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Views expressed in this journal are those of the authors, and are not to be construed as the official opinions or policies of the Department of the Air Force or the Air University. The purpose of this journal is to stimulate healthy discussion of Air Force problems which may ultimately result in improvement of our national security. Appropriate contributions of pertinent articles and correspondence which present new views, or refute or support old ones, are solicited.

THE
UNITED STATES AIR FORCE
AIR UNIVERSITY QUARTERLY REVIEW

VOLUME III

WINTER 1949

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PRIZE EDITORIAL

WHY EMPHASIZE AIR POWER?

AIR POWER, as a basic military means of decision, is a comparatively new one. Armies were first conceived and used in eras before historical reference. Navies followed, although their power as a decisive weapon did not become felt until after the Middle Ages and England's rise to world power. The First World War saw the introduction of aerial flight to war, and World War II proved its worth as a means of obtaining a decision.

The basic concept of warfare is to destroy the opponent's will to resist. The first to achieve this destruction will be the victor. Before the advent of air power it was usually necessary to obtain a vital decision over the opposing armed forces, either an army or navy. The destruction or reduction to a state of impotency of the opposing forces then allowed the victorious commander to attack the people of the opponent nation and destroy their will to resist.

With the coming of air power the effect of armed conflict can for the first time in history be felt immediately by the people, who in the last analysis can decide whether to fight or capitulate. Armies or navies, no matter how powerful, can be by-passed and rendered ineffective in a comparatively short period of time by loss of support of their countrymen who maintain them.

It is not to be construed that mass bombings of civilian populations will necessarily bring decision. The factors that decide

where and what shall be the target depend upon continuous study. But it is to be remembered that with air power a decisive force can be brought to bear in a minimum length of time against a primary target—the will of the people. The Battle of Britain, an example often used by detractors of air power, reveals a misuse of offensive air power by the Germans rather than the ineffectiveness of it as a decisive weapon. Had the RAF been destroyed through the proper use of the German Air Force, England would have been at the mercy of Germany. Then the Royal Navy and Army would have been useless against the forthcoming attack on the will of the English people to resist.

The only defense against the one force aimed directly at the factor that decides capitulation is air power. The nation with the strongest air power, both offensive and defensive, holds the requirement for victory.

It is a matter of history that we have refrained from striking the first blow. Hence it is vital that we be capable of immediate and decisive reprisal. No longer can we depend upon time as an ally to prepare the return blow. It must be struck in hours.

This, then, is the case for emphasis on air power. With proper support it is the weapon for achieving a decision in the minimum time. The nation that recognizes it and prepares for it will play the percentages for success if war should come.

*Robert J. Seabolt, Major USAF
MacDill Air Force Base*

Henry Harley Arnold

GENERAL OF THE AIR FORCE

SUNDAY, THE FIFTEENTH OF JANUARY, 1950, the news came that our great wartime commander was dead. The life that had been entirely devoted to service in the United States Air Force and to commanding it and building it into the exercise of overwhelming power against our enemies in a world-encircling war was fulfilled.

Most Americans serve themselves. America was founded to provide them the opportunity. But some Americans have been called to serve America—to make America, and to keep America the home of men who can live as they will. Little thinking where the long road would lead, young Henry Harley Arnold went away to West Point and was graduated into the service of his country. He became one of the first few military pilots in the world, and above all the many honors and decorations of his later years he continued to esteem his Military Aviator's Badge, numbered One. In the bitter struggle for adequate American air power he joined all his energies with those of other American airmen now, with him, justly honored for their roles in the long controversy. When the Second World War came to confirm his foresight and theirs in matters of warfare, he directed the creation and deployment of tremendous air forces and at the same time sat for American air in the councils of war as the trusted adviser of the President of the United States.

Power departs, and glory does not keep forever in the memory of men. But in the great book of Duty it can be recorded in the characters of a continuing American way of life that throughout all his days a man served his country and in her hour of need he served her well. In that book it is now so written of General Henry Harley Arnold.

Air Warfare and Morality

MAJOR GENERAL ORVIL A. ANDERSON

THROUGHOUT recorded history, evolution in the nature of war has been associated with evolution in the technical and mechanical characteristics of weapons. Over a period of some thousands of years we have progressed from the stone and club age, through the spear, bow and arrow, cross-bow, and gunpowder periods, finally to arrive at the atomic era. Each major advance in weapons has been marked either by an increase in the range of the weapon or by an increase in its destructive capacity, or by both. We have gone from the war capability of the club, the capacity to bruise or kill a single individual at a range of a few feet, to the war capability of modern air weapons, the capacity to destroy whole cities or key industrial systems at ranges of thousands of miles.

The frightening increase in the potential of weapons has been matched with an evolution in our social and economic structure which adds further hazard to modern existence. The simple agrarian life, with humanity living close to the soil, dispersed and largely independent, has been replaced with a complex social and economic fabric which is super-vulnerable in many critical areas. As the power of weapons has increased, concentrations of population, industry, and transportation have developed which provide highly profitable targets for destruction by modern military weapons. Thus the evolution of our social order into a compact industrialized structure has placed us in double jeopardy: *First*, it has produced long-range weapons capable of great destruction. *Second*, it has created the targets for these weapons.

This observation has a singular significance to our problems of today, when the fate of America, the fate of world civilization itself, is primarily dependent upon the strategic concepts that guide the provisions we make for our sustained security.

The views expressed in this article are not the official views of the Department of the Air Force or of the Air University. The purpose of the article is to stimulate healthy discussion of Air Force problems which may ultimately result in improvement of our national security.

It is pertinent here to note that, as in most fields of human endeavor, the evolution of military strategy has not been completely abreast of the evolution in weapons.

Most military strategists—not being responsible for, and in some cases not familiar with, scientific developments—have normally resisted new weapons. Strategic thinking generally has tended to retard the rapid development and exploitation of the full potential of new weapons because the new weapon tends to upset the familiar relationships that the strategist has been accustomed to employ in his thinking. The revolutionary potential of modern weapons so far exceeds the power of traditional weapons that it is questionable if there is much in common between past military objectives, and consequently military strategy to achieve these objectives, and the military objectives of a possible Third World War.

Wars in the past, including the Second World War, have been fought basically to a surface strategy. By this is meant one in which surface-force operations dominated the grand strategy. Either a final assault and invasion of the enemy homeland by ground troops was visualized, or sea blockade, with its attendant economic and military strangulation, or both, was intended to be decisive.

For example, the strategy of World War II against Germany was a surface strategy. Its objective was invasion and occupation of Germany proper. In implementing this strategy air power was employed to prepare for the invasion, and sea power was employed to project the invasion forces and their logistics across the seas. The strategy of the war against Japan, as implemented, was a little more complex. The grand strategy still visualized final invasion of the Japanese home islands, but the economic vulnerability of Japan was such that she *could* have been defeated primarily by sea power exercising a technique of blockade and strangulation. The complexity of Pacific strategy was further compounded by a command structure which led to two major surface thrusts aimed at Japan and by the new weapons system—the long-range air force—which upset the intention of the planned invasion by forcing surrender before the final invasion could take place.

These examples from the Second World War point up the inherent tactical capabilities of land power, sea power, and air power and show that the requirement for these various capabilities should be judged in relation to the potential of weapons

currently available and in relation to the other factors in war.

The ultimate strategic objective of all three military forces is identical. It is the reduction or elimination of the power and power potential of the enemy in order to remove his capacity to threaten our security. The techniques employed by the three categories of military force are dictated by the capabilities and limitations of the weapons employed by these forces.

Land power, in order to accomplish the strategic objective, must invade and capture the territory of the opposing state. By occupying vital areas it deprives the enemy of the use of the resources of the area occupied. These resources may be raw material, communications, industry, or government institutions.

Sea power, by establishing control of the sea lines of communication, may strangle or starve the economic life of a nation, providing that nation is dependent on these lines of communication to a large extent for survival. Great Britain or Japan would be outstanding examples of insular nations which are wholly dependent on sea lines of communication for bare survival.

Similarly the strategic objective of air power is the elimination or reduction of the enemy's power and power potential. The technique employed by air power in accomplishing this objective is to attack directly the power and sources of power of the enemy state. The targets may be selected segments of his industrial establishment, his communications or transportation system, the source of his governmental or social control, or his military forces-in-being.

Land power, in invading and occupying, may have to fight land armies, but the destruction of those armies is not the ultimate strategic objective of land power. Sea power, in accomplishing sea blockade, may have to fight sea battles; but these battles, again, are not the ultimate strategic objectives of sea power. And air power, in neutralizing an enemy, may have to fight air battles, but victories in the air are not the ultimate strategic objectives of air power.

If these fundamentals were fully understood, thinking on the present security problem would be improved. The destruction of armies, navies, and air forces is not the ultimate strategic objective of the various components of our armed forces. At best, armies, navies, and air forces are but means to ends. If our present position is viewed in the light of the techniques appropriate to the three categories of military force (land, sea,

and air) there is immediate indication of a solution. What should be the core of our strategy for a possible future war? Invasion and occupation—sea blockade and strangulation—or air neutralization?

If a possible military enemy in the foreseeable future is a land-mass power, operating on interior land and river lines of communication, geographically and economically it is not particularly vulnerable to sea blockade and strangulation. Thus a strategy based primarily upon offensive sea power would not defeat that enemy.

If this potential enemy has a powerful land force-in-being backed up by a relatively secure and adequate logistic base, and if we want something near a numerical land-power equality with this potential foe, we then would be required to maintain constantly an army as large as the one we built for World War II. Further, even this force could be outnumbered very quickly by full mobilization of the enemy's potential land power. The continued maintenance of an army of this size would impose such a staggering load on our economy that our standard of living and our democratic way of life would be seriously affected. We know also that the projection of land power, in mass, across the seas requires control of those seas. At the same time a potential enemy nation—herself relatively invulnerable to sea power attack—through effective use of a modern submarine force could seriously interfere with and possibly defeat any opposing force requiring vast movement of logistics across the ocean. It would appear then that a strategy based upon land power would be costly, hazardous, and uncertain of success.

Logic, therefore, strongly supports the conclusion that a basic strategy which exploits the power potential of new weapons to the fullest is our soundest hope of successfully defending ourselves. The combination of air vehicles and atomic explosives represents, at present, our greatest power potential.

Such a strategy does not mean that land power and sea power are excluded from the operation. They would participate in roles appropriate to the support of that strategy. All our military forces would be integrated toward the one common strategic objective. This strategy would permit maximum utilization of our technological superiorities and maximum exploitation of enemy weaknesses. It would avoid the areas of greatest enemy strength. It would be most economical in American

lives and resources. It would be designed to the geography of the situation, to our own strengths, and to the achievement of our postwar objectives.

This basic strategy in the foreseeable future involves what is commonly referred to as a *strategic air offensive*. Recently the concept of a strategic air offensive has come in for some rather violent criticism. It has been charged that a strategic air offensive can not be carried out and that, even if it could be carried out, it would have no military effect or value. These criticisms are both transparent and senseless to a thinking person.

THERE is, however, one criticism against the strategic air offensive which, if properly nourished and expanded, could cost us a war. This argument attacks the concept of strategic bombing from a basis of morality. It has a certain attraction to people of Western culture. Traditionally we have attempted to maintain a combatant and noncombatant status in our wars. The distinction between the two has, however, been more difficult to discern as wars have become more nearly total in scope. The difference between the citizen soldier and the factory worker who provides the tools of war is rather nebulous. The soldier and the worker are complementary in modern war.

It is naturally abhorrent to us to consider that war may be fought which will involve our homes and families. We want it to be fought at the greatest distance from them as possible. An aggressor is not concerned about these values.

In essence the argument from morality condemns strategic bombing as an effort aimed at women and children and the civilian population. It alleges that strategic bombing kills the innocent population and is not directed against legitimate military objectives. Under analysis this argument is fallacious.

Before the airplane and the atomic bomb became significant instruments in the military arsenal, the same basic problem in humanity was present. During World War I and World War II, which were fought with traditional weapons on the surface of the earth, it was recognized that noncombatants in a combat zone were very likely to get hurt. Insofar as practicable, the problem was solved by evacuation. Women and children and noncombatants were cleared out of the combat areas. If the

principle of evacuation was not or could not be employed—if the noncombatants happened to be in a village under artillery bombardment—the artillery shells did not differentiate between enemies in uniform and civilians that might be present. If the civilian happened to be in a foxhole, he could expect the fire of the battlefield.

During World War II, insofar as air action was concerned, this principle of evacuation was still employed. The French civilians living adjacent to the railroad marshalling yards which handled German army logistics were warned by leaflets that the marshalling yards were critical targets and that they should get out of the area. Likewise the residents of Japanese cities were warned that the cities were military targets because of the dispersed home industry which was so essential to the Japanese economy. Those who abandoned their homes lived. Those who did not, in effect remained on the battlefield and took the chances of a battlefield.

The important point is that the categories of military targets appropriate to modern weapons have expanded the battlefield to include the industrial and economic sources of strength of a nation and that these critical elements of economy are legitimate military targets because they create and maintain the enemy's fighting forces. The principle of evacuation can still be applied, as it was applied by the British in World War II when thousands of women and children and noncombatants were removed from city areas.

In other words, nothing completely new in the field of ethics or morality has been added to the grim problems of war. No new issue of morality is involved. Only the degree of hazard has changed. There is no new principle.

It is significant to observe that aggressor nations normally do not like the idea of strategic bombing. It is not consistent with the philosophy of conquest and exploitation. Hence it may be expected that through established international agencies and by means of every known type of propaganda, the attempt will be made to discredit and to outlaw strategic bombing. Hitler himself spoke out against strategic bombing during the last war. Certainly he had no moral objections. A monster who would tolerate—in fact, encourage—such pestholes as Buchenwald, Dachau, and other concentration camps and mass-murder sites would not be deterred from killing citizens because of

any moral issue involved. The reason for his efforts to outlaw the bombing of cities is quite evident. It stems logically from his war aims. Germany under Hitler was bent upon dominating the whole of Europe, if not the whole world. She was embarked upon a policy of expansion and aggression. It would not have served her purpose to destroy the economic plant which she wanted to control. She was not threatened by Holland, Belgium, France, Poland, or England. They were not attempting to take her over. The reverse was true. Thus Germany's war strategy was based upon an occupation of the other continental powers with ground forces, after a minimum destruction of the economy of those countries.

Germany also realized that the Allies were not prepared to take the war to Germany on the ground. However from British bases the air war could be launched against Germany herself. Obviously, in a situation such as this, wherein Germany had nothing to gain and everything to lose, she would come out strongly against the weapon which could hurt her most—strategic bombing.

To rely, however, upon the belief that any possible enemy, because it is committed to a policy of aggression, might not use strategic bombing on the United States would be to take an unnecessary and unrealistic gamble. Hitler believed that he could take over Europe without involving the United States in war. If an enemy believes to the contrary, she could be perfectly willing to destroy Britain and the United States to gain the rest of the world—and, under another circumstance, could be willing to destroy Britain and the United States to prevent collapse from the inevitable internal corrosion associated with any dictatorship. In the meantime it would be distinctly to her advantage to outlaw strategic bombing and to convince the Western world that they are too moral and too humane to employ their best weapon in their fight for survival.

If we permit ourselves to become mesmerized with this humanity aspect, we can place ourselves in position to lose a war, because we will have failed to exploit the power of modern science in our own defense. A longer-term view of humanity would undoubtedly recognize that humanity is best served by the survival, rather than by the destruction, of Western civilization. An informed viewpoint will also recognize that the survival of Western civilization will depend in large measure upon the utilization of those weapons in our arsenal in which we are

superior—chief among which is our scientific and technological potential.

THOSE who condemn the strategic air offensive on morality grounds also maintain that the destruction incidental to such an attack ensures losing the peace even though we win the war: Germany, after World War II, is frequently cited as a case in point. Again this is a most superficial type of reasoning. It is a matter of record that the grim determination of the Allies, as they went to war with Germany in World War II, was so to reduce Germany that she would never again constitute a threat to the peace of the world. Our basic strategic thinking was founded on this tenet long before the power of the strategic air offensive was comprehended, and the extension of that national intention was found in the postwar application of parts of the Morgenthau plan. If strategic bombing so decimated Germany that it was not consistent with our national objectives, why then were German industrial plants dismantled and destroyed by the Allied occupying powers after the war ended? It is obvious, from the course of action which we followed, that strategic bombing—in spite of the great destruction wrought—had only partially satisfied Allied policy. The wrecking of Germany continued long after the last bomb fell.

The strategic air offensive had been designed to destroy only certain vital segments of the German war economy—such as oil. In this it succeeded, and the German war machine ground to a halt. However the strategic air offensive had *not* been designed to destroy the *total* industrial fabric of Germany, and the dismantling of German industry continued for some time after the war ended. Hence it becomes obvious that the destruction from the bombing *was* consistent with our national objectives, but being confined to certain segments of the German war economy, it was not sufficiently widespread to prevent the recuperation of German industry. Reduction of the recuperative power of the industry was apparently one of the objectives of the postwar dismantling program.

Actually, we did not come close to losing the peace in Europe because of the physical damage we did to our enemies in defeating them, but rather *because of the unmasking of a former ally as another totalitarian aggressive power bent on world domination.*

In visualizing the physical and material damage which might be heaped upon an enemy in a strategic air offensive, it is well to compare such damage with the disastrous losses to France and England of their young manhood during World War I. The cream of the manhood of both nations was lost, *in traditional surface warfare*, and the impact of this blood bath was one of much greater significance than the destruction of factories. Generations are required to rebuild a race. On the other hand our own casualties during World War II, in surface combat, were the lowest we have ever suffered, percentage-wise. This was true in spite of the greatly increased killing power of surface weapons. Our World War II casualties were low simply because we partially exploited the power of an air offensive in preparing for our surface operations. We reduced the capability of the enemy for effective and sustained surface warfare prior to the time that we committed our forces to surface combat. United States military leaders would be derelict in their duty to the people of the United States and the Western democracies if they did not fully exploit the power of the air offensive in a future war and so minimize the casualties which would be suffered by us and our friends.

The whole issue of morality as applied to warfare engaged in by peace-loving people must be considered against a background of war aims. Traditionally the United States will fight only if her security or the security of other peace-loving peoples is threatened. We have no aggressive intentions toward any other power. If we had such intentions, we would be subject to censure before world opinion as being unnecessarily brutal to use weapons of mass destruction in accomplishing our aims. If, however, our position as a champion of the dignity of man and human rights were threatened by a totalitarian power which has indicated it has no such standards, we would clearly be at fault if we did not use the key means at our disposal to defend ourselves. We are only defending ourselves, albeit we are doing it by taking the war to the enemy.

TO summarize, fallible man, adhering to the patterns of past thinking, resists the evolution and change dictated by the power of science. He resents the threat to his established order and traditional patterns. These failings have been able

to slow down but not stop progress. Such weaknesses can be sources of great danger when our security is threatened.

It has been pointed out that the strategic objectives of land, sea, and air warfare are similar. An objective analysis of the specific factors in the situation will logically dictate a certain course of action. Sea blockade and strangulation will not defeat an enemy who is not dependent on sea communications to a large extent for survival. Invasion and occupation in the face of heavy odds, if successful at all, would be terribly costly in American lives and resources. Utilization of strategic air power presents the soundest solution to our military problem. This will require the wisest balance and employment of our integrated land, sea, and air forces to attain maximum effectiveness.

The employment of weapons of mass destruction is not immoral. This propaganda line will probably be exploited by an enemy—as it was by Hitler—to suit his own purpose. He realizes that he has little to worry about in a war with us fought according to traditional patterns. An enemy having nothing to fear will feel free to continue a policy of aggression and expansion until his aim of world domination is achieved. We are not only morally justified but morally obligated to develop our maximum strength to provide for our security.

Air War College

*G*overnment by law never was established simply by edict of agreement. Always it had to grow. Individual freedom, handmaiden of the rule of law, grows with equally exasperating slowness. We cannot expect the whole world to produce by a miracle an order of freedom which cost the free nations of the West so much tribulation through the centuries. Western Europe was the cradle of this modern concept of human freedom. Self-government is the product of Western European thought and experience and experiment, although its roots go back much deeper into the Mediterranean world of antiquity.

Western Europe not only nurtured freedom and the rule of law but transplanted them to the New World, to Australia, and New Zealand. Even in India and its neighboring states, so new to independence, the dominant political ideas today are those of France and England, of Montesquieu and of John Locke, centering upon the notion of responsible self-government and individual liberty.

—William H. Hessler,
Operation Survival
Prentice Hall, 1949

WANTED: Intellectual Leadership

CAPTAIN JOHN B. BARRON

THE Lieutenant said, "Of course, he's a Communist." He was looking up at a portrait of a prominent American on the wall of the officers' club.

This monumental judgment delivered on a familiar citizen whose popularity is open to question, but who is in no sense a Communist, expresses—perhaps in a mildly exaggerated form—the political naivete of too many officers, not all of them young.

But the problem cuts deeper than lack of political sophistication. Unless the Air Force can work out a definite educational program based on the assumption that leadership requires something more than professional knowledge, technical virtuosity, and honorable dealings in the tradition of the military service, our future leaders are likely to possess every attribute except intellectual leadership.

What is necessary is that we recognize that leadership is not nurtured in a technical vacuum, but is essentially what the leader *is*—the total not of what he knows but the sum total of what he thinks, feels, knows, and does.

We are getting so far away from the meaning of leadership as to define it *in practice* in terms of mastery of specialized techniques—the more an officer knows about his specialty the more effective the leader. Granted that technical skill is important, it does not constitute leadership. The usurpation of the leader's role by the specialist can lead only to a military organization which falls short of its maximum contribution to the society it serves.

The Air Force is no longer a few gallant men eking out enough gasoline to keep their airplanes in the air. It is a tre-

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mendous organization with its roots in the ingenuity of the men who make its aircraft and in the resourcefulness and courage of the men who fly them—and this includes those who never get off the ground. For in a real sense every man and every woman in an Air Force uniform is aircrew: the administrator, the communicator, the personnel officer. Without them no airplane would move.

This whole vast organization needs to be led. It must be led dynamically by men with the imagination to capture the full significance of its mission. It can never be permitted to drift on an ebbtide of inertia or self-congratulation.

Implicit in the lack of a realistic approach to the problem of leadership is the strange thesis in some minds that anything more than superficial insight into the sobering realities of our time is extraneous to the job of being a leader.

What these people are saying, in effect, is that a man's values, the scope of his imagination, his insight into problems of self, and his ability to grasp nonmilitary abstractions have no necessary bearing on his performance as an officer as long as he possesses ordinary intelligence and common sense.

The trouble with this thesis is that the type of mind which is insensible to the deeper values of life, which goes along blithely uncritical of itself, and which, except for sociable chatter, regards the wider issues of morality, history, and politics as scholar's business is also incapable of making with any degree of success those decisions which our commanders are called upon to make almost every day. In a complex organization even those problems which pass as insignificant frequently require a wealth of integrated knowledge and the superior perception which only the more mature leader is able to bring to bear. The modern military leader cannot weave himself into a cocoon. He must relate his actions to the world "outside."

We may expect that the commander who fails to see why a study of politics is indispensable to a study of war, or why an Air Force officer should know something about the origin and development of communism or about the basic assumptions of his own society, will also fail to grasp the importance of new techniques of military management or the possibilities of a new weapon or even why the military service must remain subordinate to civil authority.

This is not to suggest that the United States Air Force convert itself into a uniformed lamasery in which metaphysics

mingles with maintenance as a subject of mass conversation. There is nothing academic about preparing for war. Leadership, moreover, involves a constellation of right habits and skills for which no knowledge of physics or philosophy can compensate.

We always come back to the fact that the Air Force has a difficult job to do, a job which cannot always be performed according to the best tenets of democracy or even of justice. It is a hardboiled job which brooks no nonsense, because a civilization's survival may depend upon it. But it is precisely because moral growth and an ever-widening mental horizon are matters of practical, clay-footed necessity that we must expand our conception of leadership.

Nor is it intended to suggest that the officer corps lags in comparison with other professional groups. On the contrary, no one need blush for our officers. They are intelligent and adaptable. But what is significant is that they are not distinguished for more than ordinary insight into human relationships—the organization of which is their main concern aside from the use of their weapons—or for more than a casual understanding of their world. Yet, if we assume the necessity for certain prerequisites such as physical energy, normal emotional development, and adequate professional knowledge, we must grant that such insight and such understanding are necessary for effective leadership.

A doctor, a lawyer, or an engineer may succeed without leadership qualities, but an officer stands or falls by the measure of his leadership.

Indifference to fundamental questions which are not susceptible to the common-sense, garden-variety of solution and failure to enter individually into the intellectual life of our times cannot be shrugged off as academic or irrelevant to the job in hand. It is distinctly relevant if we wish to cultivate real leadership. The next war, if it comes, will be fought the better by leaders who appreciate the significance of the stakes.

There is danger in a one-sided interest in life. If we ask: What are officers interested in as a group apart from their daily service?—the answer would seem to suggest that as a body the officer corps is threatened with intellectual and cultural anaemia.

Although the truth is probably less harsh, our librarians testify that officers do not read. Not even military history or

books related to their profession appear to rouse their interest. Only news magazines are read with any consistency—which is probably true of most other professions. Organized discussion groups are regarded as either prissy or slightly puerile. At best, no one thinks of them. Lectures by people in the news or professional educators are seldom attended—even if opportunity offers on the base itself. Interest in the arts, including music, is practically non-existent.

THE Air Force, in common with the other services, must utilize its own resources to provide the soil in which intelligent leadership may flourish. This premise is not invalidated by the presence of officers who have achieved recognized superiority without any more than the usual military training and discipline. These officers, including some recently retired, not only represent a high degree of intellectual leadership, but a number among them have made solid contributions to national life. The armed services may take pride in officers who have served as their country's ambassadors, as Secretary of State, as occupation authorities with vast powers over the civil economy, as a university president. The services may also point to a number of officers who in their daily relationships and performance of duty demonstrate character and ability which compel respect from those who would hold them to the highest standards. But the point is that we cannot afford to drift in the hope that such individuals will come to the fore of their own momentum. Furthermore our problem is not only to develop sound leadership at the top of the military hierarchy but to raise the intellectual watermark at all levels of command.

If the leadership of the Air Force topside is moving toward an increased appreciation of the idea that steady intellectual growth is as vital to the effectiveness of the officer corps as its fighting readiness and technical know-how, there is little evidence that this appreciation has made much headway among field commanders. At all levels within the Air Force, except in rare instances, the only established source of intellectual stimulation, the Information and Education program, has been reduced to futility because commanders either fail to see the value of the program or rationalize their failure to implement it by insisting that they cannot find personnel competent enough to administer it and, anyway, "officers can't spare the

time." Then there are those, unfortunately too numerous, whose conception of Information and Education seldom travels beyond lectures on military sanitation and chemical warfare.

The truth is that every professional group—lawyers, doctors, engineers—exhibits a tendency to drift, to evade all responsibility except that which is imposed upon them to retain their status. The officer corps is no exception.

There is a fundamental difference, however, between the officer corps and other professional groups. Officers do not serve their own interests as individuals; they serve a nation's interests. They are professional servants of a people. The people have a right to expect that each officer will exploit his capacity for leadership to the fullest. Self-improvement is a necessary condition of service. Another difference is significant: the officer corps represents a homogeneous body susceptible to immediate organization, training, and discipline. Officers are where they can be reached; they are not free to disassociate themselves from the group because its designated goals displease them. A program violating neither the laws of logic nor the laws of human nature and pursued with zeal by those whom it is designed to benefit must succeed.

