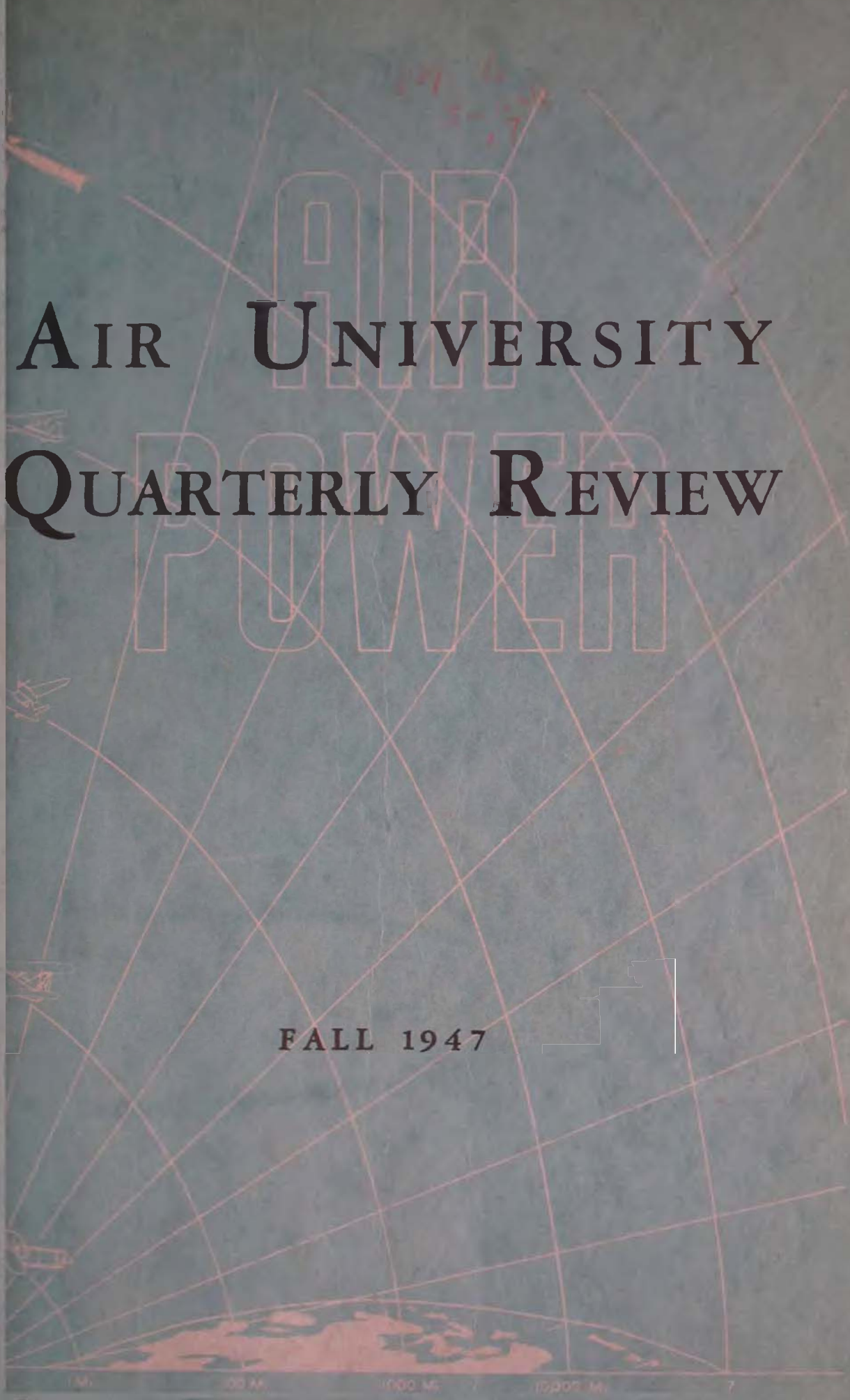

AIR UNIVERSITY QUARTERLY REVIEW

FALL 1947

Vol. I

No. 2

AIR UNIVERSITY QUARTERLY REVIEW

Printed at Maxwell Field, Alabama, September, 1947, under authority contained in par. 5c, AR 350-130, 12 June 1945

THE

UNITED STATES AIR FORCE

AIR UNIVERSITY QUARTERLY REVIEW

Vol. I, No. 2 FALL 1947

AIR UNIVERSITY QUARTERLY REVIEW is printed by Reproduction Unit, AU.

Published by
Air University
Maxwell Field, Alabama

AIR UNIVERSITY QUARTERLY REVIEW sells for fifty cents a copy and subscriptions may be ordered, two dollars a year, through the Book Department, Air University, Maxwell Field, Alabama. Students and faculty of the Air War College and the Air Command and Staff School are provided free copies as textual material.

ONE-WAY COMBAT

Colonel Dale O. Smith

ON FIRST consideration, the average air veteran takes a pessimistic view of one-way combat. The idea of flying into enemy territory beyond the point of safe return, continuing the penetration until almost all his fuel is consumed before attacking, and then, after bombing, going a relatively short distance further before bailing out or crash landing, strikes him as being a rather grim way to conduct a war. But a tactic of this sort is the only way targets that are beyond the aircraft radius of action can be bombed.

Shuttle bombing was conducted during the past war when friendly bases were available beyond the target. One-way combat should not be confused with shuttle bombing, for in one-way combat a landing must be made in enemy territory or, when conditions are favorable, in neutral territory. The airplane and crew are expended as the cost of placing an atom bomb on a target which is within range, but beyond the radius of action of the most advanced base.

The simple finality of the term "one-way combat" makes the air veteran immediately skeptical. His whole effort in past air war, other than to perform his mission, has been to *avoid* one-way flights. But, when he devotes some logical thought to the tactic, it is likely that he will be willing to conduct such operations should they become necessary in future war.

