, London, 1928.

as the base ports had to be thickened to keep the guns fed. Expenditures pyramided at a fantastic rate. Organization expanded to maintain the heavy fires. There was no corresponding tactical gain. At the last battle of Ypres in 1917, more than 120,000 men served the guns in a preliminary bombardment lasting 19 days. There had been dumped 321 trainloads each carrying 400 tons of artillery shell. The total of 4,283,000 shells, weighing about 107,000 tons, ripped apart the whole surface of the battlefield, destroying drains and roads, and making it an almost impassible quagmire. About 45 miles of territory was gained; each square mile cost half a division of men.

There is no call here to discuss at length the influence of the rise of air power and of the armored force upon the size and shape of conventional field organization during World War I; though they were the two great innovations of the cycle, the fact is that for the time being they scarcely moderated the growth and change of the older arms except that the horse cavalry, already living on borrowed time, was deprived of its one remaining vital function.

The weapons of military aviation during World War I were as yet powerless to produce more than a slightly harassing effect upon deployed field forces, for all that a new word was adopted to describe it—"strafing." Air observation became a main servant of conventional fires. Similarly, the tank first aided and then became the trail-breaker for the older arms, without at the same time shrinking their size or lessening their responsibilities. The tank was created in the hope of breaking the tactical deadlock on the Western Front. Its operations during the final months (or even earlier at Cambrai) proved it had that capability. There was thus indicated a return swing of the pendulum, with armored force restoring offensive mobility to the field army. Tank pioneers believed in it thoroughly; others discounted it and felt that the scales would continue to be weighed heavily in favor of the defensive. The war ended before armor, operating on its own, could finally prove its case.

Recapitulating, the conditions which gave rise to the heavy division of World War I, with its greatly enlarged artillery structure and cumbersome rearward organization, would seem to be these:

1. Establishing the continuous front.
2. Unremitting confrontation between the two sides locked along this front.
3. Use of massed artillery to break resistance in the sector chosen for the attack.
4. Continuing deployment of infantry forces within rifle distance of the opposing side.
5. Use of deep earthworks in the fire zone and of splinter-proofs to rearward.
6. Deepening the defensive sector because of vast increase in the size of armies and in rates of fire, necessitating increased protection and consequent expansion of the logistical establishment.
7. Extension of artillery ranges commensurate with deepening the defensive establishment.

Considered as a whole, and weighing each point in relation to all others, the conditions were peculiar to this one war on one front only; whether the newly arisen division structure was the best possible for relatively mobile operations where open flanks were to be sought went unproved; however, the

newly acquired massiveness of the artillery and its balance in ratio to the other combat arms seemed to be assured fixtures for the future; the rise of armor to a point where it promised domination of offensive operations foreshadowed that in future war engagement would be more or less continuous until victory was gained; under these conditions the concentrating of artillery would continue to have decisive impact, and the upbuilding of the arm would prove self-justifying, since the outlook was that its guns would be almost continuously within reach of profitable targets.

#### **PRESENT USE OF THE FIELD DIVISION**

A main question confronting today's planners is whether the same weight in conventional artillery is still availing and necessary when: (a) area missiles rather than conventional artillery concentrations seem likely to be employed for break-through; (b) all massing of artillery invokes a positive danger to the side offering it as a target; (c) opposing fronts are not likely to be close-joined for longer than brief periods; (d) protracted duels by opposing artilleries (conventional) do not seem in prospect; and (e) protective curtains against infantry infiltration rather than softening-up fires against heavily fortified positions in preparation for the friendly infantry-armor assault may well become the main function of conventional field artillery.