The political experience of a democracy shows that certain conditions considered conducive to the public weal cannot be legislated into existence. In default of public support the laws are ignored or frustrated. Even within the comparatively inelastic framework of military discipline, compliance with clear, unmistakable directives is not automatic but must be regularly observed and enforced. This is strange only if we are tempted to take too roseate a view of human limitations.

The war developed, from earlier origins, two important techniques of military management, public information and personnel utilization (classification and assignment), both of which have had a constant uphill fight despite regulations which establish them as command responsibilities. Even today it is not easy to convince some commanders that the Air Force is under obligation to explain its actions to the national community or that the local community is entitled to know something of the activities of its neighbor Air Force installation.

That is the problem. It is a problem of raising our sights. It is a matter of educating ourselves to a more comprehensive conception of the kind of leadership we require if the Air Force is to fulfill its mission. No program which sets this conception

in motion can be expected to succeed unless commanders at all levels grasp the importance of the objectives. This has nothing to do with discipline; it is a psychological pattern of behavior we are dealing with here.

We require not so much resourceful reorganization as the creation of those conditions best calculated to foster the moral, intellectual, and technical growth of each officer and airman. The idea that when anything goes wrong all you do is find a successful formula for reorganizing is an illusion. No formula can be effective if it depends on a leader who has neither cultivated his mind, refined his perception, nor disciplined his will.

THERE is not only a need to submit our conception of leadership to restudy but a need for our leaders to assess themselves. This will require that they be thoroughly honest with themselves; that they recognize that their obligation to render competent leadership is greater than ever. Certain questions will require resolute and courageous answers. Why, for example, the present antagonism of many Americans to their military leaders? Why the continual sniping at officers by both press and radio? Why the faintly contemptuous connotation which has affixed itself to the term "brass"—and which is growing increasingly less faint?

Do these attitudes represent only the natural, traditional suspicion of a democratic society toward its members-at-arms? Do they reflect the public's "sense of partnership" in the military services? Are they tokens of the American's chronic distaste for being ordered about? *Or* do they arise partly out of the behavior characteristics of officers themselves?

Desire to advance is natural and healthy; its absence is probably a sign of decadence. At the same time there is no room for egotists who cynically regard military service as a living embroidered with a certain social prestige and whose conception of its obligations is to get themselves promoted as expeditiously as the rules permit.

An officer integrated in 1947 wired his father, "Just got permanent job."

In a coarse way this officer typified a group of officers who had limited occupational pasts prior to entering the service and only an uncertain future out of it. Their reaction to the news that "they made it" was entirely natural. They had been

named to an honorable calling where others, including their own friends, had failed. Their reaction does not prevent them from becoming fine officers. But it tells us something about the kind of individual we have to deal with in large numbers if we are to train for a more balanced type of leadership.

We may grant that officers "learn through their skins" from association with each other. But it is certainly a matter of debate whether an officer who entered upon commissioned service with only a high school or junior college education at age 21 to 25 and who served through the war years without any further academic training—for which experience alone is rarely a substitute and self-teaching without preliminary education only a poor alternative—has an adequate foundation for the type of leadership we are discussing. We should recognize with equal frankness that officers and men of the armed forces are no less members of a striving, highly competitive society because they wear a uniform and serve the people at large than certain people whose names are followed by the letters "Inc."

Material values and competitive social processes impose a curious dichotomy on the soldier: he must serve large, group objectives, even at personal sacrifice, at the same time that he serves himself as an individual requiring both material security and personal recognition. "Duty, Honor, Country" becomes alloyed with a conception of service as a job. The airman and the soldier and the sailor are part of their community. In that community a job is not only important; it is vital. Without it an individual, regardless of his moral character or his spiritual achievements, has no status.

Some commanders have expressed the fear that the profession of the soldier is losing prestige and that it is becoming something of a dubious distinction to hold a commission. Certainly it is nothing rare for an officer to be asked: "Why do you stay in?" This question is directed more frequently to officers who have had fair success or demonstrated some earning capacity in civilian occupations rather than to young officers whose lack of earning power in civilian life is known.

Those who must plan for the future of the armed forces cannot afford to blink these attitudes among the American people, even though they may prevail with only a minority. Not only are they evidence of public awareness that the earning ceiling in the services is relatively low, they are also symptoms of a

deeper dissatisfaction. This tendency among Americans who are neither stupid nor malicious—and it would be a great mistake for us to think of them as either—to sneer at the “high brass” is dangerous because it threatens the security of the United States. The nation needs the strongest Air Force within reach of its purse. But suspicion of military leaders may induce the people to hobble the services even though they pay the cost. They may get rid of the policeman while the thief has one foot in the door.

A healthy military service conscious of its high mission will be quick to diagnose the causes of this dissatisfaction and equally prompt to apply a remedy.

STANDARDS of education were too low in the integration of regular officers. In consequence the service is open to the charge that it allowed itself the luxury of speed in a post-war period in which it could afford more rigorous processes of selection. If this is true, it would appear to be a carry-over of the results of the precipitate haste in which officer candidates and aviation cadets were procured to meet the demands of war.

Despite the gifted officers the Military Academy has given to the nation in every conflict since its inception, its curriculum should not be exempt from frequent critical analysis. The Academy should compare favorably with the best university. An efficient vocational school with a little glamor thrown in will not provide the kind of leadership we require.

Concern with the lack of education among officers is reflected in the raising of academic qualifications for an Air Force commission. This is a necessity, but for the immediate future, merely a partial solution. Today's problem is presented by those thousands of officers already integrated or on extended active duty who fall short of the intellectual qualifications essential for Air Force leadership.

It is proper to observe that the service schools of the armed forces provide excellent training; and that the curricula of the more advanced schools recognize that professional proficiency does not stop with military tactics and organization but extends into the broader areas of psychology, economics, and social relationships. What is needed, however, is, first, to refine this type of instruction with greater attention to fundamentals

of knowledge* and, second, to bring it within reach of every officer as part of his professional routine. This will help to give him, for one thing, the understanding necessary to assimilate more readily what he gets at the advanced schools, where, it is already apparent, students are handicapped by the limited intellectual background they bring to the work.

Education for both officer and airman should be a continuous process rather than a series of career steps. In addition to increasing his store of professional knowledge and skills, an officer may then be expected to acquire over a period of years a heightened awareness of the rich and variegated forces which mold men and their affairs and to gain some practice in objective thinking, a technique which is necessary for the practice of the military profession and which, far from being born with, we are able to acquire only after painstaking self-discipline. Certainly there is no quick, easy method of developing intellectual leadership. To complicate matters, the intellectual problem cannot be divorced from the moral problem of making better men, in whom intellect is but a part. A man must be judged by his *total* harvest of thinking, feeling, and living.

Perhaps it is worth emphasizing that formal education in itself indicates only that a person has been exposed to a certain degree of instruction. About all that we may conclude from it with certainty is that the person thus exposed is more likely to educate himself than those who have been less fortunate. In the military service, where education must be regarded as an efficiency tool rather than as the realization of a classic ideal, all that can be done is to provide the opportunity and furnish the motivation for officers to broaden their intellectual capacity.

Obviously, we will need to be realistic—limited funds will make realism easier. We need not expect that every officer in his maturity will be capable of administering either the Department of State or a major university. But we may expect that a long-range program based on a practical conception of the requirements for Air Force leadership will help to stimulate a healthy mental development and that the result will have dollars and cents value. The stock in trade may be invisible, but the future dividends will be palpable enough.

*In the present age the human mind must be coerced into theoretical studies; it runs of its own accord to practical applications; and instead of perpetually referring it to the minute examination of secondary effects it is well to divert it from them sometimes in order to raise it up to the contemplation of primary cause.—Alexis de Tocqueville, *Democracy in America*.

There is no doubt from all the evidence at hand that our planners realize that the intellectual segment of the complex pattern of traits we call leadership demands more attention. The question is whether their plans go deep enough to get at the fault which lies in limited intellectual range. The Air University might be well advised to recommend the appointment of a committee of senior officers of the highest qualifications to consider the problem. The committee might be asked

- (1) To direct the administration of tests to fix the broad areas in which officers are most typically deficient. It is impossible to measure what a man *is*; only the least vital part of him is measurable at all. But it is entirely practicable to get an approximate idea of the extent of a man's knowledge, the values which guide his thinking, his imaginative scope, even his judgment.
- (2) To consider raising the educational requirements for a commission to a college degree.
- (3) To study the service school system with a view toward broadening its base. As a practical matter we should require more instruction in the social sciences and in the

Academic Preparation of U. S. Air Force Officers

Rank	Regular Officers			Reserve Officers		
	<i>high school</i>	<i>2 years college</i>	<i>4 years college</i>	<i>high school</i>	<i>2 years college</i>	<i>4 years college</i>
	%	%	%	%	%	%
General	100.00	100.00	100.00	100.00	100.00	100.00
Colonel	98.81	93.14	72.69	89.95	79.89	49.71
Lt. Colonel	98.10	90.60	66.85	97.77	63.04	47.84
Major	98.90	82.61	56.67	92.18	61.45	30.73
Captain	98.95	62.31	33.78	97.18	48.64	21.03
First Lt.	98.81	55.97	26.65	95.72	33.38	9.64
Second Lt.	99.99	76.02	76.02	99.29	32.62	8.33
Warrant O.	84.40	21.02	10.51	75.48	10.21	16.20
Total	98.69	71.48	45.68	95.47	41.15	6.15

Statistics based on a survey by Statistical Control, 31 December 1948, reveal that officers in the middle grades from First Lieutenant through Lieutenant Colonel—the leaders of tomorrow's Air Force—as a group have the least academic training in the Officer Corps.

humanities. Since no military institution exists in a vacuum, the Air Force leader must understand something of the social forces which pull and haul his organization.

- (4) To examine the feasibility of adding written examinations to the "best qualified" method of promotion.
- (5) To study the advisability of detailing more officers to civilian schools for undergraduate and graduate study, especially in the social sciences.
- (6) Finally, to make appropriate recommendations to the Secretary of the Air Force.

More immediately, the Information and Education program should be rescued from a sickly effort to comply with an unpopular regulation. This means a live program conducted with vigor and imagination, by professional teachers if necessary, with enough zeal for the program to give it some body. It means frequent lectures on base level by civic leaders, by writers, by scholars, by men from every field who have a contribution to make. It means that commanders must be motivated to drive the program through year after year.

A trained and disciplined officer corps is as much the prime need of the military service as it was in the days of Lee and Grant. It was Lee's constant concern. The great Virginian himself was an example of what character and intellect can mean to a military leader. The nobility of his character permeated his deeds even in the heat of his bitterest campaigns.

The Air Force requires a constant audit of its leadership. Everything depends upon it. Without good leadership, efficiency is an illusion and morale is out the window.

Headquarters, Joint Puerto Rican Exercise

As then human life a kaleidoscope of change, whirling us from one scene to another, with nothing that abides, no solid ground on which to plant our feet? We are conscious of the opposite. Change is on every side, but within us abides inexhaustible the power to will and to effect changes, that power which the ancients called the pectus and the vis mentis, the unconquerable mind. There and there only at every moment we discover a sure support in action, a safe refuge and resting place to refresh from time to time our spirits and to renew our life with stronger and with better heart.

Reduction of Maladjustments at Isolated Stations

COLONEL ROBERT L. SNIDER*

FROM World War II combat days comes a saying heard by the new arrival on any of the isolated Air Force outposts in the Aleutian chain that if a man has more than a year's service on the islands of williwaw winds, it is likely he'll catch himself talking to the ravens, but that if later the ravens start talking back, the time has come for a conference with a psychiatrist to initiate travel orders.

There is no question that service in the Aleutians is rigorous and rough. Its difference from other Air Force stations has caused special problems in psychology and psychoneurology. Extreme isolation, with the nearest town over a thousand miles away, compounded by the sudden fury of the Aleutian weather with its hundred-mile williwaws, greatly amplifies adjustment problems. During the war there were more evacuations from the Aleutians because of mental troubles than there were casualties from enemy action. Although morale in the Aleutians has been surprisingly high, a number of service personnel and civilians have been unable to endure the environmental stresses. Maladjustments of any type may degenerate into a psychoneurosis, or, in severe cases, to a psychosis [insanity]. The Department of Defense has recognized the rigor of service in certain isolated bases by crediting the overseas records of military personnel with 36 points for each year. Since mental health and "job-effectiveness" are so interdependent and interrelated, action should be taken to maintain the highest possible morale at these bases.

*The author wishes to acknowledge the assistance of Mr. Harry Chittim, Operations Analyst, Strategic Air Command, in assembling information for this paper.

The views expressed in this article are not the official views of the Department of the Air Force or of the Air University. The purpose of the article is to stimulate healthy discussion of Air Force problems which may ultimately result in improvement of our national security.

Strategic planners feel that the isolated bases in many parts of the world are essential links in our chain of global defense. Yet because of priority of other activities, personnel shortages, and restrictions in budgetary appropriations, little attention has been given to personnel adjustment problems. If leaders at all levels of command endeavor to keep environmental stresses to a minimum and provide good supervision, maladjustments and psychoneurotic casualties will be reduced.

The mental evacuees, or "casualties," from the isolated bases throughout the Pacific have continued to be so numerous as to initiate special study by the Air Surgeon General. In 1948 Army, Navy, and Air Force personnel and civilians each had about equal percentages of mental patients who required evacuation. Case diagnoses varied among acute situational maladjustment, chronic emotional instability reaction, severe conversion reaction manifested by cephalalgia, and others. Numerically these cases constitute a casualty rate which is of concern to the medical department, but it should particularly be pointed out that only extreme cases were evacuated. For every such case evacuated, it is estimated that at least ten other individuals were affected to a lesser degree but seriously enough to reduce their military effectiveness.

At Stateside Air Force bases it is important to keep maladjustment cases to the minimum; in the Aleutians it is urgent. Let me put it like this: The airman's interest and adjustment in his job is the rock foundation upon which the Air Force is built. In every organization of human beings there is usually a portion of maladjusted individuals. Although psychologists state that men with perfectly adjusted and integrated personalities are seldom in the majority, in a normal situation the apparent incidence and degree of maladjustment is small. The further a situation or condition departs from the normal, the greater the incidence and degree of maladjustment. Since the physical and psychological environment of military service is a departure from normal life, the ratio of maladjusted individuals in the services tends to increase over that in civil life. Thus the Air Force recruiting standards should take this condition into account.

At installations where deviation from the normal is great, because of isolation, severe climatic conditions, imminent danger, or other stresses, the degree of maladjustment increases, unless the commanders and the Air Force program can over-

come the adverse conditions. Individual instability which results in maladjustment is not always caused directly by environmental stresses. Oftentimes neurosis latent in the individual manifests itself when the rigor of the situation, the straw that breaks the camel's back, produces overt behavior.

Today maladjusted personnel continue to be a serious problem in the services, but more particularly in isolated stations and outposts. Little coordinated research has been done in this field, and there is reason to believe that loss in military effectiveness is sufficient to warrant large-scale studies with a view toward determining the best remedial measures.* The complexities of the human mind and emotions do not lend themselves to the formulation of set rules. Two individuals respond differently to the stimulus or set of conditions; the same individual reacts differently to the same stimulus at different times and in different environments. The military services can find the least common multiple of these variations. But at present, because of lack of data, recommendations can be made only on the basis of knowledge of mental hygiene, subjective thinking, common sense, and experience at isolated stations. It is the purpose of this discussion to attempt such recommendations.

The Selection of Personnel. During the war, the rapid expansion of Selective Service made it inevitable that large numbers of deviates from normal behavior would be inducted. The psychiatric screening machinery eliminated only the more obvious misfits and occasionally was in serious error. But with the screening devices available, there were 1,850,000 neuropsychiatric rejections, or twelve per cent of all examinations. The large numbers of subsequent neuropsychiatric discharges indicated that new cases had developed and that the screening had been rushed. From 1942 to 1945, 545,000 were separated from the services for neuropsychiatric disorders. Since the war it is suspected that the race of the recruiting service to keep pace with attrition has resulted in the enlistment of many men who, from the standpoint of the services, had better remained civilians.

While increasing emphasis has been placed on the need for men mentally capable of being trained in highly specialized

*One bright spot in this important but neglected field was the establishment of the Human Resources Research Institute under the Air University.

skills and techniques for the Air Force, there has not been a correspondingly high emphasis on the requirement for all men to be sufficiently stable to withstand the stresses of unusual activities at far-flung localities under adverse conditions. Techniques in psychology and psychiatry have progressed to the point where initial screening of recruits can be much more complete. The loss in the number of new enlistments would be offset by the greater efficiency of those selected. The Air Force will always require a certain number of "strong backs," but the number decreases. Probably careful screening is more important in time of peace than in wartime. During war, patriotism, a sense of duty, a crusading spirit, can carry an individual through who in peacetime would succumb to the stresses of an unfamiliar situation. The emphasis in recruiting should be on quality rather than on quantity.

Classification and Assignment of Personnel. Personnel who are properly classified and assigned are not only efficient but in general contented; and a contented individual is seldom a maladjustment problem. From the standpoint of military effectiveness the classification and assignment of personnel are of supreme importance, and any investment of time and funds to improve them will pay dividends. The round peg in a square hole is costly. Techniques and procedures for determining capacities, potential skills, and interest have been developed to the point where large industrial concerns rely upon them entirely for supplying efficient manpower; the services can not afford to overlook them. The recruiting service estimates that the annual cost to the government of one private is \$3448. No industrial or commercial enterprise would think of hiring an employee at that salary without first determining his ability to perform his job—not and remain solvent. And industry can discharge the man, not commonly the practice in the services.

It has been observed in Kwajalein, Greenland, and Alaska that the individuals who are enthusiastic about and efficient in their jobs are those who are well assigned. They see the worthwhileness of their job; they have confidence in their ability to fill it; and, despite isolation, they put all they have into it for the duration of their tour. Herein is no implication that life on an isolated station is a joy forever; but it is stated with certainty that carefully selected, classified, and assigned men will

better adapt themselves to difficult situations and will serve their tours with credit to themselves and the service.

There is probably some ground for the suspicion that assignments to isolated stations are not always made with the best interests of the service and the station in mind. There is reason to believe that when a requisition for personnel is made the "goof-offs" and the misfits are sometimes sent. When an officer, especially a commanding officer of a small unit, is selected from such a category, the result may be disastrous. To man our outposts and isolated installations, our best men are needed—men who are stable, well-adjusted, and proficient in their MOS, and, whenever possible, have elected to go. For, strange as it may seem, there is no place on earth for which volunteers may not be found. This approach may be at odds with service policy, but as the Air Force feels its way across hitherto unknown and inaccessible regions, the men who man these areas must be the best available. In an isolated unit, one maladjusted individual can adversely affect the whole unit and lower its efficiency.

Officers as Leaders. Many Americans dislike regimentation. As compared with other countries, the reins of home, church, and school are loosely held. There is a wide gap between the light restraint of the typical youth's environment and the military discipline of the services. The transition is difficult for even the well-adjusted youth. If the Air Force, which is essentially a young organization, fails to provide the necessary guidance in the transition, it will lose much of the potential effectiveness of its recruits.

The responsibility for getting the most out of a young man rests largely with junior officers, themselves but little more than youths. They are the small-unit commanders, who control the destinies of the personnel assigned to them. Typically today, they are young pilots, successful in their vocation and in combat, but for the most part totally untrained and inexperienced in administration and in the leadership of men in a peacetime organization. The Air Force has done a magnificent job of training pilots and other specialists, but greater stress is necessary on training for leadership. The small-unit commander today must be a military leader, but he must also be a father-confessor, a guide, and often a big brother to his men. To be successful, he must be a good amateur psychologist and must understand and be sympathetic toward the airman. In short,

whether we like it or not, he stands *in loco parentis* to his unit. As an indifferent and apathetic "boss" or as a wise, understanding, but firm father he can develop the bad or the good potentialities of each of his men.

There is great need for the training of junior officers in the human relations aspect of their jobs. Officers should be screened at the completion of such training to ensure that no incompetent is assigned as small-unit commander. It is unfortunate that the rotation policy makes it impossible for a commander to remain long with his unit; however if all officers were thoroughly trained as small-unit commanders, changes in command would not result in too severe changes in policy. Training as suggested should, of course, be extended to the noncommissioned officers of the units; it is the responsibility of the commander to provide such training. None of the above is intended as an argument for the "coddling" of personnel; it is an argument aimed at helping the new man adjust himself to a new environment, so that he can make his optimum contribution to the service. There is evidence that officers have more than the usual effect on the morale and performance of their enlisted men in isolated areas such as the Aleutians and the Arctic. On isolated stations the Base Commander has increased responsibilities in leadership and greater requirements in taking the initiative to overcome obstacles that stand in the way of airmen becoming adjusted to their new assignments.

Promises. As a result of talking with many enlisted personnel, the writer is of the opinion that one of the biggest gripes is the failure of the service to fulfill its promises: promises of assignment, of family quarters, of promotion, of schooling, *etc.* Sometimes these promises are made officially, more often they are made by unauthorized personnel, or perhaps by a recruiting sergeant. Sometimes the promise is inferred by the new man, unfamiliar with service ways. Whatever the circumstances, the result is the same: a disgruntled, disillusioned soldier who certainly will not work to capacity and who even more certainly will not be a good prospect for re-enlistment. The rule of thumb in the service, as in other walks of life, should be to make no promises not certain of fulfillment. Perhaps in the service, with shifting policies and plans, it is better to make no promises at all.

Orientation. The Air Force has the responsibility of orienting personnel to a new location, particularly if the new station is isolated or presents conditions very different from those in the Zone of the Interior. Generally the new man has heard all the bad about the new assignment and little of the good. The misinformation about Alaska and the Aleutians makes men assigned there apprehensive of the fate which awaits them. Adak, for example, is, according to popular belief, a hostile island of eternal rain, fog, and williwaws; a man is lucky if he gets there alive, and if he does he will be thoroughly miserable throughout his tour because of complete lack of comforts. The tale is partly true, but there are bright, sunny days on Adak when some of the finest scenery in the world unfolds; for half of the year the grass is green, flowers grow in riotous colors, the fishing is excellent, and quarters and facilities compare favorably with many stations in the ZI. During the war it was the practice to hand each assignee a handbook describing an unfamiliar area of assignment. This practice should be continued. For some areas movies are presently available; Project TF 19020 will shortly produce movies of value in orienting personnel to Alaska and the Aleutians. Competent lecturers can pass on the real facts about the new location, stressing the mission of the station in the over-all military program and the individual's importance to the mission. An hour of orientation at the replacement center would go far toward removing the perfectly natural fear of the young recruit for the unknown.

What can be Done at Station Level?

It has been pointed out that careful initial selection and classification are important procedures in eliminating potential maladjusted personnel. Obviously there is little that the stations can do to improve these techniques; the station takes what is sent to it, good and bad. It is believed, however, that the station can assist in getting the maximum effectiveness from the personnel it receives by providing an environment wherein maladjustment, dissatisfaction, and malingering will be held to a minimum. To this end the following suggestions are made:

Reception of Personnel. Too often upon arrival at a station a new man faces needless waiting, and he is off to a bad start, a potential malcontent. It is not too much to expect that upon

arrival a new man will be cared for promptly and courteously and that he and his luggage will be transported to quarters and to a decent meal instead of facing a blank wall of indifference at Base Operations.

Assignment and Orientation. Assignment should be prompt. It should involve a conference with the organization commander whose responsibility is (1) to help get the new man oriented, (2) to determine where he can work most effectively and contentedly, (3) to learn as much as he can about him, his ambitions, and his interests. No other factor contributes so much to mental health on a remote station as proper assignment. In a short interview a competent, sympathetic officer can start a man in the right direction by removing his apprehensions, and making him feel that there is an important job to be done and that he is needed to help accomplish it.

At each station a handbook should be prepared and placed in the hands of each new arrival. It not only should contain the rules and regulations of the station but should list the available facilities and the recreational possibilities, on and off station. The emphasis should be on the advantages of the station; he has already heard about all the disadvantages.

Soon after arrival he should be given thorough indoctrination in the techniques of living in the region where the station is located, particularly where conditions are unusual. If a school for this purpose is not available, then an experienced noncommissioned officer should be assigned to brief him, this information to be supplemented by manuals, motion pictures, and other instructional aids.

The proper reception of new personnel and their effective assimilation into a unit depend very largely upon the organization commander. It is essential that he know his men personally, be familiar with their problems, and be easily accessible.

Recreation. With personnel properly oriented and assigned, the remaining problem is to provide satisfying activities for off-duty hours. The fact must be faced that the optimum recreational opportunities will be only a poor substitute for the normal activities of life in the Zone of the Interior. At best only a small percentage of personnel will have their families with them. There are no towns to offer diversion. The station must be recreationally self-sufficient. It is too much to hope that a program can be devised that will make men enthusiastic to remain indefinitely, but it should be possible for them

to find interests that dispel the boredom and monotony conducive to discontent and neuroses.

Special Services has a particularly important function on isolated bases. The Special Service staff should be carefully selected and should be given the opportunity to develop a broad program. In very small units, not ordinarily assigned a Special Service officer, a resourceful individual of the unit should be assigned this additional duty.

The interests of personnel cover a broad range of human activities, and the facilities of the station should be sufficiently diverse to gratify them all. The natural resources of the locality frequently offer many opportunities for recreation. On the island of Adak, for instance, there are excellent opportunities for the fisherman, the amateur geologist, the botanist. The station can provide equipment for these activities and arrange tours, afoot and by land or water transportation. The base athletic program can be broadened to offer sports activities to everyone on the base. In service programs, as in our schools and colleges, the tendency is to set up activities only for the athletes, little provision being made for the man who needs them most, the non-athlete. It is desirable to train good teams for all sports, but such training benefits only a few. The "dubs" should also have their games. Inter-unit tournaments should be held in all sports; a horseshoe tournament means as much to the horseshoe pitcher as does an inter-base championship football game to the participants. Commanders must encourage athletic activity within their units.

Library. It is believed that most service libraries are too limited in their offerings to appeal to the entire body of personnel. We tend to consider the library an educational institution to the exclusion of its recreational possibilities. It should provide reading material for all levels of reading ability.

Education. An ardent exponent of USAFI courses is a prime necessity. It is not enough to announce in the Daily Bulletin that courses are available or to expose USAFI literature to public view. The USAFI officer should take positive steps to acquaint all personnel with the possibilities for self-improvement and recreation by means of visits to day-rooms, slides at the theater, literature with a punch, and conferences with prospective students. To supplement the formal USAFI courses, it is possible to find amateur devotees of many subjects to offer instruction in their fields. A resourceful Special Service officer

can organize such activities, provide the necessary floor space, and generally supervise the program.

Hobby Shops. Logistically the supplying of material for many hobbies is a difficult problem. However there are numerous hobbies that require little more than a space to work and a bench: photography, sheet metal and iron work, leather-working, basketry, woodwork, jewelry-making, and a host of others. An ardent hobbyist can usually be found to coach novices.

General. No mention has been made of the more obvious facilities and services for keeping men happy: good housing, good food, good mail service, good PX facilities. On the isolated station it is essential to have these the best possible under the conditions existing.

No matter how rough the duty may be at a station, if facilities are present that can be turned into quarters and if medical care is available, dependents who are willing to undergo the hardships should be allowed to come.

It is the responsibility of every officer and noncommissioned officer to make the conditions of living as pleasant as possible for his men. He must be a "chaplain" to hear the woes of his men, and must be constantly alert to detect maladjustments in early stages and prompt to determine causes and to seek remedies. Very frequently an incipient neurosis case is prevented by the simple practice of "talking it out" to a sympathetic listener. Obviously the job of the official chaplains increases geometrically at an isolated station, and only the most competent should be assigned. Equally obvious is the need for a competent, down-to-earth psychiatrist on the medical staff of the station, a need that will decrease as every officer takes complete action to fulfill his responsibilities to his men.