The first questions to be answered in considering one-way combat are: (1) Why are one-way flights necessary, and (2) why is it necessary to extend the bombing range of our existing airplanes? The B-36 has all the range we need, it is argued. But the cold fact remains that should we go to war soon we shall not have enough B-36s to conduct offensive operations in great force. We shall mainly have to use our B-50s and our B-29s with about 3,000 miles range. General Kenney has said that "if we get into trouble again, the attack will probably come over the shortest air routes from

the European-Asiatic land mass across the North Polar Basin."

Naturally we will counterattack. But from existing bases available to us, the B-29s and B-50s will not be able to strike vital Eurasian targets and return to their points of take-off. Reference to a polar-projection map will demonstrate that our radius of action is far short of that necessary to make conventional round-trip sorties. Therefore, if we are to hit the targets we must buy one-way tickets.

The next question that comes to mind is: Why not seize advance bases by surface action? As we did in World War II, why don't we plan to take bases within our radius of action? Why rush? In the last war practically all our operational bases were secured and built after we entered the war. But it was a time-consuming process. It took over a year to put our English bases in shape to conduct offensive operations in force, and those bases were given to us without requiring surface action. Most African, Italian, and Pacific bases had to be seized and it took considerably longer to develop them. It may be said that the Marianas bases which had to be seized and then built upon were not effectively operational until *three years* after we entered the war.

Can we wait three years before employing the atomic bomb in force? In this day of atomic warfare, will our enemy wait? Or will he, if he has the bomb, conduct one-way operations? The answer is evident. We won't have time to seize advance bases and develop them. We must strike in force as quickly as we can, else our enemy will beat us to the punch. And an atomic-bomb punch might well be the knockout blow.

We would be guilty of gross negligence if we planned on the assumption that the enemy doesn't have the bomb. There is every indication, with all the data on atomic energy which we have openly supplied the world, that any determined nation with resources could manufacture the atomic bomb within three to five years, starting from scratch. This estimate has been made by the scientist who helped develop the bomb. And there is much evidence that none of the great powers started from scratch. Potential enemies have been working on the atomic project since 1942, which would give them bombs on hand right now.

To assume that potential enemies have no bomb carriers

with adequate range to place the bombs on our cities would be equally shortsighted. There is no trick to building a long-range bomb carrier, and any powerful nation not doing just that would be guilty of stupidity beyond all reason. For example, at least four B-29s were fully compromised by being in the hands of Russia as far back as July 1944. Many more were compromised in Japan.

The only safe assumption we can make is that potential enemies have developed or will develop atomic bombs and that, with one-way flight, they have aircraft today with range enough to drop atomic bombs on our cities.

Defense against such attacks presents a gloomy picture. Certainly we have no defensive system now that would be even remotely successful and it is unlikely that we ever will have such a system before war is upon us. Without question we cannot rely on defensive measures during the immediate future. The complexion of atomic war reemphasizes the old cliché that the best defense is a good offense, and alters it somewhat: the best defense is the *first* offense *in force.*

IT TOOK about 600,000 tons of bombs to knock out Germany. Probably less than ten percent of those bombs struck the intended targets. Consequently, the factor of error is well represented within the 600,000-ton figure. Germany did not capitulate as a direct result of bombing but many experts assert that she would have done so with slightly more bombing. Let us assume that it would have taken almost twice that tonnage, or *one million tons,* to defeat her. This shower of bombs would have been rained over Germany for a period of from five to seven years, during which time she could have rebuilt much of the damage and strengthened her moral resistance to the terror and tragedy. But let us assume we could have rained that terrible destruction down on her in *one day.* What do you expect her reactions would have been to that? Such an attack would have been a cataclysm. Germany as a nation would have been stunned and devastated beyond all conception. There could have been no doubt about her further will to resist.

Conservatively speaking, the atomic bomb has a destructive force equal to 10,000 tons of TNT. One hundred such

bombs would equal one million tons of TNT. One hundred B-29s could drop almost twice as much destructive force on Germany as was dropped by all the allied air forces during the war.

You may say that many targets will not be suitable for A-bombs. Targets such as air fields, submarine pens, or launching sites for guided missiles would be too small or could not be effectively destroyed. Once the equivalent of a million tons of bombs has been dropped on cities and industrial areas, why worry about the small targets? The nation will be dead, without industry, communications, transportation, fuel or government. After the crushing atomic blow, small targets may be attacked conventionally as mopping-up exercises. The main issue will not be in doubt.

This devastation will most likely be our fate if we wait for our potential enemy to throw the first stone. And the possibility of our retaliating in force, after having been struck in force, is remote. We must be prepared, then, to strike on a moment's notice, and to strike *in force*. We can do this today only by accepting the tactic of one-way combat.

But will the necessity for one-way flight convince our combat crews that they must fly such missions? It is doubtful that crews can be sold on necessity alone. They must be convinced that they have better than a fifty-fifty chance for survival, regardless of necessity. Careful planning of the one-way missions should assure them a very high probability of survival.

In the *un*planned one-way flights that occurred in the past war, more than half the crews survived. If one-way flight becomes a recognized method of warfare, our enemy may lay the death penalty on captured flyers in an effort to curtail one-way operations. The Japanese, who practiced this in the past war, later gave it up as an ineffectual way to stop bombardment. Even so, with good planning there is a likelihood that most flyers will evade capture.

In the first place, if we lay on the first attacks *in force* the combat phase of the war will probably be over in a week. It should not be too difficult for a flyer to hide out for that time even in a very hostile area. He would have taken enough emergency rations to last him several weeks and

he could likely spend that short time in a hayloft or a foxhole without being discovered.

The crews would be well prepared to live under cover for long periods. They could bail out with as much food and equipment as paratroopers normally carry, all their supplies being designed to sustain them in the enemy country. Other equipment stowed in the airplane would be available if they could crash-land in a remote spot.

Depending on the target locations, they might reach neutral territory and be interned, or they might come down in enemy country near an area which contained sympathetic people, or they might hide out in the Arctic, where game is profuse and people live off the country indefinitely. In fact, when a one-way flight is *planned* there is every possible chance for survival.

Should the war not terminate in a few weeks, it is not farfetched to assume that we could run rescue missions to remove evading crews from enemy territory. We rescued many such downed airmen during the war with Japan.