There is, however, some support for the idea that the terrible power of the new weapons will drive rival forces even closer together than before that they may get protection out of propinquity. Is it within reason? As now organized and deployed, the field division operates with an average depth of 3 to 7 miles (there are many exceptions) and its most sensitive installations are toward the rear. It cannot function with greater compression and still give the desired scope and flexibility to its guns. The depth in the necessary operating zone of itself excludes the possibility that the field division can become insulated against atomic attack by tightening the in-fighting grip. There is particular significance in the fact that its organic weapons, balanced to operate with a fair degree of uniformity across the division front, vary in range from a few yards (hand-thrown) to in excess of 15,000 yards. This breadth and depth of power obviously is designed to avail in situations where the opponent's tactical front is in arm's reach and his tactical rear is far distant. It runs counter to any concept of a tightly squeezed defensive zone, or for that matter, of a deep zone organized checkerboard fashion. The combat deployment of the field division, as now regulated by its organizational structure, would appear to predetermine that even when opposing battle fronts are closely joined, paralysis can be produced in the division by an atomic strike without excessive jeopardy to the forward field elements of the side delivering the blow.

The present triangular division is a lineal descendent of the World War I square division. But again it is to be noted that its pattern and the greater mobility which came of it evolved slowly and were not finally certified until another world war proved beyond doubt that the pendulum had swung back to the offensive and the old tactical organization was too large and too rigid. No general staff serving a western army read aright the portents of change as the 1918 war phased into peaceful contemplation of what might happen next. In

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France, the theory of the defensive wall became ascendant while the role of armor was envisaged as an echo of Agincourt with mailed knights riding against the vulnerable flank of any successful penetration. Britain, the mother of modern armor, by keeping the infant starved, denied it any promise of becoming prodigious. The United States Army continued along for almost 20 years with no armored theory and no armored force worthy of the name. In all three nations the cavalry arm was continued, drawing the nourishment which might otherwise have gone into tank and antitank preparations. Our War Department rejected the 105-mm howitzer as the basic field piece, retaining the 75-mm gun, despite the fact that it obviously packed too light a punch to stop heavily plated housings. There being no radically new and universally accepted theory about how tactics would be transformed by the new weapons systems now developing in other nations, particularly Germany, there arose no imaginative design for a modernized field division in which offensive mobility and defensive close-range hitting power would be nicely balanced.

In the United States, the beginning of a firm base was not put under armored power until the rearming of Hitler's Germany, with its emphasis on panzer strength, filled the horizon. "Streamlining" of the field division still dates from 1938. World War II came, its early battles attested that the armored division had the capability of swift and decisive penetration. The campaigns in Poland, Norway, and France showed further that the lack of armor-stopping gun power in direct support of the infantry line constituted a fatal flaw and that the infantry division itself had to become more flexible and more quickly capable of redressing its front toward any new threat if it was to survive and succeed against the new authority of the tank. Even so, the reform came slowly and the Army was still suffering the birthpangs of triangularization when the nation went to war.

The instrument which finally emerged, after renovation of the American artillery and the establishing of a modern armored force, was in general quite evenly balanced and well suited to the needs of the type of warfare already in progress. Defense in line, while at close grips with the enemy, and attack by conventional fire-and-movement, with artillery concentrations first weakening the crust and armor concentrations than breaking it, were over-all the standard procedures. Even in the Pacific atoll fighting, the perimeter defense was but a variation of linear methods made necessary by the peculiar elusiveness of the enemy and his predilection with night attack. In the main theaters, where one or more field armies engaged, divisions still deployed check to jowl, forming a flankless front. The field division was flexible enough and deep enough to accommodate that purpose. It was also in the normal situation mobile enough to exploit and widen quickly any breach cut by armor over a narrow front.

In the campaign to liberate France, tactical equipoise between the two sides was never more than of brief duration, mainly because the ability to shift armor quickly made the threat constant and kept the battle fluid even when infantry became briefly stalemated. In consequence, there was no repetition of the massive and extended artillery duels which characterized World War I. To keep armor in check, artillery had to operate more or less evenly along the general line. With the exception of a few great shoots like that at Operation COBRA and in preparation for the Rhine crossing (where armor was no longer pressing close) the concentrating of artillery meant the groupings

of a few battalions. So instead of having to refuge in heavy works, infantry found the foxhole sufficient in the usual fighting situation. There were no prolonged periods of defense; there was no need for deep earthworks; forward mobility of itself lightened the logistical load upon the field army. But when the need arose for swift retrograde movement, or orderly withdrawal after local defeat (as in the Ardennes break-through) the field division did not prove itself a wieldy, plastic instrument.