To repeat, it has not been the purpose of this paper to advocate "soft" leadership and the "coddling" of troops. Boredom, monotony, and dissatisfaction are cancers that eat into the military effectiveness of our important far-flung installations and result in "casualties" in both war and peace. Careful planning by alert officers can correct these ills.

Air War College

Industrial Mobilization Planning

LIEUTENANT COLONEL WILBUR R. CARTER

WITH the evolution of the concept and techniques of modern warfare, particularly during the twentieth century, it has become increasingly evident that in the event of another conflict the power making the earliest and most efficient application of its resources will probably emerge the victor. As used above, the term "resources" means all goods and services available to the nation, including adequately manned munitions, productive capacity, transportation, manpower, and the basic natural resources, such as ore, coal, and petroleum. To accomplish the early and efficient exploitation of these national resources, it is essential that a thorough understanding exists of (1) the magnitude of the expected requirements, (2) the availability of resources to meet the requirements, (3) how or where the resources will be applied, (4) the methods of financing the requirements, (5) the economic controls that will be used, and (6) the nature and function of the administrative organization required to implement the entire program. Preparations in these areas, when adequately developed and knit together, comprise a national mobilization plan. That portion known as the industrial mobilization plan is, at the national level, basically a statement of the contemplated industrial operations of the national wartime economy supported by studies or annexes developing the various aspects of the several problems. Primarily important among these annexes are those which treat the production problems of the three armed services. It is with the problem of the development of the service annexes, commonly termed the service industrial mobilization plan, that this paper is concerned.

The views expressed in this article are not the official views of the Department of the Air Force or of the Air University. The purpose of the article is to stimulate healthy discussion of Air Force problems which may ultimately result in improvement of our national security.

Initially the question "what is a service level industrial mobilization plan?" may well be raised. The term is quite comprehensive and does not lend itself to a concise definition. For example, it has sometimes been defined as the blueprint for establishing the production structure necessary to yield the required munitions or as the fundamental logistics treatment of a strategic plan. Without worrying about a precise definition, a service level I.M.P. may be thought of, essentially, as the answers to the questions of *who*, in the event of war, will be producing *what* munitions in *which* facility and at *what* rate.

For purposes of illustration in developing the subject, frequent reference will be made to the Air Force program. However, the successive points established are believed equally important to each service in the preparation of its own plan.

During the past two years the conduct of the Air Materiel Command Industrial Mobilization Planning program has been under the leadership of Major General Frederick M. Hopkins, Jr., Chief of the Industrial Planning Division. Conduct of the work has established the following broad guide lines:

1. The plan, as expressed in terms of required production, must be based upon a sound, intelligent, and reasonably attainable strategic plan.
2. The plan must at all times be in balance with the current procurement program. The existing procurement or "level of industry" must be considered as the springboard for launching production acceleration. Also, only those articles in production or ready for early production can be considered in the plan. The current lethal value of a weapon still in the "drawing board" stage is zero.
3. The plan must be simple, flexible, and built around the key, critical, hard-to-produce items. Planning to the "nuts and bolts" level would be unwieldy, inflexible, and difficult. Moreover, the "vendor," "off-the-shelf" item is not expected to be a bottleneck.
4. Industry must participate in the development of the plan.
5. The results of the plan must be made known to operational planners.

Within these broad lines much has been accomplished toward developing an Air Force Industrial Mobilization Plan. The results indicate that the final plan should consist of the following sections:

A manufacturing section: A statement of the potential production of the various items considered and the industrial structure necessary for that production.

A resources section: A collective statement of the resources (manpower, machine tools, floor space, and materials) required for the production programs, how these resources will be provided, and the procedure for their administration.

An industry defense section: An appraisal of the vulnerability of the aeronautical industry and a program for the reduction of this vulnerability.

An administrative section: A treatment of problems of organization, operational procedures, implementing directives, budget and fiscal requirements, etc.

The Manufacturing Section

In developing this section, it is essential to consider (1) research, (2) requirements, (3) selection of items, (4) alignment of facilities, products and management, (5) potential production, and (6) measures to increase potential production.

1. Research. Studies must be conducted of previous efforts at industrial mobilization planning, both foreign and domestic, in order to discover the strong and weak points and the advantages and disadvantages of the various approaches used.

The history of industrial production during mobilization must be studied. Along these lines the Air Force has compiled considerable data relative to aeronautical production, with particular attention to the periods prior to, during, and just after World War II. The objective of this research was to determine the factors which influenced acceleration of production and to develop for purposes of production planning "in-put—out-put" factors expressed in terms of units of products to square feet of floor space and hours of direct and indirect work.

2. Requirements. The essentiality of firm requirements, attainable by maximum effort, cannot be over-emphasized. Requirements are the base upon which an industrial mobilization plan is constructed. Without a firm and realistic base the soundness of a plan becomes highly questionable. It is essential to both the operational and the industrial planner that the requirements are feasible objectives. The requirements of each armed force must be in consonance with its assigned strategic and tactical role, and the feasibility of those requirements

will be tempered by the national ability to provide the total national requirements.

The requirements considered by the Industrial Planning Division of Air Materiel Command stem from the strategic plan established by the Joint Chiefs of Staff. The Air Force portion of this plan is expressed by the Chief of Staff, USAF, in terms of operational, support, and administrative units. The various munitions necessary for equipping and maintaining these units constitute the total Air Force requirement. The production requirement is determined by subtracting from the total the munitions in the hands of troops and those available from reserve stocks. Planning for meeting the production requirement is the primary function of industrial mobilization planning on the Service level.

The Air Force, in developing its plan, has used the aircraft portions of the production requirement as targets in formulating potential production curves for each of the various *airframes*. In the construction of these curves particular attention was given to the tactical or strategic importance of each model, the peak requirements of each model as expressed both in quantity and in time, the readiness for production of each model, and the over-all existing level of aeronautical production. The base line of airframes was used because it was felt that adequate information was available from previous study contracts with industry, to allow a reasonably accurate statement of the potential production of airframes. Also it is recognized that the production acceleration of airframes is much more flexible than that of components. With the base line of potential airframe production laid down, a computation was made of the components (engines, propellers, landing gear, fire control systems, etc.) required, consideration being given to schedule advancements (assembly lead time and shop flow or fabrication time) necessary to match components with airframes to meet aircraft schedules. This procedure applied to the major munitions required for a mobilization period gives a fix on the production load.

3. Selection of Items. With the basic production requirements established, the next problem is to select the items upon which to concentrate attention. It is conceivable that planning could be performed for all the items necessary to support a mobilization. However, the cost in time, effort, and dollars for con-

ducting that type of program would be almost prohibitive. Also the collection, evaluation, and collation of such a vast amount of data as would be needed would almost preclude the possibility of short-term adjustments to accommodate program changes. But adequate preplanning for items which are certain to be production bottlenecks can be accomplished at a reasonable cost to allow diversion of effort at time of mobilization to handle the less critical items. Approximately two hundred critical items were chosen from the hundreds of thousands produced for the Air Force. Some of the factors used in making this selection were lead time, complexity of the production problems, the rate of acceleration of the build-up curve, and the suitability of the item to the production processes of the existing peacetime production equipment. In addition to airframes and certain aircraft components the list includes some ground handling and supply items. The items selected absorb approximately eight per cent of the total Air Force funds expended for procurement of fabricated or production articles.

4. Alignment of Facilities, Products, and Management. With the requirements established and the items selected, attention can be given to determining *who* will be producing *what* munitions *where*. In the alignment of product with facility there are three basic problems: (1) the resolution of multiple claims for specific facilities to produce different munitions. (2) the most effective utilization of the physical characteristics (such as bay heights and widths, ramp area, foundations) of the facilities available, (3) placing production proximate to the supporting producer and to final assembly operation.

The Services have been required to make requests for tentative production capacity allocations through the Munitions Board in accordance with its Annex 47 program, subject to substantiation of the requirement. This program has done much to resolve multiple claims for a single facility.

It is obvious that multiple combinations of product and facility are possible and that the selection of the optimum combination is a complex task. The total facilities or, as generally expressed, the square feet of floor space required to support the program is determined by the use of the previously mentioned production-planning factors. These factors are the production yields, expressed in terms of items or pounds of items, expected from a unit of floor space. The problem then is to

match the facilities and their physical characteristics and locations with the products for the best combination.

In adding the element of management to this combination, it is essential to consider its experience in the production of the article or a comparable production experience. Current munitions are far more complex than those to which "Rosie the Riveter" contributed so much during World War II. Management's knowledge of the production problems involved is essential to good production acceleration. Also important is the nature of the organization. Operation of multiple plants by a single management requires that its existing organization be adequate in depth. The ability of the "one man" type of organization successfully to operate multiple plants is limited, because mobilization production requires on-the-spot, quick, qualified decisions. The desires of management also should be considered whenever possible. Better results are usually to be expected if management is producing an item agreeable to itself. However requirements of a mobilization differ from normal peacetime production to the extent that substantial conversion of industry will be necessary. Hence the alignment of management, facilities, and products for mobilization production cannot give consideration to simplification of the problems of reconversion at the close of hostilities.

5. Potential Production. The production factors mentioned above are merely statements of the production that may be expected after a facility is fully tooled up and operating efficiently. They are used to determine the floor space necessary to satisfy peak requirements without regard of the time necessary to build up to the peak. A mobilization plan is, however, directly dependent upon the build-up or rate of production. This rate determines the availability of newly produced munitions, which governs the activation rate of operational units, thus influencing the nature and magnitude of operational plans.

Consequently the Air Force has requested existing prime manufacturers for assistance in planning. The individual contractor was given an assumed "M-Day," the plant or plants that would be available to him, the products he would be expected to produce, the expected peak rates of production, and the assumptions that machine tools and materials would be available as required. From these data and assumptions he was asked to state his calculated production schedules. He was also

given the alignment of other facilities and managements that would be building his product, and asked to estimate their potential production. Finally he was asked to state his requirements for manpower, machine tools, and facilities to support the production schedules. The participation of industry in developing this information has been most gratifying. Top management is interested in the program and has expended maximum effort to produce dependable data.

Two other principal aspects of this problem need and will get early attention. First is the alignment of subcontractors to support the primes. Without adequate planning some subcontractors might become substantially overloaded and others left with competent open capacity. It is necessary to determine that the rate of production from the various subcontractors will be adequate to support the prime producers' rate of production as well as to ensure efficient utilization of all capacity. Second is the validation of the assumption that materials and machine tools will be available as required. It is recognized that this assumption is questionable, but it was made in the interest of pushing ahead with the plan and avoiding the issue of "which comes first—the chicken or the egg?" The production build-up establishes the need for the machine tools and materials, but lack of these items restricts the possible build-up. By assuming their availability and using fixed values for the other variables, such as status of product, floor space, and potential labor absorption rates, the potential production was determined and a fix obtained on the requirements for materials and machine tools. With these requirements firm, the question of availability can then be explored.

With the information in hand, relative to the potential production of the several items, it is a relatively easy process to balance the components against airframes to establish the potential rate of production of complete aircraft.

6. Measures to Increase Potential Production. Graphic or tabular comparison of the data showing potential production and requirements indicates the probable extent of the production deficit. Reduction or elimination of this deficit is a prime objective. Examination of this problem suggests three principal measures to accomplish this aim.

First: The volume of existing production has a direct bearing on production availability and acceleration. With a higher

existing level of production acceleration can take place sooner, and the accumulated production over this "flat out period" is greater. Between the high point of an existing level of production sufficient to equip and support the entire required combat force and the low point of no munitions output, a compromise point exists which is within the economic and financial limitations of a sound national budget and which will allow substantial acceleration within a reasonable period of time.

The exact level of existing production necessary for adequate acceleration is a function of time. If the international situation is unsettled, or progressively deteriorates, it is logical to assume that munitions production will be at a sufficiently high rate to allow reasonable acceleration. If, on the other hand, an M-Day arrives without warning, the production of munitions during the initial stage of from twelve to fifteen months will be substantially limited to the existing producers. Some improvement is possible, however, if multiple producers are in production at rates substantially below capacity.

The problem of accelerating production centers in the inescapable preliminary steps that must be taken before it is possible to raise materially the level of output. It takes a certain period of time to tool an empty plant for production, and it takes a different period of time to convert an operating plant to new production. Certain measures may slightly compress this time, but having the tools in place, already cutting metal on the desired end item, is extremely beneficial to production acceleration.

Second: Advance, direct preparedness measures on the end product can affect materially its potential production expansion. New munitions developed and produced during peacetime are normally produced by low-volume processes. The extent of peacetime procurement and the economics of competition will not permit the introduction of increased tools and tooling costs incident to a high-volume production concept. Under high-volume production conditions it is efficient and ultimately cheaper per unit to design, install, and operate machines which perform multiple machining operations on an item simultaneously. For low-volume production, however, amortization of this capital investment makes the item unit-cost prohibitive. The transition of an item from low to high-volume production processes is time consuming. We can, today, under peacetime conditions plan and prepare for this transition and thereby

reduce the time between M-Day and production acceleration. Planning for this transition is commonly called "direct preparedness measures" and includes:

- (1) Redesigning the item for high-volume production with the attendant parts processing sheets.
- (2) Planning the plant layout and manufacturing plan for high-volume production.
- (3) Designing the tools and tooling for this level of production, and
- (4) If warranted, fabricating and installing these tools and tooling.

Third: A program of education for the potential mobilization producer can save time and improve acceleration. In the early stages of World War II, industry, in many instances, was eager to enter into munitions production, but it was extremely difficult to ascertain the desired items and to secure the necessary specifications and production data. To avoid this condition and to provide preproduction planning, the Air Force has initiated a program with certain expected manufacturers of critical items. The potential producers have been asked to work out a satisfactory license agreement with the current manufacturer or company having proprietary rights to authorize the licensee to produce the article. Simple as this agreement appears, its consummation in World War II required an extensive period of negotiation, during which the licensee was not producing. In addition to the above agreement the licensee is provided with all engineering and manufacturing data and requested to become thoroughly familiar with the production problems and to plan completely his mobilization production of the article. The participation and interest of industry has been most gratifying. As one contractor stated: "When we are through with this study, if mobilization occurs we will know exactly what the Air Force expects from us and in detail what we must do to produce the article."

The Resources Section

The objective of the Resources Section is to describe adequately the total net resources required and to set out the details for the Service administration of the resources.

Under emergency or mobilization conditions all national production resources will be under control of the National Security

Resources Board, which will determine the collective national resources requirements, ascertain their availability, and apportion them to the various segments of the national economy. The Board is more interested in the order of magnitude and characteristics of the combined resources required to meet a program than in the details of the requirements for the production of a single item within a program. Hence it is the responsibility of the Services to state their resources requirements, expressed in terms of quantity, quality, and time, to the Munitions Board, which, in turn, acts as the claimant to the NSRB for the aggregate Service requirements.

As mentioned previously, the statement of the potential production of the various munitions yields a net requirement for the four resources of manpower, materials, machine tools, and facilities necessary to support the production of the respective items. Preparation of these data then is but a process of collection from the various production programs and of compilation. It may be expected, however, that program changes and unforeseen production problems under mobilization conditions may substantially influence the time-phased resources requirements. Hence it is advisable to have a predetermined system to accomplish the periodic forecasting of resources necessary for the several producers and also a system for allocating resources to meet the producers' needs. During World War II the periodic forecasting of resources required for the aeronautical program was accomplished through the use of the Aeronautical Manufacturers Planning Report. Installation of this system was a slow and exasperating process of trial and error, replete with misunderstandings and delays. Predetermination of the reporting system to be used and a thorough understanding of the system by industry and the Services can substantially influence the early application of critical resources to effect the most efficient results. Whether the system adopted is the AMPR or the XYZ system is of no concern, if it is adequately thought through, reduced to writing, understood, and accepted by all concerned. Without such a system it will be difficult in the early stages of a mobilization period to gage the relative merit of the requirements for the various programs, and the resultant competition between producers and programs will result in inefficiencies.

Complementing the system of reporting resources requirements, there must be a procedure for the transmission of the

requirements to the NSRB and, after the Board has issued its allocations to the claimants, a further system for getting the allocation on to the proper places in industry. During World War II several methods were used for handling the critical materials problem, with the Controlled Materials Plan apparently producing the most effective results. The question of whether the CMP system should be adopted and applied to all resources or whether a new system should be used needs to be resolved. After the decision is reached, all concerned parties must be informed if maximum effectiveness is to be realized.

The Industry Defense Section

The history of World War I and II shows that, given adequate time, United States industry can and will mobilize and produce phenomenal quantities of munitions. This fact is well known both to citizens of this country and to potential enemies of the United States. It must be assumed that in the event of war all possible steps will be taken by our enemies to prevent the effective mobilization of production in the United States. It is essential to evaluate the vulnerability of industry and to have a program for the reduction of this vulnerability.

Although various criteria may be used for determining industrial vulnerability, the most logical approach seems to be on a product basis. In this approach the initial problem is to determine the production structure which supports the output of an end item. For example, to support manufacture of an aircraft several components are required, all of which are normally produced in different locations. Although all components are essential to a completed aircraft, a comparison of the effect of their loss on the production program of the aircraft shows a substantial variation. If component X has a lead time of two months, a shop-flow time of five months, and a period for reconstitution of the production line of twelve months, as opposed to component Y, which has a lead time of ten days, a shop-flow time of fifteen days, and a production-line-reconstitution time of three months, it is obvious that the aircraft program vulnerability is several times higher for component X than for component Y. Therefore component X requires preferential treatment in application of protective measures. After the production structure is developed and understanding of

relative vulnerability is obtained, a priority list of products requiring protective measures can be established.

The protective measures program is designed to reduce industrial vulnerability from two sources of work stoppages: external sources such as bombings and internal sources such as sabotage and strikes. With respect to the first both active and passive measures can be taken. The active measures comprise determining the areas of critical production and providing these areas with maximum protection to turn back attacks. The passive measures may include a variety of items, such as the use of camouflage or blast walls, moving the production line underground, or dispersing the production process to multiple feeder plants.

Protective measures against vulnerability from internal sources consist of inducing management to reach a thorough understanding of their plant's vulnerability to sabotage, coupled with an active plan to guard the vulnerable spots. These measures must be coordinated with the military programs of area ground security and plans for plant seizure and operation in the event of controllable work stoppages.

As with other aspects of industrial mobilization planning, the industry defense program must be dynamic and capable of rapid adjustment to accommodate changes.

The Administrative Section

The general problem of organization and administration is usually prominent in any complex operation of substantial size. Preplanning of an operation can give indications of the type of problems that may be expected. Anticipation and pre-resolution of the expected problems can facilitate implementation of the plan and thus allow additional effort to be applied toward the handling of unanticipated problems.

In the implementation of an Industrial Mobilization Plan, at least these major problems will exist:

(1) *Responsibility and Functions.* Who will be responsible for implementing the plan? If it is to be a split responsibility between the Munitions Board and the Services, what are the responsibilities at the respective levels? In carrying out the responsibilities, will functions follow in parallel or will there be an overlap between the Munitions Board and the Services?

In discharging the responsibilities, exactly what are the various functions?

(2) *Organization.* In carrying out the Service responsibilities and functions, what type of organization will be required? Will it be an expansion of the existing procurement organization or will it be a new organization? With the organization established, what functions and responsibilities will be further decentralized? What will be the magnitude of the problems within each function and what depth of organization will be required? What qualifications are required in the personnel necessary to staff the organization? What will be the source of personnel for staffing the organization? What will be the required rate for staffing the organization?

(3) *Operating Instructions.* In the discharge of the responsibilities and functions, what operational procedures will be necessary and what operating instructions can be prepared? What operating instructions will be required for decentralized functions?

(4) *Implementing Instructions.* What directives in implementation of the plan can be prepared and held ready for short-notice dispatch?

(5) *Budget.* What will be the nature of funds required for initial implementation of the plan? How much money will be required? How will expenditures, particularly facility expansions, be handled?

These are but a few of the questions which can profitably be presolved.

This discussion has sketched briefly the principal elements and problems inherent to a sound industrial mobilization plan. Adequate preparation will require continuous participation and contributions from the best experience and judgment in government and industry. As we leave farther and farther behind the experiences of the last war, we must make increased efforts to keep in sharp focus the imperative necessity for the plans. A smooth, orderly, and expeditious mobilization of industry may well be the determinant of victory.

Scientific Techniques for Program Planning

MARSHALL WOOD

PROGRAM PLANNING may be defined as the construction of a schedule of actions to accomplish stated objectives, together with a schedule of the resources necessary to accomplish these actions. To be operationally useful, the actions specified in such a program must support one another, and the resource requirements must be consistent with all known external resource limitations.

Obviously the first step in the preparation of any program is to define the objectives the program is to achieve. The objective of the peacetime military establishment is conceived to be primarily the creation of conditions favorable to our winning a war, if war should occur. If a potential enemy's intelligence is good, we may reasonably hope that the creation of conditions favorable to our winning a war, if it should occur, will also be effective in reducing the probability that war will occur. Only a small proportion of our establishment is engaged in activities, such as policing of occupied territories, for which there is a direct peacetime requirement.

The simplest means of defining quantitatively the requirements for accomplishing these objectives is to construct a war plan showing the actions which we believe we must take to ensure victory in a future war. To be usable for this purpose, a war plan must define quantitatively the major wartime tasks, in terms of forces deployed, rates of operation, and rates of attrition and replacement, so that we may derive from it the required levels of support activities, such as training, supply, maintenance, procurement, transportation. Since virtually all

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peacetime or pre-M-Day actions are limited by budgets and since the budgetary process takes about two years, the assumed M-Day of a war plan to be used for this purpose must be from three to four years in the future, in order to allow for this budgetary process and for the subsequent accomplishment of the action to attain the required M-Day position. Such a plan is called an Intermediate Range War Plan.

Given an Intermediate Range War Plan, it is possible to determine in some detail the complete schedule of actions which must be performed after M-Day to accomplish the war plan—that is, we may determine from the plan (which states only the combat operations to be performed) the schedule of induction, training, construction, procurement, supply, maintenance, distribution, and other supporting activities which must be performed to back up the combat operations. From this schedule of post M-Day actions, usually called a mobilization plan or program, we may in turn compute the composition of the military establishment on M-Day which we must attain in peacetime in order to have the capability of performing the mobilization program and war plan. This statement of the required M-Day position provides the bridge between the war plan and mobilization program, on the one hand, and the peacetime program on the other. It states, in terms of inventories and production or training rates for equipment, personnel, and all the other items used by the military establishment, the status which must be attained in peacetime in order to provide the capability for carrying out the war plan. Having defined this required M-Day position, we may then determine the action necessary to proceed from our present status to the required M-Day position. This is the peacetime operating program. Annual segments of this program for the 3 or 4-year span between the present status and the assumed M-Day are the primary basis for developing the budget for any fiscal year within the span.

In the construction of this peacetime program to attain the M-Day position, it frequently appears that it is not possible to program the attainment of the required M-Day position defined by the war plan and the derived mobilization program within budgetary and personnel ceilings and other limitations. We are then faced with choosing among four logical alternatives: (1) we may attempt to raise or remove the limitations; (2) we may review our planning factors and attempt to develop new methods of operation which will permit us to accomplish our

objectives with reduced amounts of funds, personnel, or other limited items; or failing these, we must (3) revise the war plan objectives, or (4) defer the time by which we seek to attain the required M-Day status.

Under present program planning procedures, the programming of any of these four alternatives would require a great deal of time, so that in practice it has seldom been possible to adopt any of them. The result has been that operating programs and budgets have been developed largely independent of strategic guidance, because such strategic guidance as was available led to requirements which could not be met and it was not possible within the time available to revise war plans and mobilization programs so as to provide effective guidance at a level consistent with peacetime budget limitations.

Under present procedures the complete process of developing a war plan, translating it into a mobilization program and a required M-Day status, and translating this in turn into a peacetime program and budget takes over two years. It is obviously impractical to repeat this process as a basis for revising the detailed composition of the budget estimates when the over-all budget estimate resulting from the original war plan is cut. Yet unless these steps are performed somehow, we can have no assurance that we are accomplishing our basic objectives to the maximum extent possible within our means. Clearly some method of reducing the time required for these planning operations is needed.

Early in 1947 the Air Comptroller's Office undertook a concerted attack on this problem, establishing the Planning Research Division in the Directorate of Program Standards and Cost Control. The work of this Division, now designated as *PROJECT SCOOP* (Scientific Computation of Optimum Programs), was directed to four main problem areas:

- a. The systematic and comprehensive identification and quantitative evaluation of interrelationships among Air Force activities, objectives, and limitations, usually expressed in the form of planning factors;
- b. The development of a system of equations, or "mathematical model" of operations, expressing these interrelationships explicitly in mathematical form;
- c. The development of mathematical computing techniques for the solution of these systems of equations, so as to construct a program which will accomplish our objectives to the

maximum extent possible within external limitations of funds, industrial capacity, *etc*;

- d. The development and construction of high speed electronic computing machines adequate to perform in a few days the computations required for the solution of the equations for a complete Air Force program.

IN the first problem area, the definition and quantitative evaluation of interrelationships, much has been accomplished. Many of these relationships are of course contained in published documents, such as Tables of Organization and Equipment, Tables of Distribution, Tables of Allowances, and replacement factor bulletins. A large proportion of the missing ones have been developed by the Planning Research Division over the last two years, outstanding examples being Air Force Letter 150-10 in the field of peacetime factors and Registered Document WPF-48 in the field of wartime planning factors. Many more factors have been developed and published in a series of Standards Evaluation Branch studies, and others which have been developed are as yet unpublished.

A central problem in all the factor work is to devise a satisfactory method of aggregation. Even with an electronic computer, we can not hope to deal with millions of items; yet we must consider all the items which are or may become limiting factors. We need not consider them individually if we can construct aggregates of items, so that the over-all characteristics of the aggregate can be meaningfully described in relation to the program as a whole. And we must, of course, provide means for translating every such aggregate into item detail when we are ready to develop detailed operating programs.

An outstanding example of an aggregation problem is the computation of budget estimates for procurement and overhaul of supplies and equipment. Formerly this work required about six months of detailed computation after the over-all Air Force program was determined. And before that three to six months were required for preparing the over-all program, so that about a year elapsed after basic program decisions were made before we knew their implications in this major field. This lag has in effect precluded any real consideration of supply and maintenance limitations and capabilities in the prepa-

ration of Air Force programs, since limitations of other factors which could be more readily computed, such as aircraft or personnel, forced program changes at more frequent intervals. This also resulted in a supply and maintenance program which was always out of phase with the rest of the Air Force program.