One-way combat will quickly expend our bomber force if the war is not soon brought to a decision. The chances, however, of assuring a lightning victory are so great that it would be shortsighted indeed to hoard our bomber force at home until that doubtful time arrived when we would have bases near enough to make conventional round-trip missions. Add to this the crushing consequences of the enemy attacking us by one-way flights and we have no alternative but to accept this concept.

And what if we do expend most of our B-50s and B-29s during the first few days of a war? Since we cannot operate them on round trips, they would be of limited value to us until bases within their radius of action were secured. In the same time that it would require us to seize and develop new bases, we could rebuild our bomber force, provided we had the industry left to do it with.

CONSIDERING cost, the expenditure of one B-29 and its crew for the placing of an atomic bomb is dirt cheap. General Arnold said that one atomic bomb in a B-29 is equal to 200-plus B-29s conventionally loaded. Losing one B-29 and

crew out of such a task force gives a loss rate of one-half of one per cent, which was highly acceptable during the past war.

Whether or not pure reason and past statistics lead to the conclusion that one-way operations will be as safe, man for man, as our conventional round-trip operations, and whether or not the necessity of national survival is a factor, the concept of one-way combat will not be accepted by the Air Force until it is widely discussed and tested. Human nature is reluctant to change, and one-way combat is a complete reversal of policy. Furthermore, the American public must be considered. The mothers and wives of this country will bring such political pressure to bear in opposition of the tactic (unless they are previously conditioned to feel it is relatively safe) that the tactic could not be considered, regardless of its military worth.

We must begin today a reeducation of our Air Force personnel on the advisability of one-way combat. It may even be shown that the probability of survival is *greater* by operating only one way. There will be no withdrawing force to be shot at by enemy fighters, and no threatening flak areas to be re-traversed. In fact, almost half of the dangerous part of a conventional mission will be eliminated.

The problem of evading and surviving on the ground will assume paramount proportions. Training should begin on survival, escape, and evasion techniques. Languages must be taught. And exercises must be conducted under simulated conditions to assure the Air Force personnel that they are qualified and competent to conduct a one-way flight and to survive.

The great potency of the atomic bomb makes the blitzkrieg theory of warfare more cogent than ever before. There seems to be little doubt that the nation making the first atomic bomb strike *in force* will be the victor. Our inadequate air bases, coupled with the relatively short range of our B-29s, makes one-way combat a necessity for the immediate future if we are to employ our Air Power offensively in such a way as to be victorious.

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Air Officer's Education

Captain Robert O'Brien

THERE are three distinct elements in the education of an Air Force officer: military instruction, technical or professional training, and general education.

Air warfare has come upon us so rapidly that the military instruction of Air Force officers has never been thought out and analyzed as a new military problem. The traditional army basic training has consequently served as the model for military instruction in the Air Force. Close-order drill, bivouacs, field exercises and the other common routine ground-training maneuvers are as much an introduction to military life for a young flyer as they are for a foot soldier. This approach overlooks the fact that each occupation has its own peculiar psychology, its own dialectics.

Flying, which has been a dream of mankind throughout history, adds a new dimension to man's existence. There is no experience in a flyer's life prior to his air training that prepares him for this dimension, whereas an infantryman learns to walk and to double-time as a child, and a sailor learns the problems involved in handling a ship through the experience of operating and directing a wheeled vehicle over a definite course. When we subject the flyer to the same basic military instruction as an infantryman, we not only delay his orientation to this new sphere - the air - but we doubly handicap him by forcing him to act two more long years as an infantryman.

As there is no preparation for the flyer in ordinary life, a special emphasis is needed to steep him in his new element *from the very beginning of his military instruction.* And emphasis means that he must be torn away from his habits of thinking of the earth as a place to be walked upon or driven over. The infantryman thinks of assaulting frontiers and breaking the resistance of armies. The sailor envisages the blockading of sea lanes, and victory through attrition and starvation. But total warfare, the new concept which has

grown out of the development of the airplane, finds its most effective expression in the destruction of centers of production. The airman must be taught to think about methods which will paralyze the economy of an enemy nation; further on in this article, the study of economics is discussed as the major subject of general education which provides the airman with this knowledge.

The Air Force will never realize its full potentialities from its own element, the air, unless the airman is first allowed to develop his soldierly qualities out of this element. He must learn to look at everything from the air, including his problems of drill, discipline, comradeship, courage, organization, and administration. The pre-flight inspection, for example, might be the basic act around which all the discipline of the Air Force centers or grows. By learning to look at the world of the air, all misleading symbols, such as close-order drill, would be done away with. If flying is at the center of the military instruction program, other related subjects will fall into place naturally and acquire greater meaning, "care and feeding of troops," "transportation and troop movement," "military history and biography," and "survival" -- all these subjects which have become complicated in fast-moving aerial warfare should be approached by airmen who are familiar with the possibilities and limitations of Air Power.

A subject of military instruction that is lightly touched upon in the Air Force is "physical training." All voluntary or ordered hardship, such as training to get along with little or uncomfortable sleep, to survive on short rations, to know something about self sufficiency, should be included in military instruction. In the past, the Air Force has been able to provide its men with more conveniences than were necessary. It is fine if this can be done without interfering with operations, but unless the men have exerted themselves at some time to sacrifice these comforts, constant grumbling will always plague the field commander. The programs of physical training should not lead officers to think that they are passively undergoing this as a training, when in reality they are showing themselves capable of surviving a rugged experience. As long as we call it "physical training,"

we shall have no lasting results because the exertion must be an attainment of the character and not of the muscles.

The Air Force was founded and developed to full maturity, in only thirty years, under the pressure of two wars. This precocious growth has hindered the establishment of great traditions which mean permanency in any institution, for without a heroic past no really hopeful future is possible. This is a secret of institutional life which must be recognized in the Air Force. Continual neglect of tradition might lead to an argument by the other services that the Air Force is not permanent, but merely a new development which itself is now superseded by guided missiles. Therefore, the Air Force must insist that today it is the heir and the instrument which carries on the great military traditions of this country. In its exploration of new frontiers, in its responsibility as the first line of defense, and in its readiness to dissent from untenable military opinions, the Air Force represents the continuation of the achievements of Lewis and Clark, of Fremont, of Perry, of Byrd. Our present pioneering in the Arctic and our explorations in the ionosphere represent a modern conquest of frontiers. The study of military history and biography should be included as an essential part of the military instruction program in all service schools so that this background could be added to the consciousness of the officers of the present Air Force.