Why that was so is beyond saying, since the number of breakdowns was few and the causes were never properly assessed. But the delicacy of the American communications system, and the consequent snapping of chain of command, would seem to have been a main factor. In an hour of great emergency when the front became riven and fighting companies were cut off from contact, their silence tended to superinduce paralysis at all higher levels. In that situation, the modern division, as constituted, does not find it less difficult to move back from its own tracks because of its high velocity machines. It is usually committed as a whole and on its own initiative (or otherwise) is disposed toward withdrawal only when it can account for its situation as a whole. When any smaller elements are fogged out, the division is more tied, more vulnerable to the enemy's further design than when it knows these smaller elements have been destroyed. Yet rapid and secure movement in whatever direction that has been determined is the main object in tactical organization. Though this idea is basic to the economy of force, its translation into structural terms is dependent on the dominating conditions in any period of warfare. Many outside conditions influence and help regulate the over-all size of armies. But how large a division, a regiment, or any other of its tactical parts should be is determined by what best enables response, control, and survival against those forces or weapons of the battlefield comprising the main threat to its existence.

Following World War II, the triangular division was made slightly larger, given more artillery power, and provided with organic armor. This was an extension from experience in the last war as fought. Again given the same pattern of conflict, the infantry division would have proved capable of more mobile and heavier hitting. But for the weight added, it had not gained proportionate increased strength against an irregular opponent, and the possible effect of atomic attack upon field forces was not a consideration entering into the change.

Korean operations provided the only test of the new division's power and flexibility. The results, though on the whole satisfactory, were not conclusive because of the besetting condition of American over-extension. During the first year, when operations were highly mobile, the integrated armor and the superior power of the close-support artillery provided the margin of American survival. But except in relatively small-scale operations, penetrations by armored columns striking via the road, while getting some spectacular results in the initial phases, led almost invariably to dangerous over-extension and lack of caution in the covering of flanks. The terrain, favoring the enemy, virtually prevented wide envelopment, or deprived such maneuver of its accustomed gains. If enveloped, the enemy back-trailed to new positions, against which the friendly infantry had once again to deploy to drive him out. In the crises of defense, the superiority of American armor and artillery fire fre-

quently saved the infantry from annihilation. But in the advance by columns along the road, where there was seldom deep use of flankers, the highly mobile characteristics of the accompanying arms sometimes resulted in committing infantry far beyond reasonable range.

In the final two years, the Korean conditions were those virtually of a restrained siege warfare. The one remarkable parallel to the World War I situation was linear defense based upon the flankless front. Otherwise, the two situations had little in common. Deployed in unusual depth and using great dispersion, the enemy bodies during static defense used deep underground cover which was insensitive to the heaviest shells and bombs. Their surface works were little occupied and therefore were not vulnerable to artillery concentrations. Fire could smash in the trenches almost at will but no advantage came of it. The main role of the friendly guns was to stop and destroy the enemy infantry as they attacked the subridges of the outpost line, or else to illuminate these baited traps when attack threatened.

Armor forsook its accustomed role, either becoming spliced into the infantry MLR to compensate for weakness in infantry numbers or staying in parks to rearward for use as a defensive reserve. In this situation, irrespective of the fact that armor's capacity could not be offensively exploited for lack of infantry reserves, there can be no doubt that the increased weight of the new division helped. The superior strength of the artillery was the measure of the numerically weaker side's ability to stand on even terms.

But it does not follow that if an atomic war had developed over the same terrain, the division structure would have been the best possible, or that the power of conventional artillery within the division could have been profitably exploited. Quite conceivably, after the first atomic missile had exploded, there would have ensued a wholly new set of conditions with both sides so altering their tactics thereafter, and so changing their protective methods, as to gain maximum security against the decisive weapon. That the two fronts could not have remained locked is hardly to be doubted. Not only to conserve defense, but to allow working latitude for offensive use of their own atomic weapons, the two sides would have had to base at greater distances each from the other. In their normal field posture, the defending lines could not remain within normal reach of conventional division fires without inviting quick destruction by atomic bomb or shell. But if one can conceive of them separating and then continuing to operate beyond range of field observation, moving to contact only when a full attempt at quick penetration had been mounted or when weather change particularly favored an advance, then it would be necessary to conclude that the conditions of field warfare have changed wholly, and that reform in structure must accompany revision of tactics.