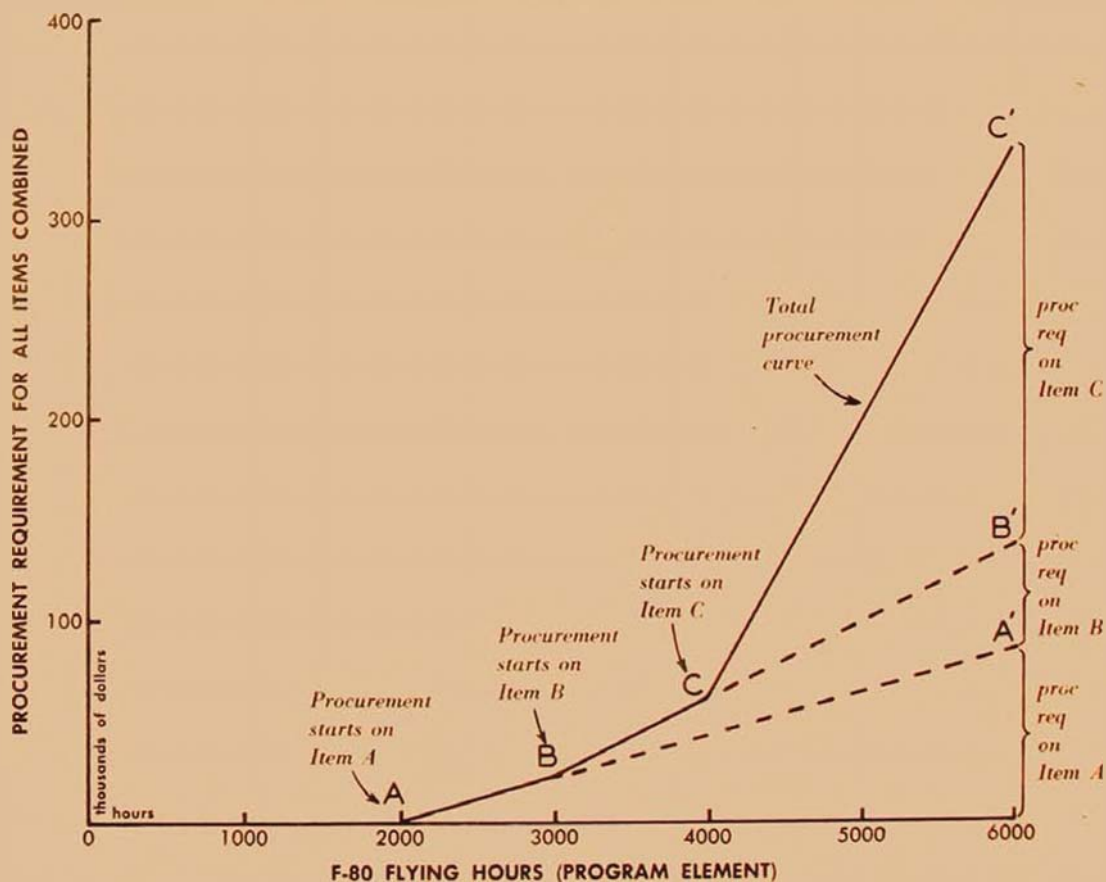
As one phase of PROJECT SCOOP the Planning Research Division recently developed a new procedure which has been successfully employed by Air Materiel Command in overcoming these difficulties. Fundamentally it is simply a technique of aggregation, based on relating the requirement for every item to that particular characteristic of the program which generates the requirement. Although there are hundreds of thousands of items, there were found to be only a little over a hundred major characteristics of the program, or program elements, which generate the requirements for supply items. We therefore do not lose any information in computing requirements if we group the items into aggregates corresponding to the program element to which their consumption is related. This procedure is somewhat similar to procedures which have been proposed and used before which involve computing costs per flying hour, per man-year, *etc.*

Although this type of aggregation results in no loss of information with regard to requirements, it does create problems concerning resources if stock levels of the various items comprising an aggregate are unbalanced, in the sense that the inventories of the different items will support widely differing sizes of programs. If, however, we are able to relate each item to one and only one program characteristic or program element, we may overcome this difficulty by expressing the cost per flying hour or per man-year as a variable function of the size of the program, instead of assuming it constant, as is usually done. Thus we have an increasing cost per unit of program element as the inventories of the various items comprising the aggregate are exhausted. This procedure is illustrated in Chart A for an aggregate of three items. The inventory of each item is expressed in terms of the program level or amount of program which can be sustained entirely from inventory, this value being designated the normalized inventory. Procurement for any item will be required if the program is larger than the normalized inventory of the item. The items are then ranked from the smallest to the largest in terms of this normalized inventory expressed in program units such as flying hours, man-

years, etc. The total procurement requirement for each item is then represented by means of a graph which is zero up to the normalized inventory and increases thereafter at a constant rate of cost equal to the consumption rate multiplied by the unit cost of the item. To obtain the cumulative costs over all items, the graphs for each item are then added, or piled one on top of another, in the order of their normalized inventory. The resulting solid line ABCC', which is the sum or envelope of the graphs for the individual items, gives the total procurement cost for the aggregate group of items. Thus for any program level we can readily read off the required value of procurement.

The cost of overhaul of reparable supply items has also been incorporated into this procedure, so that a curve of manpower requirements for overhaul of supply items is also obtained for each of the aggregates, taking into consideration the amount of reparable inventory, the amount of serviceable inventory, the consumption rate, the wearout rate, (i.e., rate at which items are scrapped), the procurement cost, and the overhaul

**CHART A: PROCUREMENT REQUIREMENTS
FOR NONREPARABLE ITEMS USED ON F-80 AIRCRAFT**

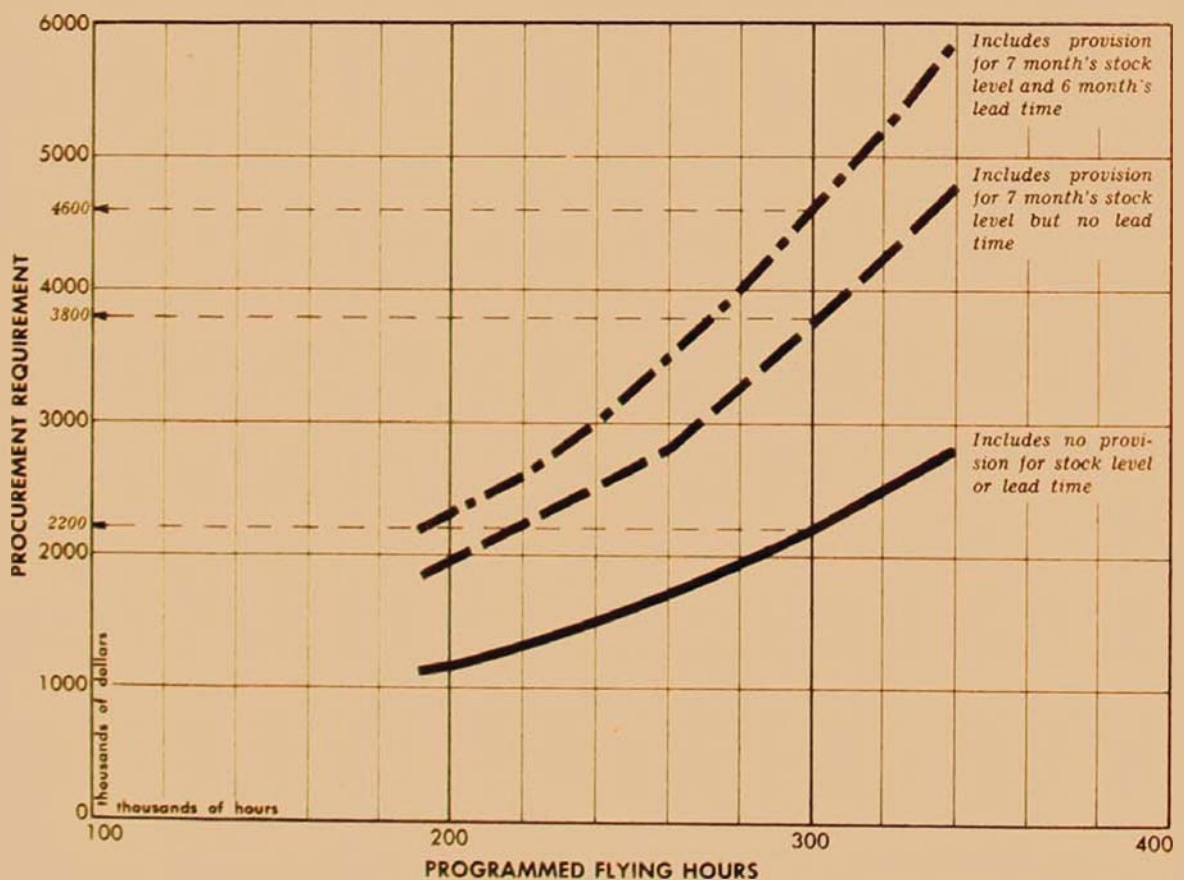


cost for each item. These procedures are now in use, and provided the basis for the preparation of the F.Y. 1951 budget estimates. Their use has not only greatly reduced the time required for supply computations but has permitted the computations to proceed concurrently with the development of program information and make possible rapid and accurate changes in supply requirements to conform to program changes.

These tables have been computed on several different assumptions as to stock level and lead-time (the time elapsed between the placing of an order and delivery of the item) and have been graphed as illustrated in Chart B to provide a basis for top management decisions on program changes when funds are limited. Such charts group together all the procurement requirements related to a given model of aircraft, including engine and common parts, and permit quick evaluation of the relative effects of changes in program and changes in stock level and lead-time policy.

Similar aggregation techniques have been applied to military personnel, permitting reduction of the 700-odd Military Occupational Specialties to about 150 family groups for pur-

CHART B: SUPPLIES AND EQUIPMENT FOR AIRCRAFT, MODEL A



poses of over-all programming. Here the criterion was the amount and kind of training required to produce the various skills, coupled with some consideration of association and interchangeability of skills in use.

THE second major problem area is the construction of a mathematical model of operations expressing all the interrelationships between Air Force activities. These interrelationships arise from the sharing between two or more activities of limited amounts of an item or group of items, such as personnel, equipment, supplies, or funds; from the production by one activity of an item, such as trained personnel or serviceable equipment, which is used by another; or by the production by two or more activities of an item which is used by another activity. These interrelationships must all be evaluated numerically before a mathematical model can be constructed.

The mathematical model of operations stands in the same relationship to a program as an airplane model or a Link trainer does to an airplane. It permits assessing the effects of external forces upon the mechanism; and it permits training operators to run the mechanism, through giving them practice in assessing the results of varying manipulations of the controls. It represents relationships in the form of equations, rather than through mechanical simulation, although consideration has been given to the construction of a physical model in the form of an electrical analog computer. We have decided on mathematical models and digital computers for this work because they seem to provide greater flexibility and capacity for a given cost. Similarly airplane and missile designers have been turning increasingly to mathematical models for use with digital computers as being cheaper, more flexible, and of greater capacity than wind-tunnel models.

The mathematical model consists of a large system of simultaneous equations in which the variables are the quantities of the activities to be performed, the coefficients are the requirements of a unit quantity of each activity for each item, and each equation expresses the sum of the requirements of all activities for an item. There is a set of these equations for each time period, which balances the inventory or status at the beginning of the time period with the consumption or produc-

tion during the time period and the status at the end of the time period.

A simple model of the Berlin Airlift may serve to illustrate these equations and interrelationships. The airlift flying operation itself produces supplies in Berlin; it requires aircrews, aircraft, and runways for its operation; and it consumes funds for gasoline and for pay of personnel. It also uses up part of the aircraft, as a result of crashes and normal wear and tear. These facts are represented by two coefficients for each item, which completely define the activity. These coefficients are called *input* coefficients and *output* coefficients. The input coefficients define the amounts of each item required at the beginning of a unit time period or consumed during the time period to permit unit quantity operation of the activity; the output coefficients define the amounts of each item left over at the end of a unit time period or produced during the time period as a result of unit quantity operation of the activity.

The input coefficient is obtained as the sum of the capital equipment, the attrition, and the consumption, all of which must be on hand at the beginning of the time period. The output coefficient is the sum of the capital equipment and the production per unit of the activity, all of which are available at the end of the time period. The capital equipment comprises items such as real estate, aircraft, and operating personnel which are utilized in carrying out the activity but which remain essentially unchanged at the end of the operation.

The derivation of the input and output coefficients is illustrated in Chart C. The coefficient for the 95,000 tons of supplies

**CHART C: COMPUTATION OF INPUT AND OUTPUT CHARACTERISTICS
FOR ACTIVITY II: "FLYING THE AIRLIFT"**

Unit of activity: 10,000 flights

Unit of time: three months

Items	Unit of measure	Required at beginning of time period			Available at end of time period			
		capital equipment	attrition	con- sumption	total in- put coef- ficient	capital equip- ment	pro- duction	total out- put coef- ficient
Supplies in Berlin	Thousands of tons			-95	-95			
Runways	No. of runways	1			1	1		1
Crew Capacity	No. of crews			134	134			
Aircraft	No. of aircraft	39	5		44	39		39
Money	Millions of dollars			8.7	8.7			

delivered in Berlin is put in the consumption column and given a minus sign, because under the rule just described, the output is considered to be one time unit later than the input, whereas the delivery of supplies by air is a continuous process which involves a negligible time lag. This time lag is the essential distinction between the input and output coefficient.*

Chart D gives the input and output coefficients for each activity within the group of activities supporting the airlift operation. The equations at the bottom of this chart comprise the mathematical model of the airlift operation. The unit "crew capacity" is used as a consumption item rather than "crews" as a capital equipment item because the loss of crews as a result of the operation is not a function primarily of the amount of flying but of the age distribution of the crews in terms of the time they have been flying the airlift. The policy was to retire airlift crews to other jobs after six months of flying the airlift. This is reflected in Activities V and VI and in items 3 and 4 in Chart D. Item 4, "New crews," represents crews which have just started their six-month tour of duty on the airlift; item 3, "experienced crews," represents crews which have completed half of their six-month tour. Of either type 101 will produce 100 units of crew capacity. If experienced crews are used (Activity V) no crews will be left because they are retired from the airlift, whereas 100 experienced crews will remain if new crews are used (Activity VI). New crews for Activity VI must be procured from Training, Activity VIII. In training, an average of 67 new crews acting as instructors will produce 1000 new crews at the end of the three-month period.

To increase the level of activity beyond that which can be supported by the available runways in Berlin, additional runways must be constructed. Construction of additional runways is accomplished by Activity III. To construct one runway, \$1,200,000 must be available and 2000 tons of supplies must be flown into Berlin three months ahead of the desired completion date for the new runway. The coefficient 1 for item 2, Activity II, indicates that each runway can support 10,000 flights in a three-month period; Activity IV disposes of the excess fractional runway capacity, if any.

The upper half of Chart D may be considered as a table of detached coefficients from which the equations shown below it

*It must not be assumed that the distinction between input and output is negligible.—Ed.

CHART D: HYPOTHETICAL MODEL OF BERLIN AIRLIFT

Flow Coefficients of Basic Activities for 3-Month Period¹

Item	Unit of Measurement	Activities										X
		I	II	III	IV	V	VI	VII	VIII	IX		
		Supplying Berlin (per 1,000 tons)	Flying the Airlift (per 10,000 Flights)	Constructing Runways in Berlin (per runway)	Slough-off of Used Runway Capacity (per runway)	Using Experienced Crews (per 100 crews)	Using New Crews (per 100 crews)	Slough-off of Used Crew Capacity (per 100 crews)	Training New Crews (per 100 crews)	Storing of Unused Aircraft (per Aircraft)	Exogenous Supply (t-1)st period	
1. Supplies in Berlin*	Thousands of Tons	1 ²	0	0	0	1	0	1	0	1	0	1
2. Runways in Berlin	Number of Runways	1	-95	2								
3. Experienced Crews	Number of Crews		1	1	1	101	100					
4. New Crews	Number of Crews								67	1000		C ^(t)
5. Crew Capacity*	Number of Crews		134			-100	-100	1				A ^(t-1)
6. Aircraft	Number of Aircraft		44	39					47	43	1	B ^(t-1)
Money	Millions of Dollars		8.7	1.2				.024				
Symbol for Quantity of Activity during t th Time Period												
		$x_1^{(t)} > 0$	$x_2^{(t)} > 0$	$x_3^{(t)} > 0$	$x_4^{(t)} > 0$	$x_5^{(t)} > 0$	$x_6^{(t)} > 0$	$x_7^{(t)} > 0$	$x_8^{(t)} > 0$	$x_9^{(t)} > 0$	$x_{10}^{(t)} > 0$	

¹The figures shown in chart are illustrative only. ²Represents total input (per unit of activity) at the beginning of period; 0 represents output at end of period. However for starred items it is flow during 3-month period, where + sign means flow consumed by the activity and - sign means flow produced by the activity.

Equations Represented by Above Table

$$(1) \quad x_1^{(t)} + 2x_3^{(t)} = 95x_2^{(t)}$$

$$(5) \quad 134x_2^{(t)} + x_7^{(t)} = 100x_5^{(t)} + 100x_6^{(t)}$$

$$(2) \quad x_2^{(t)} + x_4^{(t)} = x_2^{(t-1)} + x_3^{(t-1)} + x_9^{(t-1)}$$

$$(6) \quad 44x_2^{(t)} + 47x_6^{(t)} + x_7^{(t)} = 39x_2^{(t-1)} + 43x_8^{(t-1)} + x_9^{(t-1)} + A^{(t-1)}$$

$$(3) \quad 101x_3^{(t)} = 100x_4^{(t-1)}$$

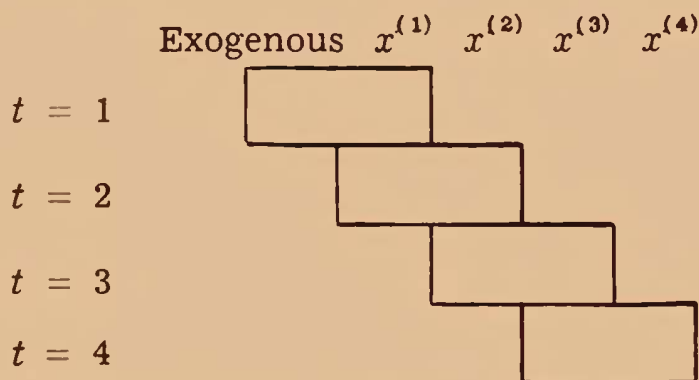
$$(7) \quad 8.7x_2^{(t)} + 1.2x_3^{(t)} + .024x_7^{(t)} + 2.9x_8^{(t)} = B^{(t-1)}$$

can be derived. The basic rule is to multiply the output of each activity per unit of activity times the level of the activity in a given time period and sum for each equipment item. This gives the total available as inputs for the next time period: accordingly each sum is equated to the corresponding sum of input coefficients times the levels of activity for the next time period.

Equation No. 1 states that the tonnage supplied to Berlin $x_1^{(t)}$ in any period equals the amount shipped in, $95x_2^{(t)}$, less the amount used to construct new runways $2x_3^{(t)}$. It should be noted that all output coefficients for this item are zero; hence no activity level for the previous period appears in this equation.

Equation No. 2 states that the runways available for use in the t^{th} period, $x_2^{(t)} + x_4^{(t)}$ are equal to the amount in use in the $t-1^{\text{st}}$ period, $x_2^{(t-1)} + x_4^{(t-1)}$ plus the amount constructed $x_3^{(t-1)}$.

Each of these equations relates the activities of one time period to the activities of the preceding time period. The activities of the first time period are related to the initial inventories of items on hand through the exogenous or specified activities. If the program being constructed is to cover several time periods, there will be as many sets of these equations as there are time periods. If we represent a single set of these equations by a rectangle then we may represent the complete set of equations for a program of four time periods as follows:



These sets of equations are characteristically rectangular, as is the complete set derived by putting together the sets for the several time periods comprising a complete program; that is, there are more activities than there are items. Remember that the variables in the equations are the levels or magnitudes of the various activities and that there is one equation for each item. This corresponds to the obvious fact that, given certain

quantities of various items, there are usually many different sets of actions which can be performed, completely using these items. To arrive at a solution, we must introduce some criterion or objective function for choosing among the many possible solutions. Crude examples of this might be to maximize the tons of bombs on the target, or to minimize the cost of dropping a given quantity of bombs on the target, or, in the airlift example, to maximize the tonnage flown into Berlin.

MATHEMATICAL procedures for solution of such indeterminate systems have been developed, but they involve making many millions of multiplications to solve even a small program problem. To meet this requirement, large-scale digital electronic computers are being procured which will have the requisite computing capacity. Development and construction of these machines is being conducted for the Air Force by the National Bureau of Standards, which is handling electronic computer development for a number of Government agencies.

Two machines are presently under construction. The first, called the Interim Computer, is being built in the laboratories of the National Bureau of Standards and is expected to be operating this spring. It will be capable of performing about 500 multiplications per second. Like all existing large-scale computers, it will be restricted in its capacity to perform our type of problem by the mechanical equipment which feeds in the basic data and feeds out the answer, in this case teletype tape and magnetic wire. Work is under way to produce supplementary equipment for handling magnetic tape at high speed, thus increasing its capacity for our work.

A second machine, the Univac, being built by a private contractor and expected to be completed during 1951, will have a multiplication speed of about 1000 numbers per second and will be able to read data from and write answers on magnetic tapes at about the same speed. A high-speed printer capable of printing about 100 lines per second on film is now under construction to meet the high-speed output requirements.

In our research and development program for Fiscal Years 1950 and 1951 we have provided for development and construction of a super-speed systematic computer capable of performing 5000 to 10,000 multiplications per second and for auxiliary

equipment to facilitate its use in programming computations and in routine statistical tabulation work.

In the meantime, pending availability of large-scale electronic computers, we have tried to find ways of improving our programming procedures with available equipment. Computational procedures have been developed and tested, utilizing available card-punch equipment, which make possible the computation of a complete mobilization program and the determination of the required M-Day position in a few weeks, starting from a war plan. These techniques are now being put to practical use in computing mobilization programs.

This interim procedure for computing programs has been based on the systematization of the long-used staff procedure. As in the normal staff procedure, we have arranged the work in a series of stages: in the first stage we compute the item requirements of the specified activities (chiefly combat activities); in the second step we compute the item requirements of those supporting activities, such as combat crew training, whose output is principally utilized by the specified activities; in the third step we compute the requirements of those supporting activities whose output is principally utilized by the specified activities and by the activities whose requirements were computed in the second step; and so on. The result is a straight-forward computing procedure, readily adaptable to machine computation. We have already computed several small mobilization programs by this procedure.

WE are now adapting this business-machine procedure to use in the "feasibility testing" of war plans. However a feasibility test of a war plan, in the strict sense, is possible only if the M-Day position is completely defined. This may be almost true for a short-range or emergency war plan, in which the M-Day position is assumed to be the actual position of the date the plan is prepared. In peacetime program planning, however, we are concerned with the use of intermediate-range war plans to provide a statement of peacetime program objectives, through determination of the action necessary in peacetime to ensure the feasibility of the war plan. This determination is made in two stages: first, the determination of the (war-time) mobilization program and the M-Day position which must be attained in peacetime in order to make the war plan

feasible; and second, the action necessary in peacetime to attain the required M-Day position from the present status.

This M-Day status is defined in terms of the production rates and inventories of various items on hand on M-Day. The word "item" is here used to include supplies, equipment, installations, personnel, or organizations. The quantity of an item on hand in initial inventory at any date includes quantities in use, in the pipeline, in stock, and held in storage or in the reserve forces or as a war reserve. The quantity on hand on M-Day is the quantity on hand at present (less depreciation, obsolescence, or attrition) plus the quantity produced between now and M-Day from production. Since the present quantity on hand is known, the determination of the quantity to be on hand on M-Day thus determines the unknown quantity to be produced between now and M-Day.

The quantity of an item needed in inventory on M-Day must be at least adequate to meet the requirements of the operations to be undertaken immediately after M-Day. If it is possible to operate the factories or training centers producing the item after M-Day at a rate equal to the post-M-Day requirements, the M-Day inventory need only provide the requirements for operations to be undertaken within a period after M-Day equal to the production and distribution pipeline.

In most types of production activities, however, pilot training, aircraft production, or gasoline refining, for example, there are inherent limitations to the maximum rates of expansion which can be attained. Extensive analysis of World War II experience, together with industrial planning studies made since the war, have revealed that most industries or activities can expand at approximately a geometric rate from the rate of production in effect on M-Day, after a time lag of varying length. For example, the pilot training establishment might double its rate of output every five months, after a lag of about 10 months after M-Day. Similarly the aircraft industry might double its output every eight months, after a lag of perhaps a year. This type of relationship seems to hold equally well for many smaller components, such as production of landing-gear struts, propellers, and engines.

Thus the extent to which post-M-Day requirements for an item can be met from production after M-Day depends on the production rate on M-Day. Since the maximum cumulative production at any point in time is approximately the sum of a

geometric series, the total cumulative amount which can be produced by any date after M-Day is directly proportional to the M-Day production rate. The principal problem of peacetime program planning is to schedule peacetime production and training activities so that the quantity of each item on hand on M-Day, plus the cumulative amounts available from maximum expansion of the production activity from the rate in effect on M-Day, will just meet the cumulative post-M-Day requirements generated by the war plan.

In some areas, principally training, the limiting production rates which largely govern our wartime capabilities are within the military establishment. In other areas, such as aircraft or engine production, the activity is a part of the civilian economy, but indirectly under our control through our procurement programs. In still other areas, such as steel and aluminum production, electric power generation, or railroad transportation, the industries concerned are producing primarily for civilian consumption in peacetime and are not even indirectly under our control. Yet we must somehow make provision for bridging the gap between production capabilities and wartime production requirements, either through industry preparedness measures or through stockpiling, or revise our plans to reflect these limitations. These activities may impose major restrictions on our program, which must be considered in any program-computing procedure.

Many of the areas where bottlenecks may occur are in the industries which are not producing directly for military demand, such as railroad transportation and electric power. The indirect effect of military procurement programs on such industries is not commonly appreciated.

To reflect such limitations properly in our planning, and also limitations of manpower which may be even more important if war should commence in a period of full employment, a detailed examination of the interrelationships between the industries in the economy of the country is required. These can be formulated into a mathematical model similar to the model we are building for our internal program planning operations.

We have attempted to initiate, concurrently with work on the Air Force model, the development of a similar mathematical model of the economy of the country to facilitate the rapid evaluation of industrial feasibility of military programs. Initial work on some of the coefficients for this model is being under-

taken by the Bureau of Labor Statistics of the Department of Labor under a grant of funds from the National Security Resources Board. The work being done by the Bureau of Labor Statistics is on a model which is essentially a static or equilibrium model, without any time dimension. We have sponsored basic research on problems of developing dynamic models of the economy through a contract with Harvard University. Extensive further work in this area, especially in the field of military and industrial manpower requirements in relation to national manpower resources, has been strongly recommended by the Research and Development Board to the military departments. Primary responsibility for coordinating this research has been allocated to the Air Force on behalf of the Department of Defense by the Research and Development Board, and an extensive research program in this area is planned in Fiscal Years 1950 and 1951.

Obviously, successful utilization of these techniques will require the development of integrated programs by all three military departments, since it would be of little use to evaluate merely the Air Force requirements against total national capabilities. An urgent need exists therefore for development by the Departments of the Army and Navy of comparable mathematical models of their operations which can be integrated with those that the Air Force has been developing for its own operations and for the civilian economy.

Headquarters, United States Air Force

Just as Great Britain from her insular position and long dependence on the sea became a sea-minded nation, and a great sea power, so must we become a great air-minded nation, and develop air power to protect us. When our American poetry sings of the air, as English poetry sings of the sea; when the uniform of the airman is a familiar sight throughout our land; when the terminology of flight becomes familiar to all of us, and part of our speech, then we will have become a great, air-minded nation, conscious of our role of leadership in the modern world. Then truly will our air power be a great force, for preserving the security of our nation, and for giving to the world the kind of peace that will endure.

—Lt. Gen. Edwin William Rawlings,

Address, 18 June 1949

In My Opinion . . .