THE SECOND element of education -- specialist training -- is an outgrowth of the union of economics and experimental science. Science has endowed technicism with the possibility of limitless growth, and industry has applied this knowledge in the development of innumerable diverse occupations. Specialization has thus become the means for advancement in modern society, yet we know that a wisely ordered society cannot be wholly controlled by specialists, and this same condition holds true for the Air Force. Modern warfare cannot be fought by the general-duty officer or soldier, but neither can the expert be allowed to determine what chances will be taken, for the expert is a specialist only in materials and techniques. Training a pilot in electronics will not produce a better commander, for it is not the possession

of techniques that defines leadership. This situation was evident during the war, when many squadron commanders who had been in the Air Force long enough to have been thoroughly cross-trained were incapable of providing the leadership which the position required.

In politics, in art, in social usages, in the other sciences, the expert is apt to be an ignorant man. Because he knows his own tiny corner of the universe, he is led to believe that he may dominate fields outside his profession. An examination of the graphic presentation of the "Army Air Force Educational System," depicting the career outlook of an Air Force officer, discloses no evidence which shows the specialist, despite his cross-training, growing into a wise, mature leader. The quality of leadership proceeds from the inner convictions of a man, and no amount of mechanical know-how can substitute for this essential.

Despite the dangers in a system of specialization, no one can dismiss the value and necessity of a division of labor either in modern industrial society or in the modern army. The extent to which technological developments have been applied to military weapons staggers the imagination. Today the Air Force makes more use of these complex weapons than any other arm or service, and therefore it requires technical schools for instructing technicians which are comparable to the shops and laboratories in industry. Gone are the days in which basically qualified soldiers could man the several branches of the army. It has been necessary to diversify labor within the military establishment, and the classification system for Military Occupational Specialties has become similar to that of Civilian Occupational Specialties. Although the positions are broadly defined as possible, the number approaches a thousand, with twelve different specialties for enlisted radar mechanics alone. The training of individual specialties does not involve difficult educational problems, for the science of job analysis and the improvement of training materials have greatly facilitated the specialist training of an unskilled soldier.

Today when real technical progress is achieved in a particular field, it is usually due to a combination of two or more existing specialties. Thus experimental science is

science in a constant flux, and it is anti-specialistic. The intrenched specialists usually fight such integration, declaring it to be unwise, or unnecessary, or impracticable, or of merely transitory value. However, the profusion of cultural and technical possessions is such today that it threatens to engulf mankind. It is urgent, therefore, that we base our specialist training, its methods and instructors, upon the plain, humble principle that the student cannot learn all that we would like him to know. Since all officers and enlisted men have become specialists within the military profession, the most serious task now is the necessity of developing within each specialist a larger view of his contribution to the total social effort. This is possible only if he is given a broad familiarity with the men and ideas which comprise his heritage.

THE REMAINDER of this article will deal with general education, its definition, theory, development, content, and necessity in an aggressive, specialized, purposeless society. There is an airy and unspecific connotation to "general," for in uncertain circumstances we are carried through largely by the quality of our nature. In this study the word "general" signifies "universal," and it applies to and is concerned with the recurring and changing roles that we enact in our lifetime.

The universal theme of America is a belief that life holds a promise for all men, that limitations must not be imposed upon their development, and that this life can only continue as long as mutual trust exists among men. Many disintegrating ideas and practices have weakened this faith: in an ever-changing society, its true meaning and power must be constantly rediscovered. Education is not the only means of achieving this, but it is one of the institutions that men have built to accomplish it. There is another side to general education that emphasizes the recurring roles of father, judge, teacher, soldier, politician, worker, player, lover, and philosopher which each man lives in his lifetime. These actions and occupations are not produced in us mechanically. At each moment it is necessary to make up our minds whether we shall live vitally or whether we shall pass

things by. Even when we seem to drift, to make no decision, aimlessness is our decision. The complexities of modern society have striven to split the personality: narrow specialization in the economic field is disorganizing family and community life; bureaucracy threatens to put an end to personal government; and pragmatism as a philosophy has substituted empiricism and expediency for authority and responsibility. Until 1939, life in this country was drifting into anarchy, and the tradition of liberal education which was concerned with the development of the whole man was being lost in departmentalization.

During the last few years, a general re-appraisal of college education has been taking place, and widespread plans for reshaping curricula have been proposed as a response to the need revealed and created by the catastrophe of a World War. Educators began to realize that peace and survival were frail entities, that social responsibility could not be delegated. The isolationism of this country did not belong to any class or section; it existed primarily in the hearts of the people. We know now that individuals must again begin to act energetically and directly in all of their roles, that they must become familiar with their history and with their society. General education is concerned with a people's attitudes and with the spirit in which they face life.

The renewed interest in general education has also been brought about by the contempt with which many college graduates view higher learning. Many have held that the essential benefit of college life resided in the social intercourse and the contacts that were made. As knowledge became investigation, information, and opinion rather than the pursuit of truth and wisdom, real intellectual development was frustrated.

When knowledge becomes cheap, mass production methods must be introduced to support the façade of learning. There has been a noticeable trend in the last thirty years to let students obtain a college degree in the least possible time and in the easiest possible manner. Pseudo-scientific systems of measurement have been devised to determine the amount of learning an individual possessed, and education has been re-

duced to a quantitative analysis. Here, again, knowledge was separated from purpose and became mere information which was readily forgotten. In professional and technical training the emphasis upon "scientific" testing methods and teaching procedures, optimum classroom size, and student load is well rewarded, but in general education, where there is a spirit to transmit, where great ambitions and the feeling of infinite growth are the conditions of learning, these practices emasculate teaching and degrade education. Any plan of general education must rule out shortcuts whether they be correspondence courses, intelligence tests, or other impersonal agencies which attempt to peddle education as if it were the latest breakfast food.