#### **IN CONCLUSION**

There are these concluding words to be said in review. Looking back on the tactics in the wars of this century and on the tactical doctrines which were held by general staffs, here and abroad, prior to the outbreak of these same wars, the lack of coincidence between the two is not only remarkable but instructive. The main lesson would seem to be: either the general staffs of

the great powers have persistently studied the past to the exclusion of the future, or if reflective vision was present, it was unable to make headway against the inertia of a tradition-bound system. In consequence the condition in which the next war was to be fought was not anticipated and fighting organization could not be accommodated to a changing requirement. When war came, all sides were surprised, not so much by each other's craft and preparation as by their own lack of foresight.

The main question is always what tactics can best be pursued with the main weapons at one's disposal. The sufficient reply requires equal reflection on offensive and defensive problems. The commanding object in all military structure is to bring decisive weapons to bear, and then keep them manned and supplied. But if the character of main weapons is such as to indicate that tactics must become more flexible and deceptive if field organization is to survive, then structure must be altered to make the force more pliable, swifter of foot, and readier to hit, give ground, and rebound. It is believed that this requirement is well indicated for operations of the future and that consequently there should be searching study of the question whether the present heavy triangular division is the most satisfactory instrument for fighting under atomic conditions. Among the suggested lines of inquiry are the following:

1. Whether the present structure is excessively rigid on defense and permits of quick definition of the decisive target area.
2. Whether its bulk is too large and its form too ponderous to permit of requisite flexibility in maneuver.
3. Whether its artillery structure is not proportioned to relatively continuous action against a close-engaged opponent.
4. Whether this condition is likely to recur under atomic conditions.
5. Whether atomic weapons will not take over more and more the main missions of heavy conventional artillery.
6. Whether they will replace the heavy guns rather than become simply a new source of power.
7. Whether operations will not tend toward placing atomic field weapons as far forward as possible since both offense and defense will be built around them.
8. Whether the division as now composed does not presuppose the continuation of linear warfare rather than defense in depth covering main communications lines.
9. Whether this remains a profitable theory for the future.
10. Whether greater maneuverability plus defense in true depth do not imply a lightening of tactical organization.
11. Whether the main conventional threat to deployed infantry in the atomic period is not massed armor rather than massed artillery.
12. If so, whether it argues for a radical revision of the standing relation between the rifle line and its support artillery in defense.

Toward such a study, it is far easier to ask questions than to supply answers. The latter may be formulated, at least tentatively, by committees who have full information about such matters as (a) what is planned for atomic artillery, as to number of guns, placement, further development, problems of supply, etc.; (b) the projected development of the guided missile, as to accuracy, range, numbers, placement in organization, mobility of the unit, etc.; and

(c) how it is proposed that these nonconventional arms in defensive operations will be equated to air-dropped atomic missiles and how far forward in relation to field forces (i.e., under what level of command) the tactical air force will function in battle. There is a host of other related questions; suffice to say that none of the information relative to the suggested study is available to the writer of this commentary, and even if it were otherwise, his knowledge of the complexes of tactical organization and the attendant logistical problems has such limitations that any suggestions, let alone recommendations, would be invidious.

In all time heretofore tactics and strategy have been linear. Today the decisive and direct threat to the rear is the revolutionary change implying that, in future, battles will be not along rigid lines but for areas. Fronts and flanks may be anywhere, as in warfare at sea but the rear will remain the point closest to the main base of supply, and armies must so deploy as to protect that point if they are to survive. They will do it, one might conclude after reviewing the main circumstances, not by forming at right angles to their main lines of communication but by enclosing them and building up defensive strength directly around them. The attack upon command will be more direct and violent than ever before. Penetration of any defensive line can be more easily achieved than in the past; exploitation following penetration will be proportionately easy unless there is a breakaway from the traditional defensive system. On all points there is fresh reason to question the soundness of existing field organization.

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