THE BALANCE IN OUR ARMED FORCES

LATELY A NUMBER OF SPEAKERS AND WRITERS have been working on the theme that our armed forces must be kept in balance. Now balance has a variety of connotations. The trapeze artist mincing his way across a wire stretched high above our heads is maintaining his balance; the housewife mixing definite amounts of flour, eggs, sugar, milk, shortening, and baking powder to produce a cake is holding to the balance of ingredients established by the recipe. And if she feels that she needs a bigger cake and puts in twice as much flour, she must double the number of eggs used and similarly increase twofold the other substances. Too many liken our military establishment to a cake mixture; they feel that some recipe or ratio has been set forth for the Army, Navy, and Air Force and that it should be as inviolable as the chemical formula H_2SO_4 . If we have 400,000 men in the Air Force, we must have 500,000 men in the Navy and Marines and 600,000 men in the Army. A recommendation for an increase in immediately effective air power is hastily countered with the note that the land and sea forces must be increased by a like proportion to maintain this sacred balance. Such a concept can be destructive to our national economy or obstructive to a sound security.

This balance is not a frozen standard; it is not a mathematical formula. For as old weapons are improved, new weapons invented, and different techniques developed, the strategy and tactics that are molded around such elements must change. Unless there is this adaptation of strategy and tactics to new capabilities, a nation becomes like France, who wedded herself to the position warfare of World War I and froze her military planning on the impenetrability of an immobile Maginot Line, ignoring the mobility of the tank and plane. This was a mistake that committed her to defeat in World War II even before

The views expressed under the heading of In My Opinion . . . are not the official views of the Department of the Air Force or of the Air University.

battle had been joined, an error that could not be overcome by the bravery and blood of any number of poilus.

There is a true concept of balance for the armed services: each one, land, sea, and air, must be of sufficient size and strength to carry out its assignment of primary missions and missions in support of the other services in the light of current strategy. This should be the sole determinant. The mere size of the other two services should have absolutely no weight in deciding how large the third service should be. The amount of money appropriated for one has no validity in itself as an argument for increasing the funds allotted to another.

Since the findings of the Finletter Commission were published in 1947 as "Survival in the Air Age," this country and most of its officials have been vocally aware of the significance of air power as the *sine qua non* of victory in modern warfare. Yet in tailoring our aviation force according to the pattern of effectiveness cut by our nation's experts to fit a specific potential enemy, we have been constantly beset by the objection that such strength in air would require more of an increase in our ground and sea forces than our economy could stand. After all, the other services must support aviation.

The burden of support is not increased automatically. To decide intelligently whether or not and how much the fleet and the army must be enlarged to care for an expansion of aerial force, many factors would have to be considered. Among the most important: How many new bases would have to be activated or how many former ones reactivated? Obviously if some or all of the additional planes and men were to be stationed at fields already in use, the support function would be much less than if they were to be assigned to several added bases. Where, globally, would the increased air strength be located? In the continental United States? On the Japanese mainland? The greater the complement abroad and the greater the distance from the United States involved, the greater the logistical burden on our sea forces. But, note, this increased demand on the other services could vary all the way from relatively little if all the groups were committed to already active bases on our mainland to a considerable amount if all were stationed at points very distant from the United States. Again, would the increase be in fighter, bombardment, or transport power? One type requires a different amount of sustaining effort than another. Are the land and sea forces presently organized in the

light of current strategy to provide the maximum support of which they are capable?

Balance can not be predicted merely upon quantity of men and materiel; the interrelationship of the services depends equally as much on quality, type, and location of these elements. It is not possible to establish a set formula that can be readily applied to a decrease or increase in one service to give us the answer as to how much to decrease or increase the other two services.

And certainly we must not forget that all strategy is heavily dependent upon a factor outside the military scope of determination, our international political program. All over the world political questions face our nation. What do we wish to be the end result in Formosa? What shall we do to effect this? Are we to ignore the crises seething in the countries of the Far East? Shall we support any particular party in China? How far do we wish to roll back the Iron Curtain? On the answers to each of these questions and to several here unasked must be planned our military strategy. These answers determine where we should have troops of the Army, ships of the Navy, and planes of the Air Force. The answers decide what we need, how much we need, and where we need it. Our international objectives, commitments, and obligations are a strong determinant—actually a basic one—of what comprises a balance of the armed services.

But another element has become dominant in the picture. It is no longer a question merely of what we would like. We must now consider what we can afford. The military budget of luxury must more and more give way to the budget of closely calculated need. It is probable that a greatly expanded military might could be maintained under a system of rigidly applied economic controls, in an atmosphere in which freedom, the dearest attribute of our form of government, might wither and die. But to sustain democracy and not administer to it a killing cure, the military program must not stifle the social and industrial progress essential to the political health of this nation. The portion of its wealth which this country can continue to devote to armed protection without suffering the psychological and material attrition for which our enemies hope is limited.

With a limited budget we must more than ever before be like the wise housewife shopping prudently, seeking the most

nourishment according to a planned diet for the least expenditure of money. Specifically we must build our armed forces along the lines most apt to deter a definite would-be assailant and most capable of a mighty retaliatory blow if we should be assaulted. So we must analyze the character of the potential enemy. Is it a country contiguous to ours? Then armored cavalry and infantry supported by attack aircraft might be the best purchase. Is it an island nation dependent upon imports for existence? Then our buying might stress an underseas fleet capable of blockade. Is it a great continental land mass, richer than we in raw manpower, with a land route to all its important sources of material? Then the intercontinental bomber should receive paramount consideration.

Balance among the military forces, therefore, is not to be determined according to a static formula. The ratio of soldiers to sailors to airmen is not an unchanging equation. The amount of money allotted to one service is not a positive factor to be considered in settling upon a budget for the other two services.

What are the military requirements for carrying out the international political program of the United States? Negatively, a force of what type and size is most apt to dissuade the potential enemy from waging war upon us? Affirmatively, what troops are necessary for ground control; what vessels are needed for supply and for guarding the sea approaches; what planes are necessary for a Berlin Airlift, to strengthen the resolves of our friends, or to weaken the purposes of our foes? And with deep concern for the economy of the nation what weapon adequate to meet the present particular threat is the least expensive? These are some of the fundamental questions that must be answered, basic factors that must be added—answers and figures that are changed by the progress of research and development and international politics—to arrive at a balanced national military establishment.

Headquarters, United States Air Force Maj. John J. Daunt, Jr.

Airman's Reading

Global Mission, by General H. H. Arnold (Harper, 615 pp., \$5)

Reviewed by

Lieutenant General Ira C. Eaker, USAF (Ret.) *

DURING THE PAST SEVERAL WEEKS I have read with peculiar interest several brief reviews by critics of General Arnold's late book, *Global Mission*. More than ninety per cent of such criticisms have been laudatory. The unfriendly critics have attacked *Global Mission* with the bludgeon: "The book is not history, and it is not literature."

Global Mission is not history, perhaps. Certainly it bears no relation to the type of historical writing so ably exemplified by Dr. Freeman in "Lee's Lieutenants" or works of that character. The student of historical writing will at once note that whereas the average historical treatise is carefully annotated with voluminous footnotes showing source material, *Global Mission* has no footnotes and no reference to source material.

It may be harsh, but none the less true, to say that *Global Mission* is not literature in the normally accepted sense of the term. Certainly its sentence structure and style bear no resemblance to the writings of Charles Beard or Woodrow Wilson, or of other eminent historians in modern times. The thing that the unfriendly critics overlooked is the fact that *Global Mission* was written by a soldier and not by a schoolman. They further forgot that no schoolman could have written such a book. No scholar would have been in a position in the Pentagon or at Yalta or on the far-flung battle fronts to have seen and heard the momentous events General Arnold recounts in *Global Mission*.

***Author's Note:** I plead guilty to being an Arnold partisan. I hope, however, that I can follow diligently the excellent example which General Arnold has set in *Global Mission*. His book is remarkably free from bias, animus, or special pleading. It seems to me that he has recounted the historic events the book contains without the color of his own position and special interest in the decisions which were made and the results which followed.

If Napoleon had told us in his own words about his retreat from Russia, if General Lee had written the story of his part in the Civil War, probably neither of these documents would have been literature. Neither would they have been history. They would simply have been the personal accounts of great actors in great dramas. Like *Global Mission* they would be invaluable historical sources and would bear the inimitable stamp of great actors on a tragic stage. It has always seemed to me that the best approach to anything is from the constructive rather than the destructive point of view. If *Global Mission* is not history and is not literature, then what is it? What will the reader find of interest and value in the Arnold story?

The first quarter of the book is a most interesting account of the young officer who graduated from West Point in 1907, an individual who suffered a keen disappointment because he was not assigned to the Cavalry. It takes this young frustrated cavalry lieutenant through service in the Philippines and then to the first flying field in the world, where the first men who flew taught him the art of flying as it was known at that early time.

There is much in these early chapters which the student of aviation will not have discovered in any of the other volumes on the early days in aviation. It relates incidents, illuminating and enlightening incidents, which were only known to Lieutenant Arnold and have been recited by no one else.

There is the story of aviation in the First World War, which I think is better told in *Global Mission* than I have ever seen it anywhere else. Certainly it is entertainingly written, this brief resume of that hectic period when aviation moved from puny adolescence to husky young manhood.

General Arnold's discussion and description of the bleak days following the first World War, and particularly his thrilling and searching analysis of the Mitchell saga, is worth the price of the book many times and will repay the time and effort spent in reading this volume.

Unfortunately the most controversial episode in American military history since the days of General Custer surrounded the brilliant and ill-starred genius, General William Mitchell. General Arnold's character portrayal of Mitchell, I feel certain, is the most accurate portrayal of the man which has been drawn to date. To me it is remarkable that General Arnold could have written about Mitchell and his trial with such free-

dom from animus. No one who knows the story will deny that General Mitchell himself picked Major Arnold as his number-one lieutenant. No one had a better opportunity to know General Mitchell's character, his method, his purpose, and the innermost workings of his heart and mind than his favorite torchbearer, Hap Arnold.

Every student of military history who wants to get a true and accurate account of the Mitchell drama must read *Global Mission*.

It will seem to the reader of *Global Mission*, during the first few nights of his reading, that the title is a misnomer. He will have perused more than 250 pages before he comes to the Second World War, which the title would lead one to believe was the subject matter of the book. But the reader will not be disappointed, for he will be entertained all the way.

The next distinct period in the book discusses the most tremendous logistic operation in all the annals of military history—the build-up of the arsenal of democracy. I well remember sitting by the radio one day in the old Munitions building with a group from General Arnold's staff, listening to the much-anticipated address of the President of the United States in which he announced that we must build 50,000 airplanes the first year. It struck all of us, I am sure, who were familiar with the fact that the total aircraft industry in the United States had produced less than 1000 planes the previous year that it was the wild dream of a madman to believe our industry could expand for the construction of 50,000 planes during the first year of the emergency. I remember, however, as though it were only yesterday, that upon seeing the gleam in General Arnold's eye when the President declared for the 50,000 planes, as contrasted with the consternation on the faces of the members of his staff, the realization came to me that Mr. Roosevelt got his figure of 50,000 from the inimitable imagination of H. H. Arnold. I am sure there was no other airman in the United States who would have had the boldness to suggest that figure to the Commander-in-Chief.

The method by which the military air strength of the United States was increased more than 1000 times in less than three years is revealed in *Global Mission*, but it is revealed without tedium and minus the dry recitation of figures. It is interlarded with many interesting anecdotes which give spice to the

story and reveal better than biography the personality and character of the narrator.

In this the second phase of the book, the logistic period, come also the stories of our high-level cooperation with the Allies. There is the description of the brief visit to England in the days of the Battle of Britain. It is by long odds the most interesting and yet the briefest report on a tour of wartime England I have seen.

Sprinkled through the build-up period in *Global Mission*, there are wonderful thumbnail biographies and personal interest sketches of the principal actors in the principal drama of modern times. General Arnold's description of his discussions with Mr. Churchill, with Mr. Roosevelt, and his fellow members of the Joint and Combined Chiefs of Staff are invaluable as historical references and most entertaining; they are significant postscripts for posterity.

For the first time, in *Global Mission*, one can learn who originated the idea of the Doolittle Tokyo raid, what MacArthur thought of the air effort in the Philippines at the time of the Japanese onslaught, and about many another enticing historical event of which there has been much speculation.

The notes which General Arnold took at the defense meetings called by the Commander-in-Chief immediately following Pearl Harbor are outlined in *Global Mission*. Certainly to date no one has reported these thrilling events with such accuracy and detail. Probably no one ever will, since, as General Arnold pointed out, he was the only one present who was taking notes.

I found General Arnold's pungent pen sketches of his associates in World War II entertaining, indeed. He gives us frankly and clearly his impressions and evaluation of Mr. Churchill, Mr. Roosevelt, Harry Hopkins, Bernard Baruch, Bill Knudsen, Mr. Morgenthau, General Marshall, General MacArthur, Robert Lovett, Air Chief Marshal Portal, Admiral King, Chiang Kai-shek, and many another famous name.

The second phase of *Global Mission*, the preparation for World War II, the readying of the American arsenal, will for many be its best part. Less is known publicly and less has been written about this phase of the greatest national operation of all time. General Arnold gives us a radar view of this darkened picture of the target.

The third phase of *Global Mission* concerns the far-flung air theaters. It indicates how the commanders were selected. It

outlines their missions. It extols their virtues and does not spare their weaknesses. General Arnold's descriptions of his visits to our air forces on every continent and in every theater of war clarifies much that has been confused in the so-called big picture.

Obviously *Global Mission* is not the place to find a detailed account of the operations of the Eighth Air Force in England, nor of the air operations in support of the invasion of Europe, nor of the detailed air operations against the Japs. But it is safe to say that some of the most significant phases of these tremendous operations will not be found elsewhere with such clarity and frankness as in *Global Mission*.

General Arnold gives us a glimpse of the initiation and build-up of the Air Transport Command, of the air operations over the Hump, the preview for the Berlin Airlift, and of many another auxiliary but none the less necessary phase and feature of the world-wide air war.

The final chapters in this, the third phase of *Global Mission*, deal with the air preparation and air operation in the air war against the Japanese. Here again he has revealed for the first time some of the travail in the inner councils. He tells us of the difficulty in obtaining the cooperation of the Russians. He outlines the problem of unity of command in the Pacific, and he points up the differences between the Army, Navy, and Air Force in Pacific strategy.

The final and very brief phase in *Global Mission* discusses the great events after Hiroshima and Nagasaki, the broken dreams at Potsdam, and the task of dismantling and destroying the greatest air force which the world has ever seen.

There are many groups of people who will profit by a careful reading of *Global Mission*. As General Bradley well said in a recent letter to me, "It is 'must' reading for the young military men of today who will have to be the Marshalls and Arnolds and Kings in any future emergency."

The thinking people of the United States will make wiser decisions in the selection of their leaders, both military and civil, if they have read *Global Mission*. They will understand more clearly the frightful errors which have been made in the past and their cost in blood and treasure.

The men who control the press and radio and the other media for influencing public opinion, may well read *Global Mission* to learn of their great influence on military decision in

event of war. They will see therein where self-styled experts caused tragedy and forced unsound decisions.

Any who are tempted to be pacifists or isolationists in the future had better read *Global Mission* to learn the implications which can flow from false doctrines.

The historian who has the difficult job of painting the true picture of the Second World War needs to read *Global Mission* for background. Here alone will he find some of the missing pieces in his puzzle.

Those who read *Global Mission* will be in two large groups. One group, who did not know General Arnold, his character and personality, will be surprised at the stature of the man. They will not have realized that one man could have been a compound of such tremendous imagination and such unequalled executive capacity. Each or either of these characteristics have been epitomized previously in great soldiers, but seldom if ever have these two divergent mental aspects been combined in such proportion in one man.

The other group, those who have known General Arnold during the past thirty years intimately and well, will have confirmed by his own modest story the many facets and remarkable strengths and weaknesses of his character. One of his harassed staff officers once complained, "The Old Man plays entirely by ear." He continued to play by ear during the five most difficult years of his life, in the build-up and execution of the air phase of World War II. He played by ear in writing *Global Mission*. The fact that there is so little discord in these great operas but confirms the genius of the man.

Global Mission is but a sketch book. It is a sketch of the early life of General Mitchell's greatest disciple. It is a sketch of the birth of American aviation. It is a sketch of the high lights of the drama in World War II.

The readers of *Global Mission* will be exasperated, as I was at times, at the brevity with which the author has dealt with the most significant historical events. He knew intimately the Wright brothers. They taught him to fly. I would like to have read chapters about that and them. He sat in many conferences with the mental and military giants of his time. I would like to have heard more of their controversies and much more about the persons who shaped the destinies of our generation.

As one who sat on occasion around the Chief's council fires, I know he could have told more that would have edified and

interested us about the great events he saw. He seemed reticent and almost stolid at times in discussing some of the most burning questions of that white-hot era, the years from 1939 to 1945.

Perhaps he will write again. He should. We should urge him to do it. There is much more to be told before air history is complete, and only with the complete history of the past can we plan soundly a logical course for the future.

Whether *Global Mission* be but the preface to the Arnold Saga, or unhappily the final chapter, this much is certain: by any yardstick, it is worthy reading for any American.*

Culver City, California

Modern Arms and Free Men, by Dr. Vannevar Bush (Simon & Schuster, \$3.50), pp. 273

Reviewed by
Colonel Grover C. Brown

VANNEVAR BUSH has received wide acclaim as a physical scientist and has earned the nation's gratitude and respect for his distinguished public service. He was the war-time Chief of the Office of Research and Development and the first postwar chairman of the Research and Development Board. Since his retirement from this last full-time public position, he has continued to demonstrate his interest in public affairs by serving, when called, in important advisory positions. His voice is often raised through the press and periodicals in public discussions of problems of atomic energy and other critical national issues.

Modern Arms and Free Men is the expression of his sober reflections and reasoned judgments upon the large affairs of the nation and the world. He proclaims his faith in the democratic tradition, his passionate devotion to freedom, his belief in the dignity of man, his absolute rejection of totalitarianism, and his vision of the potential good in the relationship between science and democracy.

The book is a development of the "evidence" Dr. Bush refers to in an early statement of the direction of his thoughts. He

General Eaker's review was written and delivered to the *Quarterly Review* several weeks before the death of General Arnold.—Ed.

says: "I have evidence that supports the two chief conclusions of this book. I believe, first, that the technological future is far less dreadful and frightening than many of us have been led to believe, and that the hopeful aspects of modern applied science outweigh by a heavy margin its threat to our civilization. I believe, second, that the democratic process is itself an asset with which, if we can find the enthusiasm and skill to use it and the faith to make it strong, we can build a world in which all men can live in prosperity and peace."

As a point of departure Dr. Bush raises in the beginning a number of the perplexing questions of our times. From the central question "Will the coming generation of our youth have to fight in another desperate war?" he breaks out others: "Is it true that a new all-out war, with atom bombs and biological warfare, would destroy civilization and drive us back to the dark ages? Is the case so desperate that a prophylactic war is justified in order to meet the inevitable at our own time and on our own terms? Can a democratic regime develop great military strength without distorting its true nature?"

Dr. Bush briefly points out the revolution in modern warfare and our between-wars somnolence. He then devotes roughly half of the book to an examination, generously interlarded with bold and sweeping evaluations, opinions, and conclusions, of the technical aspects of modern war. The technical story is developed through separate chapters on land, sea, and air warfare and others on submarines, guided missiles, atomic bombs, and biological agents.

Several succeeding chapters establish the nature of the Cold War and Communism and sharply define the Communist threat to our free society. This portion is superbly done, a lucid drawing of the ideological lines that divide the world today. Dr. Bush's discussion of totalitarianism paints a strong picture of its stultifying effects upon a nation. His description of democracy in action is a stirring account of the democratic process that points out our strengths and weaknesses, shows the major current threats, and challenges everyone to assume his responsibility as a citizen. But his enthusiasm for and faith in the democratic way weakens both of these accounts. His positive opinions about the deadly effects of dictatorships upon scientific progress may not be supportable from experience, and his beliefs about present democratic political life are idealistic, if not uninformed.

Dr. Bush uses for over-all consideration the technical, political, philosophical, and reasoned "evidence" presented throughout the book to support his critical appraisal of the education and planning problems.

Because of the eminence of the author and because it is a fine, thought-provoking book chock full of information and ideas, *Modern Arms and Free Men* will be widely read among the well-informed civilian population. But the information and arguments on the technology and strategy of modern war are of such a nature and complexity that frequent misconceptions and misquotations are likely to arise. Airmen should make an especial effort to read it.

Some difficulty of understanding and some misconceptions may occur in connection with the discussions of air warfare and total war. First, the discussions are poorly organized for the presentation of the time phasing of new developments. In one paragraph present weapons are seemingly pitted against weapons that are years in the offing. Secondly, the first reading is not likely to indicate that the potential developments discussed are, in most instances, ten or more years in the future. In the opinion of this reviewer, the offense in warfare, contrary to the first impression gained from vagueness of the "evidence," may increase in power over a long period before a decline in favor of the defense occurs. Third, early discussions of the relative powers of the offense and defense are discussed as between "two alert and fully prepared enemies." It is not until much later that the gigantic task of "full preparation" against airborne atomic attack is acknowledged. Even then the discussion is directed toward answering the question of the possible devastation of civilization by actual weapons. Fourth, the discussions of two technologies pitted one against the other give little recognition to the people involved. Scant attention is given to the factors of systems operation and strategy. Fifth, arguments pro and con about several concepts of strategy and tactics that have long been abandoned by the Air Force may give the erroneous impression that these concepts are still current with us. For example, "They may well have made mass bombing at moderate altitudes against a fully prepared and alert enemy obsolete." And, "Would great fleets of bombers carrying TNT, or its improved relative, RDX, blast us down?" And again, "It is now conceived that great fleets of bombers and fighters would fly and some in the group would have atom-

ic bombs." The term "great fleets" was established early in the book in connection with World War II operations. Sixth, the writer, as is the habit with many men of strong convictions and implicit belief in themselves, has a tendency to state his opinion of debatable issues as if they were currently and widely accepted.

Last, the book is written for the public in an effort to share with them the author's faith and confidence and beliefs. When discussing total war, the author states the problem of main concern as "Whether a future all-out war would be so devastating as to set back radically the clock of civilization." He concludes that the answer is negative. This question must be borne in mind as one reads all the "evidence." Airmen will do well to reflect that weapons systems may defeat this nation or gain a victory for us without the complete devastation envisaged.

Whether or not one agrees with some of Dr. Bush's conclusions, the book is valuable for its well-reasoned exposure of many of the factors bearing on the fundamental problems facing military men today.

Air War College

The Eagle in the Egg, by Oliver La Farge (Houghton Mifflin, \$3.50), pp. 320

Reviewed by
Capt. Raymond L. Towne

EVEN as the Air Transport Command, Oliver La Farge set himself to the task of the almost impossible, then accomplished it. To cram a running history of the ATC into one volume, together with several specific examples of its achievements, blend it together with warm and human reporting, then salt it all down with touches of wartime humor from the far corners of the world in which ATC operated is a task of no small magnitude. How well he has succeeded is, in effect, the measure of the man himself.

I would have liked to see more of the many examples of ATC experience, hard-earned experience, that were directly projected into the planning and operation of the Berlin Airlift, but perhaps that operation is a story in itself and will need a separate telling. However, without that wartime experience, and an

organization in being to retain that nucleus of men and hard-won know-how, I wonder if the Airlift to Berlin would have been seriously attempted or, once started, could have continued to success.

At times Mr. La Farge seems to be on the defensive in his repeated tries at explaining the unorthodox organization and *modus operandi* of the much discussed and equally much cussed ATC. He need not be. The ATC developed as it did out of prime necessity when the chips were down, and its basic organizational and operational principles are, I think, accepted today in all pertinent military planning.

Regarding the present Air Force-Navy integration in the Military Air Transport Service, I would like to point to the teamwork on the Berlin Airlift and, more important, to day-to-day routine operations on the scheduled air routes of MATS. I would also like to remind Mr. La Farge that first things are coming first and that each day's work brings us closer to the ideal.

After delineating with considerable accuracy the high aims and farsighted thinking of the ATC and its leaders, Mr. La Farge lets us down with a distinct thud in his statement, "Surface transport must, as always, carry the great bulk of men and equipment, but aircraft could do a great part" (page 265). I think the record of the Berlin Airlift, established with obsolescent aircraft, of 1,589,567 tons airlifted in ten and one-half months of operating to keep alive a city of two and one-half million, proves beyond reasonable doubt the practical possibilities of mass air transport.

As a matter of fact, the Commanding General of the Combined Airlift Task Force had stated that the operation of a comparable airlift to any part of the world, given the trained men and proper equipment, is entirely feasible; from Kansas City to the North Pole or from Fort Benning to the middle of the Sahara Desert would not, according to General Tunner, appear to be beyond the capabilities of the Air Force.

But these are relatively minor points and should not detract from what, considered over-all, is an excellent and very readable story of the most versatile of the wartime Air Force commands. *The Eagle in the Egg* should, I think, easily find its place on the airman's list of not only required but preferred reading. The average potential air staff officer and military planner also should find much in it to give him a clearer con-

ception of the fascinating history, the problems, and most important, the tremendous possibilities of air logistics.

Headquarters, Military Air Transport Service

Bombing and Strategy, by Admiral Sir Gerald Dickens (Sampson, Low, Marsten & Co. Ltd., 90 pp.) and Strategic Air Power, by Stefan T. Possony (Infantry Journal Press, 313 pp.)

Reviewed by
Colonel Ramsay D. Potts, Jr.

THE RECENT PUBLICATION of Dr. Vannevar Bush's survey of weapons contained in his book *Modern Arms and Free Men* renders quite timely a discussion of two other books which have been published for some time, *Strategic Air Power* by Stefan T. Possony and *Bombing and Strategy* by Admiral Sir Gerald Dickens. These two books, although covering in general the same subject, are dissimilar in volume, in approach, and in their major conclusions, but precisely because of their dissimilarity it is profitable to consider them together.

Dr. Possony's book is a detailed study of the principles and operations involved in aerial warfare, not only in the "pure" sense of that phrase but also as it impinges upon the operations on land or sea which may supplement or complement the war in the air.

Admiral Dickens' book on the other hand is not detailed and does not pretend to consider all of the various aspects of aerial warfare. It is rather a short and argumentative monograph attacking the theory of strategic bombing. Since all the arguments that Admiral Dickens advances in support of his thesis have been repeated in one form or another before Congressional committees and to the public, we have an additional reason for examining in detail the points made in the book and for comparing them with Dr. Possony's conclusions.

Admiral Dickens' criticism of the policy and strategy of bombing employed in World War II may be summed up under three headings. *First*, our air power should have been applied against enemy sea forces exclusively, and particularly against his deployed submarines, until after we had gained complete

control of the seas. *Second*, we should have restricted the war and focused our attacks solely on the enemy's armed forces. *Third*, our policy of unconditional surrender and the "total war" which ensued led us to a Pyrrhic victory with prospects greatly prejudiced for a stable and prolonged peace. These points are not new and have been made before, notably by General Fuller in his book *The Second World War* and by Professor P. M. S. Blackett in *Military and Political Consequences of Atomic Energy*. With respect to these points we may rightly question each conclusion and, having established its validity or invalidity, then further ask whether a change in bombing strategy would have resolved the objection.

As a basic principle upon which to ground his criticism Admiral Dickens makes the following statement:

"As the result of long research and reasoned deduction it has been found that, whatever the weapon employed, the principles underlying the art of fighting do not and cannot change. It is not a matter of theories. After all, are not these war principles merely those which man follows in peace in the struggle for existence, set off more starkly in war against the sombre background of danger and death on a larger scale? Those principles *must* be immutable whatever the changes in our surroundings. They cannot vary in war whether we use a sling, a musket, aircraft or rocket gun. What *does* vary, of course, is the application of the principles, and here it is no doubt where many are misled about the strategic role of aircraft and confuse the application with the principle itself."