LET US now consider seven specific subjects in the field of general education and the contribution each can make toward bettering the performance of duty of every officer.

Knowledge, fundamental to the understanding of America and to the true meaning of our lives, is derived from the study of history. One of our greatest errors in studying history is that we generally study it on a small scale, in textbooks and outlines. History becomes an affair of abstract centuries and the struggles, agonies, passions, and uncertainties of events disappear. Issues which at the time were confused seem clear, outcomes seem obvious and inevitable, and we never realize how near to failure were the triumphs that to us seem easy, or how close to success were complete and disastrous failures.

Deterministic interpretations have confused and clouded the truly universal factor of history, the element of human nature as it struggles with an uncertain or unpredictable future. Geographers have won and lost history, due to geographical or climatical conditions. Marxists have found a class war in every uprising. Interpreting the appearance of an individual genius or the role of intellectual and moral qualities in these terms may satisfy the theorists, but it is no comfort to the human being who wavers, suffers, and sacrifices.

Popular government is based on the decisions of the majority. In the United States, if people are to decide

wisely, they must know as many of the useful lessons from the collective memory of mankind as are available. The courage, the wisdom, and the faith of the people who renounced and sacrificed and died for us, inspire us to become worthy of them. This cannot be fully expressed in education, and yet education is the only peaceful method of learning these lessons.

If we are to have the best chance to avoid some fatal error in the conduct of our future affairs, we must break the spell of the purely American past. We need to find out which examples have shaped men and what real choices lie ahead. Our first and most obvious task is to see that our officers are immersed sufficiently in history to act wisely in relation to Poland, Greece, Iran, China and all other parts of the world in which they are representing this country. Our foreign policy since the end of World War I has been partial and complicated, and our failures have been due to indifference, faulty analysis, and irrelevant emotion.

To know ourselves we must begin with the fact that the United States is the daughter and the hope of Europe, and that our heritage is directly drawn from the society of Western civilization. We must learn that our legal system, our universities, the rise of towns, and the development of modern science, are all intimate parts of our own history which represent marvelous responses to problems which at one time seemed insurmountable.

The second subject of general education is science and mathematics. Some understanding of the physical scheme of the world and the organic life therein is a prerequisite for citizenship in the Air Age. Unfortunately, most science courses in colleges are designed as introductory courses for the professional scientist. This is also true of college mathematics courses. There is no reason why the ordinary man needs this information. Even the professional man, the doctor or the engineer, is burdened in many courses with the study of scientific investigation. Mastery of these professions demands apprenticeship and repetitive practice, but not the attempt to turn people into scientists. The real scientist is a creative person, and his career involves a calling and an asceticism which is quite unworldly.

Even the courses designed for the technical or professional man are far beyond the need of general education in science for an officer. In considering the place of science in general education, the Harvard Report on *General Education in a Free Society* states, "Most of the time in such courses is devoted to developing a technical vocabulary and technical skills and to a systematic presentation of the accumulated facts and theory which science has inherited from the past. Comparatively little attention is given to the examination of basic concepts, the nature of scientific enterprise, the historical development of the subject, its great literature, or its interrelationship with other areas of interest and activity." The general course in science is taught in very few American colleges, and on the whole science departments contribute the greatest proportion of backward looking, anti-intellectual, mechanic-minded members of the faculty.

We glibly talk about our "scientific age" and the need for the "scientific habit of mind." We mean by this a recognition of the fact that our lives, from the kitchen to the battle line, are shaped by the influence of machinery embodying scientific principles. On a large scale, all major social questions involve scientific matters. Everything from soil erosion and air transport to water supply and public health involves at some point matters of fact and theory from the realm of science. In spite of the fact that the sciences have been taught for fifty years in schools and colleges, the understanding of scientific truth and procedure which is necessary for intelligent leadership in public life is largely lacking. We tend to "leave it to the experts." The result is that we are ruled in public life by scientific ignoramuses and in the scientific laboratory we have, for the most part, political and social illiterates.

In mathematics students should be given an understanding of mathematical systems and their development. The role of mathematics in gaining knowledge of the natural world, its special and quantitative relations, is as important as the mastery of the logical structure of algebra, geometry, trigonometry and calculus. Some conception of the theory of numbers, familiarity with statistical analysis, symbolical

representation, and the calculation of chances, may aid in detecting many fallacies in a world that swarms with them.

The physical sciences are probably more obviously related to Air Power than any other subject. Consequently, most Air Force officers will accumulate a large amount of informal knowledge about the physical world. In formal education, however, such fields as the theory of the structure of matter -- molecular, atomic, electronic -- and theories of its variety and change, will serve to enforce their understanding of the principles employed in the development of the latest weapons. Air Force officers should also be familiar with the fundamental chemical phenomena, concepts, and classification: elements, compounds, affinity and stability, ionization, isomerism, and the periodic table. They should also know the present physical theories of waves and radiation, such as wave-motion, sound, and light; the quantum theory of light and matter, and the theory of relativity, as well as the fundamental laws of energy and the transmutation of matter. Finally, in the physical sciences, some consideration should be devoted to geological fact and theory, and to astrophysical phenomena and theory. All of this is the basis of language in the Air Age.

In the biological sciences, a general course should include the structure, function, variety and relationships of living organisms and the influences of heredity and environment in the evolution of life.

A review of the field of science and mathematics would suggest that treatment could be given in only a survey course or as it is presented now -- an introduction to specialization. This is not necessarily the case. General education calls for a thorough rationalization of the systems of instruction. The methods of descriptive analysis that have been used and are still in use must give way to the task of simplifying and synthesizing without sacrifice to the quality or substantialness of science. In order for a student to grasp the fundamental ideas of any science -- the principles, the methods of procedure, the results -- it is not necessary that he receive any great amount of formal training or familiarization with the techniques. Science presented in this manner will not be divorced from our first

subject, history, for it will continually emphasize the greatness of man's conquests and will enable the student to realize and appreciate the advances of the qualified leaders of the modern scientific world.

THE THIRD subject in the general education curriculum might be criticized, but the major social problem of our day is the economic problem, and all Air Force strategy and Air Defense centers around a complete understanding of the rationalization and localization of industry. Economics as terminologically used here is not concerned with the superficial aspects of economics, such as tariff, money, banking, corporations, taxes, or the traditional subjects of an economics department in a college. We should be concerned with the study of the reproductive problems of society; the depersonalization of labor in modern industries; the disintegration of community life under the impact of industry; the organization of the large unindustrialized areas of Africa, China, South America and India; the just allocation of world resources; and the decentralization of industry. These are the unexplored fields of economics that lie beneath the ruins of thirty years of war and revolution. Whether the beliefs that led to the founding of this country can survive in this global economic world where unemployment, impoverishment, inflation, hunger and forced migration strike all nations, is the outstanding question of our future. The professional soldier must think about these questions, for our society will live or die according to our settlement of these violent problems. How to make our own country invulnerable to the moral and physical onslaught of the new era will either be answered by bold thinking done in the Air Force or not at all. The so-called Air Defense will not protect the United States and its productive plant from the atomic bomb. It may be that this plant has to take on a different shape and for this reason *economics in our sense of the term is a compulsory subject for the Air Force, for in exposing every officer to this subject we may find the true strategist of the Air Forces.*

The fourth subject in the general education of an air officer is philosophy. Men are crushed in all effort today

by the commonplace. Mass systems of communication and unconscionable advertising beat on our individuality twenty-four hours a day and further atomize the tenuous organization of life. To attempt to uphold anything sacred, any value, anything of quality, is an almost impossible task. Everything that is different, that is excellent, anyone who holds out for the best, runs the risk of being eliminated.

An awareness of the great purpose of this country, the hope that it holds for its people throughout the world, lies neglected beneath the surface of everyday living. The absence of any common knowledge of the great ideas and aspirations which our best modern philosophers embody, further darkens an obscure future.

The unwillingness to take "time out" for meditation, the continual noisiness of our surroundings, the uncertainty of a drifting course, the immense complexity of modern life, all are provocations to discover and examine the systems, the problems, and the thoughts of present and past philosophy for guidance in our confusion. Philosophy is the product of men who have suffered, endured, experienced, and comprehended the diversity and universality that underlie all things. William James said, "To know the chief rival attitudes toward life, as the history of human thinking has developed them, and to have heard some of the reasons they can give for themselves, ought to be considered an essential part of liberal education."

Soldiers in the recent war demonstrated that courage, obedience, judgment, and humor are present in our personality today as much as they ever were. But in war the issues are obvious, the choice is narrow and limited. In the times that lie ahead in peace the path is not clear; right and wrong often are hidden in mist. Uncertainty will inevitably lead to indecision. The profuseness of the sciences, far from strengthening our faith, has upset our unity and obscured our sense of values. We must remember that the German army fell an easy victim to a seemingly unbelievable political philosophy. In peace, extraordinary effort is needed to insure that our Air Force is soundly established in harmony with our fundamental beliefs. As Eugen Rosenstock-Huessy says in *The Christian Future*, "Thinking for soldiers is a

very new aspect of research and education. But this is the reform of our educational system which...(they) demand... Higher education in the future can only be planned for people who serve and fight life's battles, on whatever fighting front, who can see the flame of faith, the rays of thought, the reflexes in acts, all as incarnations of God's works...Otherwise the bodies of the young might be slaughtered for the dated ideas of a senile science, or the mature ideas of truth might be butchered by the rash instincts of brutes."

A final word is necessary to forewarn us against the survey type of course in philosophy. The typical introductory course in college is a dreary and sterile survey which flashes one after another of the great philosophers before the class and produces only a shallow and useless knowledge of men and ideas. We must continually remember that even the most modern of philosophers did not anticipate and prepare us for the rise of Fascism and the fury of war. Our generation was born into a world of pragmatic thought in which every aspect of life, from war to worry, was overanalyzed. If the coming age is to find a faith to keep itself going, it must search out and study the prophets who understand our moral, economic, and philosophical needs and bury the "Free-thinkers" who called forth such monstrosities.

Philosophy prepares us for one of the simple functions of our service. There are times when any commander must speak to his men with conviction. He must select examples that impress them as being true and as being espoused by him. Rare as these occasions may be, they deserve a lifelong preparation because they are the decisive moment. The morale of the troops may be ruined by an unconvincing, cynical, ignorant speech at a funeral or a national holiday or before a battle. The most convincing speeches are usually those of men who have been immersed longest and most vitally in history and philosophy. The philosophers to whom an American officer might well turn are the men whose spirit fills and keeps alive our democratic institutions.

THE FIFTH subject in general education of an air officer is the study of languages. Language instruction has been of superficial quality in all phases of American education and

until the war it was not intended to do much more than to allow a student to identify a foreign word when he saw one. Usually, several years of study in a foreign language produced neither the ability to read, speak, nor to understand the language.

Some common misconceptions have undermined the possibility of serious language study in the past. It was commonly felt that languages could not be learned in school. If one would learn French, one must travel to France and live there. When the war made such travel impossible, we found that we could learn at home. Unfortunately, during the war the Armed Forces had to set up their own language schools and cram German, Russian, Japanese, and a score of other languages and dialects into people whose previous immunity to language seemed absolute. Our success in meeting this problem was due to the concentration and seriousness with which it was sponsored. This provides the clue for successful language study. The curriculum at a future Air Academy must be arranged to allow the student exclusive concentration over a period of four or five months in his chosen language. If it cannot be arranged, no time should be wasted on "seeming" to learn the language.

Considering the amount and length of American education, the ignorance that we show of the language and the culture of foreign countries is amazing. This ignorance has made us inept at conference tables, exposed on the battlefield and in enemy territories, conceited before foreigners whose customs and culture we cannot understand, and incapable of catching the drift and trend of current political and social changes in other countries. The general and his aide who were responsible in our zone for the German press, schools, and mentality did not know the German language.