This is dogmatic statement. If various new principles concerning the physical structure of the universe can be discovered, is it too much to believe that there might some day be discovered a new principle in the conduct of war? Interpreted with the utmost latitude, perhaps any such seemingly new principle could be fitted into a category covered by one of Admiral Dickens' immutable principles; but such inclusion would be a feat of semantics, and Admiral Dickens' statement unquestionably demonstrates the stubborn inflexibility of his point of view.

A few other comments on some of the principal points made by Admiral Dickens will set the stage for a comparison of his views with those expressed by Dr. Possony. In pressing the point about aerial forces being diverted from what should have been their primary task of attacking submarines, Admiral Dickens states that this diversion was due to the policy of the British Air Staff before the war and up to 1942 of producing principally those bomber types of aircraft designed for use

against production areas. This criticism misinterprets the facts as revealed by the production figures of the British aircraft industry for the period from 1937 through 1942, and it also overlooks the fact that the vital minimum security for Britain, which Admiral Dickens concedes was the primary concern, involved first and foremost the ability to beat off the Luftwaffe in its attack on the Island. That "so few" were available for the Battle of Britain was due not as much to a wrong emphasis in production as to the lack of any production at all. And this lack of production of any kind may also be said to have been the principal reason for the early defeats in Belgium, France, Greece, Crete, and Singapore. The truth is there was very little of anything available to the RAF at this stage of the war. We all may be thankful that of fighters there were just enough.

One of the principal targets for Admiral Dickens' criticism is the British Brigadier General Groves, who vigorously asserted in the early Thirties that air power would be omnipotent over all other forces. General Groves stated in essence that:

a. Enemy air forces would, in the future, make naval and military movements practically impossible.

b. Towns would be quickly destroyed from the air and there would be no defense against that form of attack. All that could be done in turn would be to try to destroy the enemy's towns and people.

c. So long as the navy and army exist they must be considered as being secondary to the Royal Air Force and be reduced where and as necessary to meet the requirements of the latter.

Admiral Dickens concludes that on every one of these points General Groves was proved wrong by the events and results of World War II. But here again the Admiral has got an "Alice in Wonderland" point of view. He is looking at the matter from the point of view of the victor—not the vanquished. Let us ask the Germans whether or not the events of the war bore out General Groves' contentions. Their answer has already been given, and if General Groves statement were turned around to apply to them, it constitutes an unqualified confirmation.

With various other points made by Admiral Dickens we would not quarrel. He makes some fair and just criticisms of Allied bombing policy and of the results which were achieved. For example, he thinks that we committed our offensive forces too soon. This may well be true, but the early token bombing

attacks were made in a political atmosphere which forced the use of such offensive power as the Allies possessed in order to strengthen the morale of a country sadly in need of such an antidote after a long period of bitter defeats. As another point, Admiral Dickens discusses the difficult distinction between strategic and tactical air operations, and to this we subscribe wholeheartedly.

From the events of the war, however, he draws what seem to be some highly erroneous conclusions. First he states that morale was strengthened by bombing. The results of the investigations conducted by the U.S. Strategic Bombing Survey show that this was not the case. Morale was, on the contrary, definitely lowered by bombing, but the military effect of this lowered morale was not important in the German police state, since the workers, even with lowered morale, were forced to go on producing. Also Admiral Dickens concludes that the army and the navy should each have its own air arm. This is a seductive doctrine and one which fails to consider the phasing of a modern war as applied to air and ground action in World War II. For fighting a land campaign against a foe who has no air force or whose air force has been defeated, this organization might seem to be desirable; but in any war where a land campaign is envisaged, it is first necessary to gain control in the air. For this purpose all of the resources of the air must be mobilized and concentrated on that task. If this fact were adequately appreciated by Admiral Dickens, he would then realize that his armies would fight their land battles under much more favorable conditions and with the concentrated power of an integrated air force available for application at any given point or sector of the land front. The effectiveness of this practice seems to be the lesson of World War II, and explains why General Bradley can state that the ratio of air squadrons to land divisions maintained in the Allied armies in Europe was much less than the ratio of Marine air squadrons to Marine divisions in the Pacific. Such a ratio as that in Europe could still give General Bradley the necessary preponderance for decisive offenses because at any given moment the combined might of all the Allied Air Forces, strategic as well as tactical, could be applied to that offensive. So in effect General Bradley had not only the air power comprising the Ninth Air Force supporting his armies, but also the air power contained in the U.S. Eighth and Fifteenth Air Forces and the RAF. And at all times, before

and during the land campaigns of the Allied armies, these "strategic" air forces were giving support in one form or another to the land battle.

Finally, in discussing the impact of the atomic bomb upon the methods of waging war, Admiral Dickens' conclusions seem completely at variance with his own categorical statements regarding the nature and principles of war. Of the atom bomb he states that "very few bombs on selected areas in any country however large would apparently dislocate military effort and national administration." And then he draws the conclusion from this that our one best defense, in fact the only defense, lies ". . . in supreme concentration, mobility, surprise and economy of force, and in ability to assume the offensive at once. . . ." His final hope is that the nations of the world may be too much frightened of reprisal to launch atomic bombs.

By contrast with the dogma of Dickens' book the most striking feature of Dr. Possony's book is the way in which the author balances the arguments for and against particular weapons and tactics. This pro and con treatment touches on every phase of warfare and considers in detail the relation of aerial warfare to the other basic elements of warfare. Actually this book was written about three years ago, and there is some reason to believe that Dr. Possony has changed certain of his basic beliefs concerning air power; but the material is still of vital importance and the scholarly temper of the book prevents it from being dated. Such a treatment of the subject with its detailed examination of all ramifications of strategic bombardment almost necessarily precludes a final judgment on the problems which face aerial strategists. This reserve in pronouncing judgment may be said to be the chief characteristic of Dr. Possony's writing.

With the main criticisms of our policy and strategy in the last war presented by Admiral Dickens, Possony seems at odds. Instead of insisting that air power in the last war should have been applied primarily against the enemy's sea forces, Dr. Possony views command in the air as the first requisite; and he does not simplify the problem of achieving this command, as Admiral Dickens does, but rather views it as a complex undertaking, the achievement of which will involve the use of all the elements of air power and not just fighters alone.

Possony does not regard the principles of war as immutable until time without end. He sees weapons not only changing

tactics and strategy but also influencing the very principles upon which the use of our weapons is founded. As to Admiral Dickens' third point, that our bombing policy is responsible for the unstable peace conditions of this postwar era, Dr. Possony implies that our relationships with Russia are the cause of this condition and not our strategy of bombing Germany and Japan.

Perhaps the outstanding contribution of the book is its insistence that we relate the size and composition of our air force to the size and composition of the forces of the potential enemy. For example, Possony would have us maintain a relationship of American air power to Russian air power of something like 6 to 5. At any rate he would insist that the criteria for our air power strength be the strength of a potential adversary. On this score he would support the British Brigadier General Groves in the contention that money and personnel should be given the other two services only after Air Force requirements are satisfied.

For the student of war Dr. Possony's book is far more important than Admiral Dickens', primarily because Possony treats the questions involved judiciously and marshals supporting facts. Admiral Dickens on the other hand is more dogmatic and more inclined to see in events, regardless of the shape of those events, support for his own opinions.

We undoubtedly may expect to hear more from Dr. Possony as he continues his study on the subject of air power. To Admiral Dickens the subject would seem to be already covered by his fixed and immutable principles of war.

Department of the Air Force

The Rome-Berlin Axis: A History of the Relations between Hitler and Mussolini, by Elizabeth Wiskemann (Oxford Univ., 376 pp., \$5.00)

Reviewed by
Professor Hans Rothfels

THE AUTHOR, a well-known writer on contemporary affairs such as the Czech-German issue or Italian and Balkan matters, has studied the relations between the two dictators very carefully. In addition to the great number of letters, memoirs, and documents which have become known,

she was able to make use of a good deal of unpublished material and, in particular, of private communications from former actors of the second rank. The historian will not always be satisfied with the critical evaluation of the various pieces of evidence, apparently so unequal in substance and reliability. Nor will he feel relieved when in quite a few cases they are introduced by an *on dit* and yet taken at face value. He would also wish for more precise quotations at many points. More than one surprising statement is made without the slightest hint how it can be borne out. But certainly Miss Wiskemann's is a narrative which does not lack in anecdotal wealth and striking colors of a more or less authentic character.

The story itself is well-known in its broader outlines and needs not be repeated here. It has many interesting implications and a tragic ring whatever way one looks at it. But it seems to be hardly justifiable to insist too much upon differences in the respective ideologies or on the played-up impact of Nietzsche, while the logic of the two dictatorial systems was the same with the dynamics working against Italy and for Nazi Germany. After the Ethiopian crisis Mussolini drifted inescapably into the role of junior partner. And it is somewhat artificial to characterize his African campaign (or the Albanian and Greek adventures, for that matter) as "anti-German" in nature. Nor should Mussolini's part at Munich be overstressed. In fact we know today that the Italian formula of mediation was drafted by Ribbentrop's opponents in the German Foreign Office. While the author knows a good deal about the Italian critics of the official policy, their German counterparts are barely mentioned. The name of General Beck appears in a footnote only. In places the story is told with some superficial levity. It gains in substance, however, when it turns to the real issues with which the Axis policy was faced. Inasmuch as the divergence of views regarding Soviet Russia, France, and Spain or the Balkan affairs has been of great importance for the history of the war, Miss Wiskemann's presentation is of considerable value.

She is less convincing in her portrayals. Although she aptly emphasizes Hitler's Austrian background, for which she has a subtle understanding, she sticks in general to the description of the Führer as "a paranoiac and subnormal adolescent." One is surprised then to read (p. 273) that "Hitler understood the intricacies of the Croatian question very well"—not a mean

achievement, on which few people can pride themselves. And if all the derogatory adjectives which are hurled at the main actors—not only at their morality but also at their intelligence—are true, one cannot help wondering what to think of those who were duped by them.

University of Chicago

Lincoln Finds a General, by Kenneth P. Williams (Macmillan, \$12.50), 2 vols., pp. 902.

Reviewed by
Major Kenneth F. Gantz

THE THEME of this ablest of all treatments of the American Civil War is that the chief military problem of the North was to find a commander for its large and well-supplied armies. For more than two generations it was the fashion to explain the early successes of the Confederate armies by the brilliance of their commanders, but without denying the skill of General Lee and some of his lieutenants, one can not escape the conclusion, now that the third generation drawing to a close has less passionately examined the evidence, that able as they were, their ability was wonderfully highlighted by the disastrous disability of their opponents. They could scarcely have avoided looking good. Certainly that is the statement of Dr. Williams, and one who follows his careful examination of the official records and his definition, often superb, of the reality of incident and motive against the claims of *a posteriori* "Reports," "Memoirs," "Lives," and "Histories," must grant the validity of his thesis that Lincoln needed not more men, not more money, not more munitions, and certainly not more advice, as much by one tenth as he needed a leader for the very adequate forces he had evoked to take to the field for the preservation of the Union.

It is the object of the two volumes now published, as the first of four, to examine the events of the three years of war in the East and the gross mishandling of the constantly powerful Army of the Potomac while Grant rose in the West until Lincoln called him to supreme command. This story is told almost entirely from the point of view of command, in the field and in the White House. The detailed analysis of cam-

paigns, battles, marches and retreats, camps and logistics, politics and pettifogging, blunder and vacillation, bogey-fright and alibi, focuses into the day-to-day chronicle of a man in the White House whose keen insight and extraordinary grasp of military strategy yearned for the essential instrument of war he lacked—not the army, he had the sufficient Army of the Potomac, but the general who would lead it deeply enough into battle to follow through to the goal.

Professor Williams judges Abraham Lincoln's generals and their opponents precisely in the light of what occurred rather than of their own opinions and the opinions of their admirers or detractors that have contributed so largely to tradition. At the outset the officers of both sides were amateurs, regulars and militia alike, at the handling of even moderate-sized commands, but amateurishness was not the plague of delay that was to descend upon Mr. Lincoln. The professionally trained Irvin McDowell, having been chosen to lead the first field force that had been assembled at Washington against the enemy, failed because he waited a day too long to fight. An otherwise reasonably competent military man, he lacked the conviction of command necessary for the timing and control of battles. He failed at First Bull Run because, unwisely deferring to subordinates, he added, for a needless reconnaissance, a second clear day of grace to the one he had, to cook food, already given to Beauregard, who very properly used both days to bring up superior forces and consolidate his positions. Having failed to provide himself with a command structure, lacking even a second in command or a chief of staff, he soon lost effective control of the battle and then lost the battle in piecemeal actions.

The abilities of George McClellan, who commanded the Army of the Potomac for more than a year and like McDowell was professionally trained and an observer of European armies, have been subject to controversy almost since the day he took command. Certainly he was an able builder of armies and inspired the affections of his men, but to Professor Williams cold facts present him as a master procrastinator who constitutionally overestimated the difficulties he had to surmount. Under McClellan the Army of the Potomac was well-turned out, magnificently armed and supplied, and smartly drilled, but it failed to give decisive battle under a commander who was over-cautious, hesitant, and slow moving. With 105,000 men a stone's throw from Richmond, better armed and better sup-

ported by artillery than the 85,000 defenders, he could not discover resolution to go down the way that was open and take his prize. His complete collapse as a field commander in the Peninsular Campaign foreshadows his failure, for procrastination and lack of boldness, to convert Antietam into a catastrophe for the Confederacy. With Lee defeated, his back against the Potomac, and set up to be overwhelmed, McClellan remained in position. In the morning Lee was gone—across the river. As Joe Johnston summed it up, “No one but McClellan could have hesitated to attack.” Professor Williams’ verdict is that “McClellan was not a real general. McClellan was not even a disciplined, truthful soldier. McClellan was merely an attractive but vain and unstable man, with considerable military knowledge, who sat a horse well and wanted to be President.” Considerable military knowledge evidently does not alone make a general.

That they were generals but not *the* general is the judgment too that must be passed upon Burnside, Hooker, and Meade. Though intelligent and energetic, with success at independent command already behind him at Roanoke Island, at Fredericksburg Ambrose Burnside could not find the resolution to hold on and keep going the next day that Grant showed at Shiloh and proved in the Wilderness. Fighting Joe Hooker, whose sobriquet was the result of an error by a typesetter and the imagination of a proofreader, proved at Chancellorsville that he did not have the heart and the iron nerve of a real commanding general. First he lost the initiative to Lee through vacillation and the unpardonable assumption of a defensive attitude—with 76,000 men and 244 guns against 43,000 and 132—then when Lee’s able gamble against his flank afforded him opportunity to cut up a great Confederate army and shorten the war, he lost his courage and finally the battle.

In both his forays across the Potomac Lee could have been destroyed and should have been destroyed on the field of battle. To McClellan’s failure to follow up at Antietam must be added Meade’s great neglect of opportunity at Gettysburg. When the broken Confederate infantry fell back at Cemetery Ridge in precipitate retreat from their immortal charge, Meade had great unused reserves near at hand. If plans for a counter-attack had been laid and the reserves placed in position to be committed, the defeat might have been turned into a rout. Fortune smiled upon Lee; there was no counterattack. But

still the road was long to Virginia. It would not seem that he could escape again.

“The army is in fine spirits.” In such a manner General Meade reported within a few hours after a third of his guns and 10,000 of his infantry had smashed the enemy's last great assault—the forever epic but ill-advised charge of Pickett's heroic 15,000. The necessary basis for harvesting real ‘fruits of victory’ thus was present. But what about the other equally important essential—the fortitude of the commander? Was Meade possessed of the determination, the will, the restless eagerness to exploit the situation fully? Or would he hesitate, magnify the difficulties that were certain to arise? And, dwelling upon uncertainties, would he grow cautious, and seek excuses for irresolution and delay? For the two days when he had been personally present on the field of battle, he had fought defensively, with very high cards in his hands. Could he change and become aggressive and, capitalizing upon the ‘fine spirits’ of the army, wring from his men every effort of which they were capable? Could he tell them, ‘You have done well, but we have just begun—I must demand of you still greater things’?”

The answer was *no*, and Lee crossed the Potomac into Virginia, Meade feebly in pursuit, having given him eleven days to make it.

We had them within our grasp. We had only to stretch forth our hands and they were ours. And nothing I could say or do could make the army move.—*Lincoln to Hay, 14 July 1863*

One must imagine, upon following Dr. Williams' detailed story of disheartening campaigns, useless delays, and wasted opportunities, how Lincoln felt after three years of attempting to fashion a victory with tools such as McClellan, Burnside, Hooker, and Meade when at last he had the keen edge and balance of Grant in hand. Of that general Dr. Williams concludes:

“Ulysses S. Grant remains unique after two world wars; he is still in many ways the most profitable and the most inspiring of all generals to study. He was a soldier's soldier, a general's general. He was always thoughtful of his subordinates, and fitted his instructions to their experience and talents; he never forgot that his superiors had hard problems; he worked tirelessly with what was given him and made no excuses or complaints. He was the embodiment of the offensive spirit that leaves the enemy no rest. He solved problems his own way, not in accordance with maxims, or the doctrines set forth by some school. Thus he was an original contributor to military art and science. He carried no staff manual to study for clues, no check list to scan for anything possibly forgotten. If his orders were logical and covered situations well, it was because he thought that way, not because he could follow a form. As he did not have a highly trained staff of the modern type, one sees in him a remarkable master of detail, as well as a general who had to make his great decisions without the aid of

subordinates selected and trained to help commanders. He began with a small but bold combined operation; he finished with a pursuit that had a perfect ending. Of all the generals in the war—on either side—he alone demonstrated his capacity to command small forces as well as large ones in battle under a great variety of circumstances, and finally to plan and direct the operations of several armies.”

It will be the scope of the two volumes to come to show this ideal general in action against his scarcely less-great opponent. If they live up to the promise of the two volumes before us, Professor Williams' work will be definitive. One can venture a few predictions. *Lincoln Finds a General* will cap the climax of the military fame of Grant, which has been steadily rising in twentieth-century treatments of the war, and it will reduce somewhat the legend of Lee. It will confirm past questioning the sagacity of Lincoln in military matters. Innumerable smaller matters will be resolved: the extent of Lee's failure at Gettysburg, of McClellan's on the Peninsula, the seriousness of the threats to Washington, the role of Stanton, the handling of logistics, and the quality of Union armies, as well as the outcome and significance of battles and campaigns.

Dr. Williams has based his work squarely where it should be based, on the *Official Records of the Union and Confederate Armies*. To these 128 volumes he has devoted discerning scrutiny. “Messages and orders contained in the records, rather than statements made in reports written subsequent to events, have been especially employed. In them we have the most reliable of documents.” He has also discussed the ideas of writers that contrast with his and has made substantial success of his effort to afford objective criticism of actors as well as accurate narration of events. The very excellent index must be mentioned.

Lincoln Finds a General has been reviewed for two reasons: it is a notable example of the examination of past military events in a day when the significance of military events immediately past is marvelously obscure to many experts on war upon whom the nation depends for advice, and second, and above all, it is powerfully convincing of the worth of a gifted commander. Many are called, but few are chosen.

Air University Quarterly Review

BRIEFER COMMENT

Guests of the Kremlin, by Lt. Col. Robert G. Emmens, pp. 291.

ONE of the Doolittle B-25 crews, after bombing Tokyo, discovered its gasoline running low and landed in Siberia. The Russians interned the five American airmen and for an entire year kept moving them from one remote spot to another. While never physically mistreated, they suffered from lack of activity and exasperation over their "hosts'" refusal to let them fight the war, to say nothing of their feelings regarding the failure of U. S. officials to secure their release or aid them in any way. Colonel Emmens tells his story simply. His observations of the Russian peoples are interesting, and the description of the eventual escape is dramatic.

Macmillan \$3

The Atlantic Pact, by Dr. Halford L. Hoskins, pp. 105.

THIS compact and easily read volume is a masterful summary of the background and events, both domestic and foreign, leading up to the signing of the Atlantic Pact. It reviews the trends in United States foreign policy and discusses our experiences with treaties of alliance since 1788. A chapter on European backgrounds and another on the separate regional situations bring the reader up-to-date with the end of the Second World War. Politico-diplomatic considerations, such as ERA, the Vandenberg Resolution affirming the aims of the United Nations Charter, and the Inter-American Treaty of Reciprocal Assistance, are highlighted against the back-

ground of European uncertainties, the Dunkirk Treaty, and the Brussels Pact. All these are so skillfully blended that the reader glides naturally into a full understanding of the needs and apprehensions that led to the final accomplishment of the Atlantic Pact. Following a discussion of means to implement the pact is a series of appendices containing the essential parts of various important treaties, statements, and the United Nations Charter, which document and support the text. Dr. Hoskins' book is recommended for all officers who wish to understand the who, what, why, when, how, and where of our latest international alliance, the alliance, perhaps, that may be the actual forerunner of a world force for peace.

Public Affairs Press \$2.50

The High Cost of Vengeance, by Freda Utley, pp. 310.

THE cost of our policy in Germany since the late war is, according to Mrs. Utley, extremely high. Feeling that Allied administration of that defeated nation has been shockingly bad, she discovers blunders and indicates paths she considers more expeditious for us to travel. Her most vituperative words are reserved for the Allied dismantlement of German industry as an act automatically depriving millions of any means of livelihood. Such a policy, she declares, has obviously mitigated the benefits of ECA dollars poured into that country; indeed she has observed certain officials tearing down factories at the same time

others were rebuilding them. As first steps toward a more realistic program she recommends giving the Germans the rights of free men and the opportunity of earning a living. There are chapters on the Nuremburg trials and American appeasement tactics with Russian occupation authorities.

Henry Regency Co. \$3.50

The Task of Nations, by Herbert Vere Evatt, pp. 279.

HERE is a forthright book about the United Nations by the President of the General Assembly. Dr. Vere Evatt discusses the organization's objectives and principles, as well as the policies underlying U. N. participation in the Berlin, Palestine, Indonesian, and other recent crises. He naturally has great faith in the U. N., believing that it "will surely win out in its great struggle against tyranny, poverty, injustice, and war." This book is for all readers desiring a better understanding of this important organization.

Duell, Sloan and Pearce \$3

Airplane Performance, Stability, and Control, by Courtland D. Perkins and Robert E. Hage, pp. 493.

THE comparatively new art of designing the airplane for adequate flying qualities is fully covered herein by two aeronautical engineers. The authors, formerly with the Air Materiel Command, begin their book with an excellent review of basic aerodynamics and engine characteristics, covering all speeds through to the supersonic region. The turboprop, turbojet, ramjet, and rocket are included,

along with the conventional reciprocating engine. In the second half of the book, which deals with the practical treatment of stability and control characteristics, only subsonic flight is discussed in view of the limited data available. This book meets the needs of the practicing aeronautical engineer as well as the requirements of the student. The text, based upon material utilized at the Air Force Institute of Technology, is profusely illustrated with charts and diagrams. Each chapter is supplemented with appropriate problems, and there are numerous pertinent references to NACA and comparable reports. A brief but highly appropriate appendix summarizes the latest information on the nature of the atmosphere, based primarily upon the upper air data secured by means of the V-2 rockets.

John Wiley & Sons \$7

The Airplane and Its Engine, by C. H. Chatfield, C. F. Taylor, and S. Ober, pp. 380.

THIS simply and clearly written book covers the latest developments in power plants and air frames with only the necessary mathematics to ensure understanding. It is prepared for the undergraduate student in mechanics or aerodynamics, but it should make interesting reading for technically minded personnel of the Air Force.

McGraw-Hill \$4.50

Last Call For Common Sense, by James P. Warburg.

THE United States, we are told, may soon become involved in a

war that may well destroy civilization; to avoid it and preserve a lasting peace, our present foreign policy must be drastically altered. The author attempts to show that the President, Congress, and State Department have failed miserably in their efforts to solve global problems. Drastic cuts in U.S. military appropriations are recommended; military aid to Western Europe is ridiculed; glossed over is Russia's part in leading the world to its present position. Serious readers may not be impressed by Mr. Warburg's accusations, nor by his remedies.

Harcourt, Brace \$3

Heredity East and West, by Julian Huxley, pp. 246.

IN an engrossing treatment of a pseudo-scientific controversy one of the great scientists of our time, the distinguished biologist Julian Huxley, exposes in terms crystal clear to the layman the startling attempt of a new orthodoxy to promulgate scientific law by decree for political expediency. Championing a variety of the long discredited view that acquired characteristics can be inherited, Trofim Lysenko, Russian agriculturist, has condemned the Mendelian genetics soundly established in world science as "bourgeois science" and with the backing of the Politburo has scourged it from the Soviet Union in favor of a party-line genetics. But if there can be a party line in genetics, the great basic scientific appeal to fact must be overridden by ideological considerations; if the universal and supranational character of science is denied, then the basic elements of scientific method must be denied, so that the pri-

mary sanction for scientific theory no longer need be consonance with the facts of nature but consonance with a political or social philosophy. With that, orthodoxy is once more enthroned, a new social-political orthodoxy, as powerful and as inimical to the free spirit of science as the orthodoxies of the past from which the Western world long struggled to free itself. Those who stray from its dogmas do so at their peril—to wit, the discrediting and punishment of eminent Russian geneticists and biologists who had dared to disagree. It is Professor Huxley's judgment that Lysenko has not understood how solidly the established genetic theory, is grounded in fact and checked by mathematical deduction and how necessary it is that experiments be controlled and subject to repetition for verification. His politico-scientist adherents "neither demand nor accept the same kind of evidence as professional scientists elsewhere; they confuse fact with doctrine and theory with hypothesis or with belief; they misuse or redefine terms to suit themselves; they appeal to past authority instead of to present established fact and to utility instead of truth; they accept other than scientific criteria, or even insist upon them, in what purports to be a scientific argument . . . they simply do not talk the same language as Western scientists." His explanation is that "the Soviet authorities considered that it was necessary and desirable to mobilize and regiment not only public opinion in the ordinary sense, but all the higher activities of the mind, both intellectual and esthetic, from natural science to art and music, from philosophy to

literature and history. Thought and creative expression had to become a weapon of foreign policy and an instrument of domestic policy in the struggle of the Soviet State to survive and to achieve its aims in the difficult postwar world. With this in view, the attempt has been made to weld the mental activities of the people of the U. S. S. R.—their ideas and emotions, their intellects and their aspirations—into a monolithic whole, an instrument for the attainment of a definite difficult goal." Professor Huxley's book is important for all of us, it is so clearly indicative of the frame of mind and the extent of operations we face in a dictative orthodoxy.

Schuman \$3

The Robert E. Lee Reader, edited by Stanley F. Horn, pp. 542

THE object of this book is to present a biography of General Lee by piecing together extracts from the voluminous literature he has inspired. Military authorities, biographers, contemporaries, diarists, newspaper correspondents of the day, foreign military observers, and writers of memoirs are, together with Lee's letters and reports, the sources of the materials the editor has linked into a continuous narrative. While these manifold contributions have been accepted rather critically at face value and from some points of view at least one might have expected the editor to avail himself of the additional insight afforded by the Official Records of the Civil War to leaven his connecting links, this reader can itself be taken at face value as a source book from which emerges the figure of a great soldier and a greater leader.

We can read in these episodic pieces, often crude but very often surprisingly fresh and inspiring, the story of both with profit.

Bobbs Merrill \$5

Principles of Aerodynamics, by James H. Dwinell, pp. 391.