The ultimate educational value of knowing a foreign language is derived from the chance it gives us to watch the workings of other people like and unlike ourselves. It opens up their literature, philosophy, and shows their contributions to science and religion. Thus the study of a language becomes the study of a people, and we who make this study adopt a second home which allows us to transcend any narrow

local nationalism.

The sixth subject in general education of an air officer is fine arts, including music. As this article said earlier, vulgarity is a burden today. The fine arts expose the cheapness and shoddiness of radio and movie productions and provide the main fountainhead by which we refresh our sense of proportion outside of nature itself. This study is not ornamental, but absolutely necessary to our health. Sickness is not only caused by the outside attack of disease upon us, but also by the exposure of our bodies to continuous dissipating influences. The pressure of always "doing" and of never seeing, feeling, singing or experiencing directly the great works of art, exhausts our nervous system. Nowhere is man's ability more evident than in the richness, the diversity, the miraculousness of his expression in music, painting, sculpture, and architecture. The pleasures derived from an understanding of form, balance, arrangement, variation, design, and harmony are a tremendous refreshment to life. General education in the fine arts is not concerned with turning out either a performer or a critic. Primarily, it should acquaint the student with the existence and development of visual and auditory languages in which truth is expressed in sound or color better than it could be in any other medium. Fine arts are as much an introduction to passionate feelings and precise expression as philosophy is. All art interprets life, determines values, and shapes our character. The type and quality of art that we favor reveals our inner nature whether we are aware of it or not. The leisure of an officer will reflect in his performance of duty, and if he develops no deep aesthetic interests, he will turn to cheapness which will weaken his firmness and his influence over his men.

The seventh and final subject of general education of an air officer is literature. All the subjects of general education are interrelated; this is especially true in respect to literature, for all subjects have their classics, and in the teaching of these a tremendous opportunity exists for introducing books that convey ideas of universal significance. Everyone is familiar with the scheme of basing an entire

college curriculum on one hundred great classics. This extreme imposes such severe limitations on study that it does not seem practical, but this use of the classics does surround them with an aura of importance that is often lacking in the conventional classroom where analysis has supplanted understanding. However, aside from a judicious use of the classics as texts in all courses, literature should command a field of study in itself, for it is only by familiarity with the classics that they are kept alive by each generation and made permanent possessions of our heritage. Literature provides the common body of stories, phrases, beliefs, heroic lives, imaginative understanding, and drama which accompanies civilization. In the early history of America, a comparatively few books provided the basis for all knowledge. The biographies of the founding fathers continually refer to *Pilgrim's Progress*, Blackstone's *Commentaries*, and the *Bible*. The influence of these books on the thought, the expression, and the values of generation after generation is felt in every custom and law of our own period.

IN PEACE, the years rapidly diminish the number of combat-experienced men on active duty, and the lessons that one generation had to learn in the fire of battle, the next generation must believe on faith. All knowledge that can be acquired in one's own life is experimental, but all knowledge that is acquired from traditions is fundamental and is the knowledge which makes leaders in peacetime. The channels which open up this knowledge are enthusiasm, love, and admiration. Only those officers who can inherit from previous generations unbreakable, unexperimental standards of behavior, can be entrusted with the lives of men or with grave decisions. The good staff officer or the accomplished specialist must be at the beck and call of these leaders because only these men have identified themselves with former generations, and they alone have the right to dispose of the lives of future generations. It is the duty of every officer to equip himself with the tools which such a responsibility requires.

A Lecture On Air Power

Major Alexander P. de Seversky

PART I

THIS SCHOOL, the Air University, seems to me a very remarkable institution. It is right here that the actual tactics and strategy of the next conflict will be developed, and it is in line with those purposes that I want to address you.

Events today hold out little real hope or probability that the nations will be able to resolve their differences peacefully. Unhappily the danger of a new armed conflict has not been eliminated. The world is in turmoil. It has been divided geographically and ideologically into two hemispheres. There seem to me only two ways to attain one peaceful world. First: one of the ideologies will succumb to the other through contamination and infiltration. The more virile system will overcome the weaker by evoking a revolution from within, thus making a uniform world with a single ideology. The peace that follows may last a hundred years or forever. Second: if no such ideological victory is achieved by either side, then a military conflict will become inevitable. There simply is not enough room on this earth for the two diametrically opposed systems.

Actually we had a golden opportunity in the recent past to head off another war for possibly a century. That was on December 7, 1941, when we lost our Navy. If at that time our leaders had had the vision to put our national resources into long-range strategic Air Power, we could have finished the war *by our own strength,* without reliance on allies other than Great Britain. We would have been in a position, at the time of victory, to organize the world along democratic lines, without competition from any great dictatorial force.

Had we put the major portion of our national resources and energies into long-range striking Air Power, we would have finished the war in complete control of the air all

over the globe; we would have been able to strike anywhere on the face of this planet directly from our own source of power, should totalitarian forces challenge our civilization. Unfortunately, some of our leaders vested with strategic preparations could not see the strategic potentialities of aircraft. They knew only the "tried and true" weapons. Instead of building invincible long-range Air Power, we threw away our chance and proceeded to rebuild the fleet, thus chaining ourselves to the obsolete strategy of surface struggle. As an aeronautical engineer I can tell you that we could have built the necessary Air Power at that time -- much faster, in fact, than we rebuilt the old weapons. It was not a technological failure but a failure in strategic vision that held us to the old ways.

IN 1939 I consulted Glenn Martin, Donald Douglas, Boeing, Consolidated, and other manufacturers. I can attest that the industry was prepared to build airplanes at that time which by 1943 could have flown directly from Alaska or Newfoundland to Asia and Europe, respectively; these aircraft could have deposited ten times the bomb load which was dropped by our Flying Fortresses on Germany. In other words, had we decided in due time that Air Power is the backbone of modern strategy, we could have dropped on Germany in 1943 -- not in 1944 or 1945 -- not 1,600,000 tons of bombs but 50,000,000 tons.