ALTHOUGH designed for undergraduate instruction, Prof. Dwinell's text will serve the professional reader as a guide to theoretical and practical aspects of aerodynamics. There are detailed discussions of such topics as Reynolds number effects on various bodies, subsonic, transonic, and supersonic characteristics of aerodynamic bodies, and theory of airfoil properties.

McGraw-Hill \$5.50

Air Transportation, by G. Lloyd Wilson and Leslie A. Bryan, pp. 665.

TEXTBOOK treatment of the developing technology and growth of a great industry, this book provides for study or reference a detailed exposition of the background, organization, rules and regulations, costs, and schedules of domestic and overseas mail, cargo, and passenger transport by commercial aviation. Major transcontinental and intercontinental airlines—routes, facilities, services—are described, together with the functions of airports, airport traffic control, the Civil Airways System, and Airway Traffic Regulation. There is also attention to such subsidiary matters as basic types of aircraft, aerodynamical laws, and the history of flight.

Prentice-Hall \$7.65



The Periodical Press



"The Atomic Explosion in Russia," Bulletin of the Atomic Scientists, October 1949, pp. 265-273.

ON SEPTEMBER 23, President Truman announced that an atomic explosion had occurred in Russia. Using this announcement as their point of departure, five distinguished Americans offer their comments in independent statements varying in length, in approach, and in temper but all singularly united in the conviction that we have as yet neither political nor military answer with which to face the Russian acquisition. There is no doubt in their minds that Russia was technically ready to explode a genuine atomic bomb, notwithstanding the soothing effects of unofficial reports that the bomb was just a baby one, not fully developed; that the explosion might have been accidental, might even have been the result of sabotage; that in any event, it will be years before the Russians have the know-how to manufacture the weapon in any significant quantity; and that American planning anticipated all this anyway. Say the Five, Let's pull our necks out of the sand and face the facts. Our planning was based on a long-term monopoly. And now our monopoly is gone.

These are thoughtful, atomically aware men: Professors Harold C. Urey, Frederick Seitz, and Leo Szilard who predicted by a close margin several years ago when the Russian bomb would be ready; Professor Bernard Brodie; and Mr. Frederick Osborn, Deputy U. S. Representative on the U.N. Atomic Energy Commission.

Mr. Osborn is patient and discreet as becomes his affiliation with United Nations, wondering whether the Soviet Union will want to change its position in regard to certain aspects of international control now that "it will be negotiating on what it may consider a more 'equal' basis." The others are firm and freely-voiced. Sometimes they show the impatience of concern for facts not generally accepted and actions not taken on time.

Bernard Brodie, "Strategy as a Science," World Politics, July 1949, pp. 467-488.

STRATEGY, says Dr. Brodie, has never acquired the status of a science, and it is high time that it did.

Experience over the centuries has gradually built up a body of "enduring principles" on how wars are fought; and when a grand moment for strategy comes, the strategist pulls out whatever principle he needs to face the moment, the enemy, and history. From time to time there appears among the ranks of the strategists a scholar who writes a book. This book is then boiled down to its strategic elements, phrased into terse theorems that go to fatten the body of "enduring principles." Among the most influential—and the most recent—of the scholars are Jomini and Mahan. Jomini be-

longed completely to another century; Mahan had a weak foot in the present century when he died.

That the "enduring principles" have endured as long as they have, Dr. Brodie believes to be due to their extreme convenience. "Because they lend themselves so readily to 'indoctrination', they are peculiarly well adapted to the traditional pattern of military education. They can be quickly learned as a part of a brief course in a war college."

He has no grudge against the past and the lessons derived from it—provided their value is exploited by trained, analytical minds. In an age when the postulates of war change so rapidly, when decisions must be made on issues with which the past has had limited applicable experience, strategy must be something more than a study of inflexible, rule-of-the-thumb maxims. It must be a science on a level with other sciences, using their analytical approach, their methodology. And the strategist must bring to his science the mind and the training required of other scientists. Then the body of "enduring principles" will be truly enduring, weeded out and transformed into a body of live and flexible theory.

Dr. Brodie's language is precise and unequivocal; his thinking straight and methodical.

Admiral Sir Gerald Dickens, "Thoughts on Strategy in Our Time," *The Fighting Forces*, Oct. 1949, pp. 167-172.

IN A SHORT FOREWORD to the "thoughts" Admiral Sir Gerald Dickens says that though he has dwelt largely on the application of certain strategic principles to meet the case of his country and empire, they are equally applicable in the case of the Atlantic Pact countries, as well as those who might fight against them. In short, they are universal.

In assembling these principles and placing them in the perspective of World War II, he appears to have been preoccupied by two major fears: that a future war engineered through air power may commit an even greater sin against humanity than he believes it committed the last time, and that such a war fought without consideration for, and integration with, land and sea power may end in failure.

He traces the sad experience of the last war from the first error which, he says, was failure to provide adequately for the security of sea communications. ("Our heavy losses in shipping delayed our final offensive by at least a year.") He points to the "U.S. Strategic Bombing Survey" as showing how limited was the effect of bombing on German war production. He talks of strategic bombing in terms of the Principles of War. He talks of Hiroshima and Nagasaki. "We must hope for a new renaissance," he concludes. "where, if wars cannot be avoided, statesmen and generals will find no room in their strategy for the promiscuous bludgeoning to which we had recourse in the late war. This is not romantic idealism—for these things pay in the end."

Andreas Dorpalen, "Germany Between East and West," *Virginia Quarterly Review*, Autumn 1949, pp. 500-514.

IN THIS WELL-REASONED AND WELL-PHRASED ARTICLE Mr. Dorpalen appraises the efforts of the East and the West to make their opposing ideologies

prevail in a debilitated country. Neither protagonist is sure of its progress; neither is willing to withdraw from the part it has tried to shape into its pattern. Meanwhile Germany remains disunited and torn between two forces. Lying at Russia's doorstep, she must eventually look in that direction for her economic life, but to look boldly there now might cause the door of the West to close on her with its sympathy, its support, its ERP. She can't afford to lose the West now.

Whether Germany's desire for Western sympathy is opportunistic or not, she is susceptible to political influence and particularly now when she lacks unity and stability. It is on this level, says Mr. Dorpalen, that the Western Powers must concentrate their efforts to prevent her from slipping into the Soviet orbit. It is the only hope he has to offer.

Lt. Col J. D. Hittle, USMC, "Sea Power and a National General Staff," United States Naval Institute Proceedings, Oct. 1949, pp. 1091-1103.

COLONEL HITTLE states his thesis at the outset, briefly and without ceremony: "A national general staff and strong sea power cannot, at the same time, exist in the same country."

Present effort to create a national general staff in the United States is, he says, nothing particularly new. It has been going on since the First World War. Historically the system is not new either. Land-locked Prussia gave birth to it, and the brain-child has been plaguing navies of the world ever since. As a solution to the problem of over-all control of the armed forces it looks good. Its structure is attractive on an organizational chart, broadly and squarely based on all the forces, pyramiding up to a well-balanced apex of power, with a chief sitting on top to make decisions. But that is exactly the fallacy of the whole idea—the completed apex, the man on top who is responsible for directing the application of all the power agencies. No one exists with the qualifications necessary for this position. No one ever has.

For those who entertain "the notion that the agencies of sea, land, and air power can live like three happy children within the family of the single general staff," Colonel Hittle tells the story of the German Navy at the hands of the land-dominated (but air-minded) Nazi staff system. He tells this story of misfortune well: how sea power was not understood, was not used, was abused; how the Air Force robbed it of its air arm, crippling and disabling it; how death finally came to the valiant Navy, and to the entire system that had caused its death.

When Colonel Hittle returns to the case of the national general staff in the United States and points a finger of doom at the Navy, his thesis begins to show signs of strain. He shows what he calls "a background of anti-naval ideology within the services frighteningly similar to that existing in Germany," but this demonstration can not be completely convincing: In a democratic country separated from the rest of the world by large areas of water, anti-naval ideology could not have the weight of a set of circumstances in a totalitarian, historically land-minded country. He talked of "lurking enemies" to naval power in the German system, and his entire thesis implies that such enemies exist without valid reason, not

only here, as in Germany, but elsewhere as well. He fails to track down and face the real enemy, although he comes close to its hiding place when he says, "Fundamental philosophies of military power do not change in a day nor in a generation." His provocative article would have been greatly enhanced by an engagement with this enemy.

Julian Huxley, "Freedom for Science: An Appeal for Action"; Bart J. Bok, "Freedom of Science and the Universal Declaration of Human Rights," *Bulletin of the Atomic Scientists*, Aug-Sep., 1949, pp. 209-217.

WHEN THE BOMB FELL on Hiroshima, it was the end of whatever feeling of freedom the scientists still had. Their world had started hemming them in long before. In Germany, while Hitler sat brewing his wars, scientists had been limited, their science perverted, their intellect persecuted. In other totalitarian countries scientists had been slavishly used. Elsewhere, in the free countries, scientists had been pressured, their creativeness harnessed. And when their potential power was realized, their monster of destruction let loose, then it looked like the end of them as individuals, almost as if they, too, were monsters, needing to be caged, their energies forever channelled to the will of society and the state.

Their world is still small around them, although the smoke of Hiroshima has long since cleared. Their affairs are inextricably tied up with the affairs of the state. This relationship is necessary, and they are ready to admit it. The state is dependent on them for its welfare, as they in turn are dependent on the state for theirs. But where is the line of demarcation, and who will draw the line in this relationship? How much and what kind of pressure can the state exert on the scientists without violating their rights as free individuals? It is with these questions and the answers to them that Mr. Huxley and Mr. Bok concern themselves. They feel that the line as it is now drawn circumscribes their freedom as scientists and as individuals.

No other field perhaps—and Mr. Bok points this out well—is as one-worldly as science. Yet today the Soviet scientists are not only hemmed in by the Iron Curtain but controlled ideologically from the Kremlin. There was a demonstration of this not long ago when the classical theories of genetics were officially condemned, and an orthodox system substituted. It was at this point that the noted English biologist, Mr. Huxley, went to the defense of the Soviet scientists with an article on "Soviet Genetics"* printed in the June 25 issue of *Nature*, to which "An Appeal for Action" is the forceful conclusion. It is a resounding call to the scientists of the world to fight for their freedom.

Mr. Bok's piece is an American's answer to the call for battle. He tells what scientists must do, what plans they must make, to have their freedom guaranteed under the universal Declaration of Human Rights. Their freedom is defined there, article by article, but under the name of "everyone." Much yet needs to be done to translate "everyone" into "scientist." It is a many-faceted subject which Mr. Bok is well-suited to discuss.

* Now expanded to a volume. See "Briefer Comment."

Lt. Col. William R. Kintner, "The Military Foundations of Peace," *Military Review*, Dec. 1949, pp. 17-21.

A PEACE-LOVING NATION that can flex a bigger muscle than any potential trouble-maker is in no danger of war, says Col. Kintner. History proves that no aggressor ever started a war which he thought he was going to lose. He starts a war to gain more power, not to lose what he already has. This was true of Hitler, and of Tojo, and of every other aggressor up to their time. It is unimportant that some of them have made mistakes in estimating the strength of their victims, as did Hitler and Tojo. The important thing is that, right or wrong, the aggressor undertakes war only when he thinks he can win. Therefore never let him think he can win. Always flex a bigger muscle than he can flex.

The price of this protection runs high. The United States must be willing in time of peace to maintain forces capable of countering any attack. And unless we are prudent, Col. Kintner warns, there is danger of an arms race which might turn our instrument of peace into one of war. This can be avoided if we pledge ourselves never to use our weapons except in self-defense.

Harold D. Lasswell, " 'Inevitable' War: A Problem in the Control of Long-Range Expectations," *World Politics*, Oct. 1949, pp. 1-39.

THERE ARE MANY TODAY who feel that belief in the "inevitability" of war between the Soviet and non-Soviet world may well be a prime factor in bringing on that war, but few have gone beyond expression of this feeling as a commonsense notion that conveniently ties up their fears in a neat little bundle. Mr Lasswell goes far beyond this point, traveling a long and sometimes lonely road to the area where lie the multitude of mental and psychological processes on which "inevitability" feeds. And being essentially creative, he attempts to show how these processes can be altered and reshaped towards a more social and pleasant end.

The belief of inevitability on both sides is, he holds, error. On the part of the Soviet world it is based on an assertion of doctrine that world communism will inevitably triumph and that, conversely and as a matter of necessity, capitalism will collapse. This is not true doctrine. It is not even doctrine as such. But as a statement of objective, couched in the language of doctrine, it creates the impression of an irresistible force. The non-Soviet world recognizes the factory markings on this piece of inevitability. It does not credit it with the power of irresistible force, but its reactions in the face of it are confused and weakened by variety. It is assailed by grave doubts that capitalism can stand the onslaught of communism. In short, it behaves as if it were going to meet an irresistible force.

Both beliefs, says Mr. Lasswell, are based on expectations—nothing more. There is no such thing as the future conspiring against the present, although the present can conspire against the future. Expectations are man-made. It is simply a matter of altering and controlling those expectations, of imposing the human will on the world, to make the future turn out favorably.

There is a problem that is more easily formulated than solved, and even Mr. Lasswell's forceful will to impose his mind on the future does not prevent him from admitting that he has not arrived at a firm basis for predicting a shift in expectations on the part of the Soviet world.

Donald W. Mitchell, "Strategy and The Atlantic Pact," *Current History*, Oct. 1949, pp. 213-215.

PROFESSOR MITCHELL is deeply concerned with the weakness of the strategic aim of an air war with Russia. He feels that considerations of distance, of her widely dispersed production and population centers, of her relative independence in raw materials and her proven ability to "live on the country" through which she passes offers little hope of victory by this means. Russia's only obvious major weakness, he says, seems to lie in her sprawling transportation system. The only chance for air success is in "hitting enemy industry hard enough and often enough to bring about an early decision," and this no air force of the size the United States is willing to support in peacetime would be capable of doing.

An even greater weakness in the air power theory, he holds, is that unless it proved immediately successful it would leave Western Europe open to immediate invasion. Thus the Atlantic Pact attempts to guarantee what our strategic aim makes impossible.

Robert G. Neumann, "World Federation: An Illusion," *American Perspective*, Oct. 1949, pp. 265-271.

DR. NEUMANN HAS MANY HARSH WORDS for the world federalists, but the harshest are those in the title of his article. They have the effect of a final pronouncement on the idea of world federation, and this is a verdict he is not yet prepared to give, although he sometimes seems on the verge of pronouncing it. World federation is possible. Given enough time almost anything is possible. The hearts of men can change, and so progress can be infinite. But we do not have time to sit around and wait for men's hearts to change. The fate of the world may well be decided in the next ten years, and in that time, he fears, the heart-changing needed for world federation is an impossibility.

The truth is simple to Dr. Neumann. Not only is the United Nations incapable of guaranteeing the peace, but by diverting public opinion from the real immediate issues, it stands a good chance of impeding it. The federalists make the mistake of building on paper. They rely on a constitution which itself violates constitutionalism. Unless a constitution is the outcome of common acceptance of basic concepts, it is nothing but a piece of paper. That is what the United Nations now have.

Dr. Neumann does not recommend throwing it away, however. He recognizes the United Nations as an effective medium of agreement which we can not afford to lose. His main point is that we must not be bound to it and the vision it holds of the future. We must be realistic and squarely face each issue as it comes. We must be flexible and use whatever tool for agreement the issue calls for.

Nathaniel Peffer, "Chinese Communism: Epoch or Episode?" *The Yale Review*, Autumn 1949, pp. 23-38.

IN 1911 China broke with the Manchus and the past and began to make herself over in the modern pattern. She selected the American republic as her model and sent students over to learn how it had been put together. They memorized the shape and the details of the structure; then they went back and began to build a republic of their own. There was much talk then of the "new" and the "young" China, but this was shallow myth, says Mr. Peffer. What was new was a veneer that did not even quite fit the surface. The time-devoured core of old China was untouched. She still felt her age and her ills.

Then came the Russians with their plan to revivify China, complete with a set of advisers who sat down in Canton with Sun Yat-sen. What was applied was another veneer, perhaps not thicker than the previous one but covering a larger area. China was desperate, willing to snatch at any hope. In 1927 the veneer buckled and snapped: the Russians were booted out. From behind the veneer, as if from the core of China herself, something emerged. It was harried and chased to the barrenness of the northeast. And there it stayed, close to the soil and the peasant, until it had reached its full size. Then it came out, waving the communist flag. The Nationalist government collapsed. The communists took over.

At this point known history ends, and Mr. Peffer comes objectively to grips with the future. What is Chinese communism? What is its relationship to Russia and the rest of the world? Will it be a veneer, too? Is it "epoch" or "episode"? Mr. Peffer wrestles no secrets from the future, but he provides the reader with all the material he needs to hazard a guess. Mr. Peffer himself takes no pot shots. He is too circumspect for that.

J. A. Rafferty, M.D., and S. J. Cutler, M.S., "The Life Expectancy of Career Flyers," *The Journal of Aviation Medicine*, Oct. 1949, pp. 360-364, 375.

TO ACHIEVE the mortality results of this paper, samples of populations of flyers and non-flyers were taken. Of the flyers only those with the longest careers were chosen from those who entered the service between 1920 and 1924. This selection was balanced by selection of comparable non-flying careers. The medical histories of both groups were followed through to 1947, and the results were summarized in conventional statistical operations. These results are striking. There is a difference in life expectancy between flyers and non-flyers in favor of the latter varying from eleven years at age twenty-two to two years at age fifty. Thus a flyer entering the service at age twenty-two can expect to live, on the average, thirty-seven more years, while a non-flyer of the same age can expect to live forty-eight more years.

The writers of this paper state that these figures are partially rationalized by mortality due to aircraft accidents. The high death rate of pilots in aircraft accidents in the early Twenties, when aviation was developing from infancy, accounts for much of the expectancy curve.

Comparable rates among young pilots may or may not prevail today. If they do not, then this study overstates the risks of flying.

Ansel E. Talbert, "Military Air Power in Europe," *The National Air Review*, Nov. 1949, pp. 1-8.

IN THIS ARTICLE reprinted from the *New York Herald Tribune*, Aviation Editor Talbert makes a first-hand analysis of the air strengths and weaknesses of Europe. Across the face of Europe today, he says, a shadow is being cast by the wings of Soviet Russia's Red Air Force. And so logically he begins by evaluating the present power of those wings, the shape which they may take in the factories and in the mind of Stalin.

Numerically the Red Air Force is the strongest air force in the world, but Mr. Talbert considers its offensive and defensive capabilities far below those of the United States Air Force and naval aviation. In its present composition it is organized primarily for supporting ground troops, the result of one of Stalin's previous convictions which reportedly was dissipated after viewing the results of strategic bombing in Germany. Marshal Novikov, who put Stalin's ground support theories into practice in World War II, has since been purged. General Golovanov, who commanded the Long Range Bomber Force, is now a marshal.

But weak as the Red Air Force is now in some of its elements, says Talbert, most strategists believe that with Allied forces now available in Western Europe it could hardly be bested or kept from gaining air superiority at any point east of the Pyrenees or the English channel. Britain's present role in aviation is chiefly defensive, looking to the future for its offensive power. France's air power still lies in the future. The radar wall of the Atlantic Pact countries, backed up by jet fighter squadrons and anti-aircraft batteries is just past the planning stage.

The only real counterbalance to the strength of the Red Air Force in Europe, Mr. Talbert concludes, is provided by America's air power in conjunction with the atom bomb.

Laurence Sears, "American Foreign Policy and its Consequences: Walking Backward into the Future," *The American Scholar*, Autumn 1949, pp 470-484.

THE UNITED STATES has "walked backward into the future" before, the last time smack into World War II. And she is doing it again, not detached and dreamy-eyed as in the days when the *bon mot* was that the last war had been fought, but pugnaciously, reluctantly, step by step, her face toward Russia.

Mr. Sears finds the picture is depressing, and he spares no details of objective examination to present it. He reviews the basic premises of our foreign policy in the past few years, what he calls "the assumptions, all too often unconscious, on which we have been acting." These assumptions phrased in exact and very conscious language, have a way of being embarrassing, lined up for inspection. Not only does our expression of foreign policy appear to him to have been inconsistent and opportunistic reactions

to fear of communism, but—and this is Mr. Sears' main thesis—they ignore the nature of our times in the walking-backward pattern of post World War I.

In closing, Mr. Sears states the assumptions which he believes should underlie our foreign policy, all explicitly formulated to harmonize with the world and the times we live in. For those, however, who feel that a democracy is at a disadvantage in dealing with communism some of Mr. Sears' assumptions may seem academic and unrealistic.

Wing Commander W. P. Whitworth, "The Part of Strategic Bombing in Modern War," *Royal Air Force Quarterly*, Oct. 1949, pp. 113-120.

THE STRATEGIC BOMBING LESSONS of World War II were hard-learned, and these Wing Commander Whitworth reviews briefly before pointing to their moral. He tells of the demoralizing struggle with time to gain air superiority over Germany; of the basic error of aiming at too many targets with the few aircraft available; of the futility of the unescorted bomber by day, of hunting targets blindly by night; and of what he calls "one of the most serious blunders" of the war, area bombing, which devastated over a period of more than three years "all the major German cities and industrial areas on the false assessments of economic experts backed by military leaders."

These were the bitter lessons. There were others, too, less bitter, but all of them together add up to a strong indication that strategic bombing in itself could be a decisive winning factor in any future war provided the country possessed (1) air superiority, (2) sufficient intelligence about the enemy to locate a weak spot in its internal economy suitable for air attack, (3) a strategic bomber force capable of reaching and destroying these vital targets and, (4) the ability to continue attacking these targets until the enemy stops resisting.

If a weak spot cannot be found in the internal economy of the enemy nation, then the strategic air arm will play only a minor role. But in any event, air superiority must be established whether the campaigns be by land, sea, or air. It is an essential requirement of a modern war against a modern enemy. That was the most important lesson of World War II.

Recommended Reading

L. F. Allen, "Judgment Day in Tokyo," *Military Government Journal*, Fall 1949, pp. 7-8, 12.

Aquila, "Air Power in Economic Warfare: A Comparison with Naval Blockade," *Journal of the Royal United Service Institution*, Nov. 1949, pp. 572-575.

A. Brecht, "The Idea of a 'Safety Belt'," *American Political Science Review*, Oct. 1949, pp. 1001-1009.

Commandant Coutaud, "Problems of Fighter Interception," *Interavia*, Sept. 1949, pp. 556-557.

Lawrence R. Hafstad, "Atomic Power for Aircraft," *Bulletin of the Atomic Scientists*, Nov. 1949, pp. 309-312.

"Soviet Aviation Day, 1949," *Interavia*, Oct. 1949, pp. 594-597.

AIR ANTHOLOGY

MR. AIR FORCE REMEMBERS*

Selections taken almost at random to illustrate the interest in human incident General Arnold has interwoven with command of factual detail to compose his chronicle of the rise of American Air Power and its triumph in the Second World War.

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Once upon a Time

EVERY SUNDAY the Wrights would invite Tom Milling and me to their home for dinner. The food and hospitality were more than welcome to a couple of young second lieutenants who found their boarding-house fare rather lean fuel, but the nourishment which all four of the Wrights gave us went far beyond the good full plates. I say "all four" because not only Wilbur and Orville, but the old Bishop and their sister Katherine were part of it, too. On some Sunday afternoons Lorin, their older brother and business representative, would come in after dinner and make it five.

I always felt their father, the Bishop, gave the stimulus of the flying idea to the boys with a toy helicopter he once bought them. At least, they were always referring to it. Later on, the Bishop—and generally Katherine and Lorin—gave unflagging encouragement as their work progressed. The year before, the old gentleman had made his only flight at the age of eighty-two, staying aloft for almost seven minutes over Huffman Field at an altitude of 350 feet and exclaiming eagerly to Orville, "Go higher, higher!"

*Title and subtitles have been added by the Editor for presentation of the selections out of context.

Katherine and Lorin never doubted, either. Indeed, Katherine gave not only her constant moral and financial aid, but most of her life to her brothers' work. She had always been ready, at the drop of a hat, to turn from her own interests to help them, as at the time when the first great news came from Kitty Hawk, and she rushed home, abandoning an important college meeting at Oberlin, to be on the receiving end of their messages. When the indifference of our own country to their offers had carried their affairs to France, it was Katherine, with her knowledge of French, who was the translator and adviser of their correspondence. When she was away, and especially when the brothers were engrossed with a new trend in the shop, they confessed sheepishly, vital things were apt to be left hanging. Also, the French used funny stationery. Once, when Katherine was absent, a seedy looking brown envelope, apparently made of butcher's wrapping paper, arrived, and they tossed it aside, unopened, discovering only on their sister's return that it contained the kind of invitation from the French Academy of Sciences that many men wait for vainly during a lifetime. Wilbur and Orville laughed hard when they told us this story.

They never took themselves half so seriously as we took them. Still, to Milling and me, sitting at their Sunday dinner table and listening to their quiet stories what they had done was a miracle—and it is a miracle to me today. Without any formal scientific training whatever, two "ordinary" young Americans from an ordinary town in the state of Ohio had not only grasped and advanced the whole known science of aerodynamics—they had become its admitted masters, even more appreciated in Europe than at home.

Take alone the classic case of "the crossed bicycle chain." After the patient years with the kites and gliders at Simms Station and Kitty Hawk they had built the first actual flying machine, and after various trials, decided to link the propellers to the engine with bicycle chains. To obtain counter-rotation of the two props they simply crossed a chain to one of them. Well, you *can't* cross a bicycle chain! It will break; it *must* break. Certainly, of all people on earth, two bicycle manufacturers ought to be the ones to know that! But they *did* cross it, and it *didn't* break! And in all my own experience with the Wright plane, I never knew or heard of a single one of their crossed chains that did.

Again, when they came to the problem of an engine, they couldn't find one light enough for the plane to lift, so they went ahead and designed one of their own—a little box with four cylinders looking like tomato cans on top—which, among other features, happened to include the principle of direct fuel injection, a factor hailed as ingenious when it reappeared during World War II. More than anyone I have ever known or read about, the Wright brothers gave me the sense that nothing is impossible. I like to think—and, during World War II, often did—that the Air Force has rooted its traditions in their spirit.

Nothing was Impossible

THE OVER-ALL PROGRAM for the Army Air Forces required an overwhelming air superiority over our enemies in the shortest possible time. Our global field of operations required men from all walks of life. Each had a part to play, whether he was a hotel clerk, a railroad man, a shipping man, a barber, an auto mechanic, or a painter. We had need for all of them, each one fitting into his proper place—square pegs in square holes and round pegs in round holes. Our administrative officers had to be trained as rapidly as possible so as to release all flying officers who could possibly be replaced. An Officer Candidate School had to be built up at once.

During those early days, a great many Air Corps officers had the idea that everybody in the Air Force should be a pilot, regardless of whether he was running a hotel, a bus line, taking charge of motor transportation, or planning a hydroponics garden for the Pacific.

As in several other cases, so in this instance I immediately ran into old-fashioned opposition—indeed, a regular sit-down strike. Every time I asked when we could establish an Officer Candidate School I was told, “Well, it will take six or eight months to build the schools; then it will take another six or eight months to get the necessary instructors and books,” and before I got through questioning, a year was accounted for and I didn't have plans for starting my school.

I stood this for some time, until February, 1942, when I called a conference of the training specialists at my headquarters in Washington. I reopened the question, “How long will it take to establish a ground officer school?” The reply was standard: “Well, it will take us three months to secure a site;

three months more to set up the schools; three months more to get instructors, books, etc." I told them Hitler would not wait that long, and neither could I. While the officers were sitting and wondering what my next move would be, I called my secretary on the office phone and said, "Get me General Miff Harmon, down at Shreveport, Louisiana."

My secretary, Miss Adkins, a knowing soul, understood as usual. In a few minutes she sounded my buzzer.

I picked up the telephone and said, so that everybody could hear: "Is that you, Miff? O.K. How are you getting along? Finding things pretty busy? You need more officers? Well, that is not a circumstance to what you are going to need when you tackle *this* job. Well, don't be surprised. How long will it take you to get me L.S.U. (Louisiana State University)? You think you can get it for me in three or four days? Well, that's great. I'll tell you what I want. I want to get a place like that to establish an Officer Candidate School. Yes, an Officer Candidate School, and we may have as many as two or three thousand candidates—maybe more than that before we get through. But you think you can get it for me in three or four days? Well, that's wonderful, Miff. Thank you very much!"

I hung up the receiver and said, "Gentlemen, you see what you can do when you have the will to do?"

Whereupon, General Walter Weaver jumped up from his chair and said, "May I be excused? I want to leave right away and go down to Miami!"

I said, "By all means."

That afternoon he called up and said he had flown to Florida and could take over some 300 hotels at Miami Beach at once if I would approve the project. He would then be ready to open the school the following Monday. I told him to go ahead and get it working. It wasn't "Monday," but classes did commence the week after that.

During that long-distance telephone conversation with "General Miff Harmon," there had actually been nobody at the other end of the wire except Miss Adkins in the outer office.

At Quebec

ONE OF THE MOST IMPORTANT SUBJECTS discussed was the "short-leggedness" of British fighters. These Spitfires, Hurricanes, etc., excellent planes in other respects, wouldn't be able to stay in

the air long enough after taking off from England to give real support to British troops landing on the northwest coast of France. That was indeed a problem. To solve it, someone had sold Churchill the idea of building floating bases out of a combination of sawdust and sea water. The notion was to force ammonia through pipes surrounded by sea water and sawdust (as is done in a regular ice plant) thereby forming large cakes of ice in the ocean or in the English Channel. With enough cakes of ice, it might be possible, by hitching them together, to create "landing fields" where the fighter planes could refuel. The plan was called, biblically, "HABAKKUK." At Quebec, the idea was outlined to the Combined Chiefs of Staff by Lord Louis Mountbatten. But it was a deep, dark secret; only the top-level planners were supposed to know anything about it.

At those meetings in Quebec behind closed doors, there were some very rough, tough sessions. Angry words were sometimes thrown back and forth. The Americans and the British did not always have the same ideas about what our future plans should be. The Americans were eager to get going and get the thing over with by making a landing in France as soon as the supplies, troops and equipment could be gotten together. The British had a tendency to hold back until everything was carefully prepared. Many times the sessions were so hot that even the Planning Staff was not allowed to be present.

One day while we were out to lunch, Lord Mountbatten brought in a sample of his ice airdrome. When we returned and had reassembled behind closed doors, he talked about it and showed how it was constructed; explained its characteristics. To show how sturdy it was, how much punishment it would take, he stood off and fired a pistol into it—several pistol shots.

The HABAKKUK piece was then put back on a wheeled litter, covered with a white sheet, and rolled out of the door. It was several feet long. As it passed the planners, who all morning long had heard loud voices raised in argument, Air Marshal Walsh said, "My God! They're shooting one another! I wonder whom they've shot!"

Journey to Cairo

NEXT MORNING we had an opportunity to look around the *Iowa* before the President arrived. It was a monster, 800 feet long,

with more than 120,000 horsepower, and overflowing with anti-aircraft guns. The main deck was tremendous. Sailors, more sailors, and more and more sailors, all over the decks! I never saw so much saluting in my life, not even at West Point!

At 9:00 o'clock, the President's yacht, the *Potomac*, came alongside with the President, Admiral Leahy, Harry Hopkins, and General "Pa" Watson. Their baggage and supplies were hoisted aboard, and at 10:00 A.M. we upped anchor and steamed down the bay. When we reached the submarine net at Hampton Roads, we stopped. A tanker came alongside and we took on oil. That night, dinner and a movie with the President.

At the end of the movie, Harry Hopkins bet "Pa" Watson five dollars he could catch a fish from the deck of this Goliath, the *Iowa*. "Pa" Watson took him up. It wasn't long before Harry Hopkins came in with four fish. A Marine and a mess boy both swore Harry had caught the fish. "Pa" Watson said, "Ice box!" "Pa" probably was right at that, but the fish cost him five bucks.

We left Hampton Roads about midnight and were in the Gulf Stream by 10:00 o'clock next morning, with the weather clear and cold, but getting warmer. There wasn't much to do in the daytime but ramble around looking at the various gadgets, at the guns, at the gun control, and at the different radar, radio, and signal stations. The ship made about twenty-five knots. Zigzagging cut the speed to about twenty-three knots. Destroyers all around us seemed to be having a rough time in the heavy seas. Four destroyer escorts on each side of us furnished protection from submarines. The heavy seas continued all day until sundown. An occasional Navy plane flying overhead was part of our escort. That night, we attended another movie with the President called *The Phantom of the Opera*.

The following day the Navy decided to put on a show for us, so at 2:30 in the afternoon, gunnery practice started, with 150 anti-aircraft guns firing at balloons. Commands seemed to come from all over the ship, but the firing was completely under control. Then, right in the midst of that imposing volume of fire, somebody shouted, "This is not a practice. Look! A torpedo wake coming directly at us!"

An alarm whipped from one of the destroyers. The whole character of the maneuvers changed instantly. We began to zigzag. More commands from everywhere. Whistles, flags, code signals. The din aboard the ship was terrific. The wake of the

torpedo became quite clear. A depth charge went off, and another, and many more. Guns started shooting, but nothing hit the torpedo.

Before we left the United States, we had known a pack of German submarines was operating to the south and east of the Azores, but we figured we would miss it by 100 to 150 miles. With that torpedo coming toward the *Iowa*, it looked as if we hadn't.

What should be done with the President? Should he stay on deck? Should we take him to his cabin and put him in a safe place, protected by armor?

The torpedo missed the stern of the *Iowa* by a scant twenty yards.

A thousand sighs of relief went up. In everyone's mind was the question, "Suppose the torpedo had hit, and it had become necessary to take the President and all the high rank off the *Iowa* in those heavy seas?" Where had it come from? Were there any more?

Later, it was determined that a torpedo-tube man on one of our own destroyers had pulled his trigger by mistake. His tube, at that particular moment, was so aimed that the torpedo traveled on a straight line toward the *Iowa*. Some say the "trigger-happy" torpedo man was called on the carpet for his actions. Of that I know nothing. Harry Hopkins remarked, "It must have been some damned Republican!"

He Went Along for the Ride

LATER IN THE EVENING, General Eaker, General Doolittle, General Spaatz, and I talked over the officers who should come to the United States to help build up the Army Air Forces Headquarters. Jimmy Doolittle told one of his typical stories about a B-17 which had come in all shot to pieces. It had been hit by a rocket and no one could understand how it had managed to stay together in the air. The tail surface was almost completely severed from the rest of the ship. Doolittle, in order to say something, and feeling a little overwhelmed, said to the tail gunner as he climbed out of the plane, "You were in that ship when it was hit?" The tail gunner, a tough, red-headed fellow, said, "Yes, sir. All the time."

After Doolittle had passed on, an officer heard the tail gunner say, "Where in hell did the bald-headed bastard think I

was? Selling peanuts in Brooklyn?" One of the crewmen said, "That was General Doolittle!" The tail gunner replied, "I know; I've seen his pictures."

Inter-Allied Conversation

RIGHT AFTER BREAKFAST I had another conference with Chiang and T. V. Soong. All the talking had to be done through Dr. Soong. The day before I had tried to find out just how much English the Generalissimo understood. Soong had been called from the room for a moment, so rather than sit at the luncheon table with Colonel Parker and the Generalissimo and say nothing, I had tried to figure out how I could do a little pantomiming. I recalled how it had been done by Harpo Marx in a show, and looked around for something I could say. In the center of the table was a bunch of flowers, and I looked at the Generalissimo. He looked at me and smiled. In my best pantomime I tried to ask, with appropriate gestures, "Were those flowers in the center of the table grown in a greenhouse, or were they grown out in the open?" I thought my pantomiming must have been pretty good, for the Generalissimo said, "Yes, Yes!" When T. V. Soong returned I asked him what the Generalissimo thought I had asked. After much talk back and forth in Chinese, Soong said, "The Generalissimo thought you had asked him whether the Chinese made tea out of flowers." From then on I knew I had to rely upon an interpreter.

The End of Goering

AT THE RITZ I was quartered in the suite that had been used by Goering. It had a tremendous bathtub, much larger than any I had ever seen, and some time or other he must have sat down in it rather hard for there was a crack across the middle of the tub.

Editor's Notes . . .

BECAUSE GENERAL IRA C. EAKER was intimately associated with many of the events described in General Arnold's *Global Mission* and held such positions of responsibility and high command, climaxing his career as Deputy Commanding General of the Army Air Forces from 1945 to 1947, that he sat and advised General Arnold in numerous of the great conferences and councils that determined the course and conduct of the war and because General Eaker is himself a skillful writer, the QUARTERLY REVIEW asked him to review *Global Mission*. We were very much pleased by his prompt and effective response. More than a review, what he sent us (p.70) is a primary document in its own right, several statements being for the record themselves.

IT IS AN IDEA running back into the nineteenth century that there is something inimical in science to poetry. Darwin himself said in his later years that he believed his long preoccupation with the material realities of the physical world had deadened his sensitivity to the arts. And numerous literary critics and assorted other wiseacres of various persuasions have unburdened their fears of the "deadening" effect of the scientific world view upon the emotional values from which poetry must spring, mythology, love, war, beautiful women, and the hero apparently being, upon the evidence of results, much more favored by the Muse than the laboratory and economic man. In the brave new worlds, they report, even the way of a man with a maid is archaic.

The Editors of the QUARTERLY REVIEW do not subscribe to this doctrine. We hold that the vistas unfolded to our view by, for example, twentieth-century physics are at least as inspiring as the alchemy of Friar Bacon or the astronomy of Milton. And certainly the accomplishments of applied science looming under wondrous names as ingredients of dentrifices or lack of ingredients in cigarette tobaccos inspire our poets of the radio and the slick-paper advertising world with lyric frenzy unapproached even by Old Irish poet dwelling upon saints legend.

The QUARTERLY REVIEW is, though, definitely concerned by the great void of poetry about the United States Air Force. Has war, one of the greatest of the poetic matters of the past from the *Iliad* to *John Brown's Body*, moved so far into the dominion of science and the machine that its robot visage forbids the celebration of great victories or the lauding of heroes or the consolation of fair ladies bereaved? Are the love of the flag and the hatred of the enemy, the suspense of the attack, the despair of defeat, and the thrill of victory to reside in the drab language of communiqués and the slick prose of ace correspondents? We say a thousand times no.

Accordingly, we urge poets and persons of poetic talent, whether or not personnel of the United States Air Force, to heed the rich materials offered by the Air Force in the War and in peace. The QUARTERLY REVIEW will publish in such quantity as space permits poems related by subject in some way to the United States Air Force and of high quality in the scale of critical standards generally prevailing among publishers of poetry. Such poems may have for subject or theme USAF personnel, real or fictitious, events or circumstances from the USAF record, ideas or ideals of or for the USAF—they may express the emotions or reflections of the poet, or of his characters—they may be lyric or narrative—sonnets, ballads, odes, blank verse, quatrains—in short, any form or style and on any subject, with the only exception that the subject must have definite connection with the USAF. For reasons of space we should like mainly to see poems of two dozen lines or less. Contributors of published poems will receive the current year's subscription to the QUARTERLY REVIEW. Rejected poems will be returned on the closing date for each issue if a stamped, self-addressed envelope is provided.

IN A PRESS CONFERENCE on the Armed Forces budget for Fiscal Year 1951 held recently in Washington by Secretary of Defense Johnson presentations were made by Secretary Symington and General Vandenberg. *Some notes:* Secretary Symington said that the Air Force supports the Administration's budget for economic reasons. The Air Force program for FY 1951 is therefore based upon a 48-group structure. The conviction of the Air Force from a purely military standpoint remains, however, that 70 groups or their equivalent is necessary for the minimum peacetime security of the United States. The year-end Air Force strength for FY 1950 of 416,000 officers and airmen will be maintained during FY 1951. Civilian employees will be continued at the reduced level of 152,000, excluding reimbursables, which was attained during FY 1950. Minimum reduction is contemplated in modernization of aircraft and the research and development program. Because of the inadequacy of its physical plant the Air Force expects to push its portion of public works provided for the over-all National Military Establishment by a contingency item in the President's budget. Funds requested for FY 1951 Air Force budget (\$4,433,000) would be utilized 37.3 per cent for major procurement in connection with modernization of the Air Force, 28.3 per cent for pay, transportation, subsistence, clothing, and equipage of military personnel, 22.5 per cent for maintenance and operation of aircraft and bases, plus their utilization for training of military forces, 5.1 per cent for research and development, 4.6 per cent for civilian components, and 1.3 per cent for administration costs in Washington and at headquarters of major commands.

General Vandenberg, in discussing implications of the budget for operational programs, said that FY 1951 would see the introduction of additional jet fighter aircraft and the complete equipping of three of the four heavy bombardment wings and two strategic reconnaissance wings with B-36's, replacing B-29's. The fourth heavy bombardment wing would be in process of conversion to B-36's by the end of FY 1951. Although aircraft to be procured out of FY 1950 and FY 1951 funds will not appear in opera-

ting units during these periods, procurement plans are for 1250 aircraft with FY 1950 funds and 1383 aircraft from the 1951 fiscal request. The major training program would remain essentially unchanged through FY 1951. A pilot graduation rate of 3000 annually is contemplated and a technical training population of some 25,000 students. Civilian components programs will remain stable in over-all strength but will increase in effectiveness. Increased emphasis will be put on Volunteer Air Reserves, the goal being to provide training for 151,000 reservists. Drill pay would be available for approximately 69,000. Air National Guard strength would remain at 49,000 for 27 combat and supporting units. Other facts brought out by General Vandenberg were that the Air Force has made available \$50,000,000 for initiation of early-warning radar net. The Air Force was maintaining 248 air bases, depots, and industrial plants world wide (193 on active status) at the beginning of FY 1950; by close of FY 1950 this number will have been reduced to 235, of which 60 will be held in inactive status as a mobilization requirement—these figures representing a planned continuing level-off through 1950 and subsequent calendar years.

THE THIRD VOLUME of the Army Air Forces in World War II, our official history, went to press 1 January. Actually Volume IV in the seven-volume series (Volume III being scheduled for a later date because it is being prepared by the same team of author-historians who prepared Volume II, published in June 1949), it is the story of the Pacific and CBI from the summer of 1942 through 1943. It will be out late in June. The remaining four volumes, now in varying states of completion, fifty to eighty per cent finished, are to appear at intervals of about one year. Volume III, treating Europe and the Mediterranean from 1944 to V-E Day, Volume V, the Pacific and CBI from 1944 to V-J Day, Volume VI, the Zone of the Interior, training, procurement, supply, *etc.*, and Volume VII, the services, air transport, aviation medicine, weather, *etc.*, will each, like their three predecessors, run to about 700 pages, with full documentation and numerous maps, charts, and photographs.

The USAF Historical Division, now located at the Air University, was established in 1942 under order of President Roosevelt directing that each of the war agencies prepare an administrative record of its wartime activities. The first Air Historian, soon convinced that neither the Air Force nor history would derive real benefit from a purely administrative story of Headquarters, made two basic decisions: the first, to secure a large number of trained historians for service overseas and within the ZI, collect an archives, and prepare carefully documented "first narratives" dealing with all phases of air activity in all parts of the world, the second, to preserve records in such form and content as to be of value in future planning and operations.

The procurement of trained historians in adequate number was difficult. It was November 1943 before the first went overseas and a year later before the office was up to strength, but in the meantime all units overseas had been required to submit a monthly history, a war diary, and special accounts, together with such supporting documents as General and Special

Orders and Mission Reports. At air force and major command levels historians prepared histories and special studies and screened out the more useful documents for forwarding to the Historical Division.

After V-J Day most of the historians were brought back to the States to complete the histories in process when the war ended, and by 1 July 1946 most of the work was done in the production of "first narratives." Ninety-seven historical studies had been written covering various phases of operations, logistics, and administration overseas and personnel, supply, procurement, training, administration, and other subjects in the ZI. The Archives had grown to fill a thousand four-drawer filing cabinets with carefully screened documents.

The Historical Division evaluates its materials as "incomplete and thin" for the period from 1941 through 1943, although not as bad as might have been because in 1944 and 1945 the historians not only prepared their current histories but collected documents and interviews and wrote monographs that gave additional and often adequate coverage to the earlier years. The records for 1944 and 1945 "leave little to be desired." These are the materials for the accomplishment of the primary mission of the Division, the preparation of the official seven-volume history of the AAF in World War II. In addition to this major work two other histories are in process: a two-volume history of the Army air arm from 1907 to 1941 and a history of the Air Force from V-J Day to June 1949, the latter to be continued by annual increments.

REQUESTS FOR INFORMATION bearing on problems of the effects of nontemperate environments on materiel, personnel, or operational techniques and requirements may be addressed to the Arctic, Desert, Tropic Information Center operative in the Air University since November 1948, with the primary mission to collect, catalog, and make available for reference all information currently being compiled on nontemperate areas by service, Federal and civilian agencies. The information collected is evaluated, and the necessary research is conducted to collate it with other information bearing on Air Force activities and operations in nontemperate areas. From the data so assembled, screened, and evaluated ADTIC writes and publishes bulletins for dissemination to requesting agencies.

Research is also being carried on several long-range special projects set up at the request of service agencies, an important one of which is "Polar Air Navigation Studies." This project, for example, involves the preparation of an annotated bibliography, a survey of polar navigation to determine deficiencies in methods and basic data, investigation of the problems disclosed by that survey, and the maintenance of a continuous file on polar air navigation.

ADTIC has scheduled several information bulletins for publication in early 1950. Its "Bibliography of Polar Air Navigation" is being published in January, to be followed shortly by an exhaustive study of "The Gobi Desert, Its People and Terrain" and by "999 Survived," an analysis of one thousand Southwest Pacific survival incidents.

LETTERS

Sir:

The article entitled "Light, Darkness, and Polar War" by Lt. Col. Oliver K. Jones in the Spring 1949 issue of the *QUARTERLY REVIEW* has a significant error in the method of calculating the hours of darkness in northern latitudes for higher altitudes. It is felt this error should be corrected, for if the methodology used in the article is adopted for planning purposes, as much as one hundred per cent error can result in forecasting hours of darkness in latitudes of 60° or 70° during one period of the summer.

This error in forecasting hours of darkness could cause the planner to seriously miscalculate the number of enemy interceptors able to make contact on a bomber force, with the resulting chain of miscalculations that an error in such a primary planning factor as "loss rate" would entail. For example, using Col. Jones' calculations for the hours of darkness at 40,000 feet at the latitude of 55° would forecast 2 hours and 20 minutes of darkness, but if it is computed correctly there are 4 hours and 7 minutes of darkness, a difference of 1 hour and 47 minutes. This difference might well mean that bombers could hit a target and withdraw under total darkness, whereas under Col. Jones' calculations the plan would indicate that the withdrawal would be made in daylight. Thus, planning estimates of bomber and crew loss, bomber and crew replacements, and many other war-time requirements would be vitally affected, for there are many different tactical considerations involved in planning daytime vs. nighttime missions.

The erroneous method of computing the hours of darkness at altitude used in the article includes the height correction of sunrise and sunset plus the height correction for morning civil twilight and evening civil twilight subtracted from the hours of darkness at sea level. The correct procedure is to subtract from the hours of darkness at sea level only the correction for morning and evening civil twilight—sunrise and sunset corrections should not be subtracted. The reason that only civil twilight corrections should be made is that the hours of darkness are limited by the time of ending civil twilight in the evening and time of beginning civil twilight in the morning and not by the time of sunrise and sunset. This corrected procedure has been coordinated with the U. S. Naval Observatory, and they have agreed that is the exact method of calculating the hours of darkness at altitude.

Donald N. Stanfield, Capt., USAF
Headquarters, USAF

We are advised by Air University navigators who have checked your computations and those in Col. Jones' article with the Air Almanac that you are right and that the method of calculation employed by Col. Jones does result in error under the particular conditions discussed. Your letter has in fact aroused doubt beyond these immediate computations. A study is now being conducted in the Air University to determine whether the Air Almanac procedures are entirely correct, and a technical article dealing with the entire subject is in preparation for our next issue—Ed.

THE CONTRIBUTORS

Maj. Robert J. Seabolt, graduate of the Command and General Staff School, is now 307th Bomb Wing Staff and Base Weather Officer; formerly Group Operations Officer, 1st Transport Group, ICDATC . . . **Maj. Gen. Orvil A. Anderson**, Commandant of Air War College, was Senior Military Advisor of the U. S. Strategic Bombing Survey. He served during World War II as Chief of Plans Division of the AAF. Chairman of the Combined Operational Committee in the ETO. and Deputy Commander for Operations of the Eighth Air Force . . . **Capt. John Barron**, Hq., Continental Air Command, Mitchel Air Force Base, is currently on duty as AF representative on the public information staff of the Maneuver Commander, Puerto Rican Exercise 1950, now assembled at Norfolk, Va. He is a former newsman and radio editor . . . **Col. Robert L. Snider** (U.S.M.A., 1938) was wartime Executive Officer, Hq., Strategic Air Forces in Europe; Chief, Scientific Branch, MIS, War Department, General Staff; Commander 5020th Wing, Alaskan Air Command; currently a student at Air War College . . . **Lt. Col. William R. Carter**, graduate of Command and General Staff School and the Armed Forces Industrial College, is currently Acting Deputy Chief of the Industrial Planning Division, Hq., AMC. He was with the Air Division of the Control Council for Germany during the latter stages of World War II . . . **Marshall K. Wood** (B.S., Chicago) is Assistant Director for Plans and Research, Directorate of Program Standards and

Cost Control, DC/S Comptroller, Hq., USAF. He is responsible for the initiation and direction of Project SCOOP . . . **Maj. John J. Daunt, Jr.** (Ll.B., Boston College), formerly an instructor at USAF Special Staff School, is now with the Security Policy Branch of USAF Directorate of Intelligence, Washington. He was wartime deputy commander of the air base at South Myitkyina . . . **Col. Grover C. Brown** (A.B., Texas), a wartime 9th Air Force group commander, is currently on the Air War College faculty; he was formerly with the Directorate of Intelligence, Hq., USAF . . . **Capt. Raymond L. Towne** has been with ATC and subsequently MATS since his return from combat operations with the 12th Air Force in 1945. He served in the Combined Airlift Task Force Headquarters as Secretary to the Air Staff of Gen. Tunner, commanding. He is now in the Public Information Office, Hq., MATS . . . **Col. Ramsay D. Potts, Jr.** (Ll.B., Harvard), recently of the Air War College faculty, now on the Executive Staff, Secretary of the Air Force; commanded the 389th and 453rd Bomb Groups, Eighth Air Force; served as Director of Operations, Eighth Air Force, and was Chief, Military Analysis Division, U.S. Strategic Bombing Survey . . . **Hans Rothfels** (Ph.D., University of Heidelberg), formerly of the University of Koenigsberg, now Professor of Modern History at the University of Chicago, is author of many books, the most recent of which is *The German Opposition to Hitler*.

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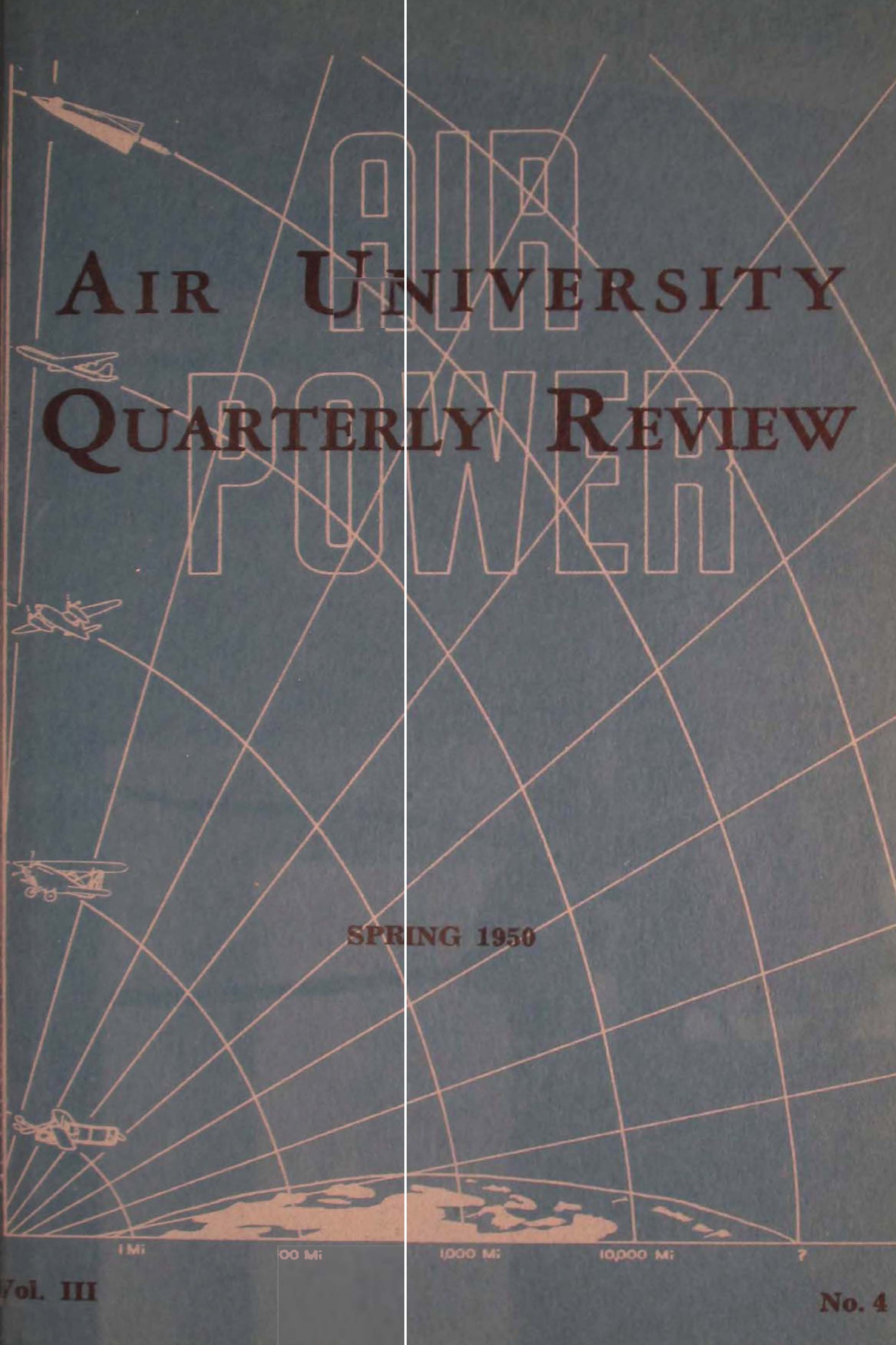
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The *QUARTERLY REVIEW* also offers a year's subscription for *LETTERS TO THE EDITOR* published entire or in part. Comment is invited on any of the materials we print or books we review—or brief discussion of other matters. Three hundred words or less will normally be used, but longer letters will be considered in accord with general significance. Mark *LETTER TO THE EDITOR*.



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