Those of us who have been in Germany know that the country would have collapsed under that weight of bombardment long before we mobilized the necessary army for invasion. But, alas, we ignored the new strategic possibilities. We went into the war along the old, obsolete lines and we adhered to these lines. We broke the basic principle of war-making by undertaking to build simultaneously the biggest army, the biggest navy and the biggest air force. In trying to be strong everywhere, we succeeded in being weak everywhere.

Moreover, after the first few combat experiences we realized that there was something wrong with our strategy; whereupon we proceeded to change and shift it constantly in

the course of conflict. That again was contrary to fundamental principles of war.

Yet we got away with it. Why? Simply because as a nation we were so terrifically strong and wealthy that we could afford the luxury of major errors and fantastic waste. We could make all the weapons of nearly all kinds of strategies and still win a war. We were in the position of a heavyweight fighter put into the ring with an infant, who can afford to make mistakes and get away with them. He can knock out the child at will -- and probably even earlier by sheer accident.

The Germans were immensely clever technologically. As far as modern weapons are concerned, they were ahead of us. Yet they lost the war. Why? In the first place, because they did not have sufficient manpower and natural resources to resist the gigantic coalition of force opposed to them. In the second place, because under a totalitarian setup they could not fully or properly exploit their available resources or the full creative powers of their people.

Most important of all, the Germans lost -- though they were ahead of us in aircraft design and many other respects -- because they lacked military know-how. Their strategy was wrong and, by reason of the dictatorial regime, remained wrong to the bitter end. The German defeat stands as an example of how a nation can lose despite tremendous technological advantages when it does not possess the necessary military brains; when it is defective in the science and art of war. The further implication of that experience is that a country having the requisite military skills can win a war despite inferior weapons and more limited natural resources.

Japan was in an even worse situation than Germany, since it not only was deficient in resources but very limited in military intellect and technological know-how. The Japanese, being great imitators, proceeded to imitate America in every respect -- copying not only our virtues but also, and even primarily, our faults. They began to build the things we were building -- land, sea, and air forces simultaneously. Though their resources were so sharply limited, they were even stupid enough to construct the two biggest battleships

in the world. These never saw combat and were sent to the bottom by a few aircraft.

Had the Japanese done first things first, and channeled their natural resources primarily into Air Power, the whole Pacific picture might have been different. With effective Air Power they might have prevented us from taking the control of the air over Japan, which enabled us to defeat them.

Those of you who have flown over that country, as I have, and have seen its terrain and natural barriers, must have come to the same conclusions that I did. Had Air Power been tied forever to a tactical role for surface strategy on both sides, the war might have lasted for generations and ended in a draw when both sides were totally exhausted. What tipped the balance was that we finally resorted to strategic Air Power; we achieved the ability to strike directly at the source of Japanese strength at home and destroy it. The enemy, unable to retain control of the air, was doomed.

As I said before, we broke every basic rule of warfare. We fought the most amateurish and unscientific war on record, but we beat the Japanese. It was a giant playing with a pygmy. This was unwittingly acknowledged by Admiral Halsey in his famous statement: "When we entered Sagami Bay on August 27th we were met by almost the entire Japanese Navy. A miserable, dirty, depressing, old-fashioned destroyer. I was ashamed then that it took us four years to finish a war with those people."

Of course, it took us four years -- and a lavish outpouring of American blood and substance -- because we relied on obsolete strategy. The extra time would not have been important were it not that it meant the loss of more lives than we needed to sacrifice.

Our top military minds were obsessed by the idea that the war had to end on the ground, on the field of face-to-face battle. But we did not have enough manpower for that kind of victory. Our strategic masterminds therefore decided on a clever scheme. They decided to build Russia and China, which had unlimited manpower, into great military machines. With Russian and Chinese armies assuming the burden of cutting down German and Japanese land armies, we could then

walk in for an easy victory, presumably saving a great many precious American lives.

But what happened? The clever scheme boomeranged. We built a Frankenstein monster in Europe which today jeopardizes the peace of the world and menaces us with the loss of millions of American lives. We nearly built another Frankenstein monster in Asia, but luckily our Air Power rolled up enough momentum to finish the war before that could happen. But the European monster -- the direct product of our shortsighted and outmoded strategy -- is still with us as a terrific problem. If we had used our natural resources wisely to create Air Power to defeat Germany by our own strength, without arming another nation, we would have spared ourselves the postwar headaches which today make talk of a third World War unavoidable.

BUT THAT is the past. Today we have to think earnestly and clearly about how we can protect ourselves in the immediate future. I don't want you to think that I consider war inevitable. I do believe, however, that we are bound to have one unless we are strong enough to discourage any would-be breaker of the peace. American military weakness is the one thing best calculated to provoke a military showdown.

Let us review briefly how we ought to organize our military defenses. In this connection, when I speak of the future I do not mean fifty or thirty-five years from now; I have in mind five or ten years. The exigencies of this shorter period are of paramount importance.

World War I was, in general, a war of position. Two armies were in a clinch for years. They were deployed in two systems of trenches and shooting it out. World War II was a war of movement, all over the face of the earth.

World War III is bound to be again a war of position but on a global scale. Two adversaries on respective sides of the earth, each equipped with long-range weapons, will be like two fortresses possessing artillery that can strike at any part of the opposing fortress. They will be shooting it out, as the trench forces did in the first World War.

If this happens tomorrow, before long-range weapons are available, we shall simply have a continuation of World War

II methods of warfare. Five or ten years hence, the "artillery" will be represented by long-range bombers and fighters, though of somewhat different military characteristics than in the last war. Later, these may be replaced by robot planes and, still later, by guided rockets. But the nature of the "artillery" will not alter the strategic equation. We will still have two fortresses shooting it out.

On one side of the globe is Eurasia, on the other America, with the Arctic area as the no-man's-land in between. Strategically, the adversaries would be stationary, pinned to their positions. Tactically, of course, there would be a good deal of movement, movement primarily in the air. The walls of these fortresses locked in a clinch would be their *defensive* Air Power; the ramrod which would penetrate the walls of either fortress would be the opposing *striking* Air Power.

Thus, if war comes in five, ten or fifteen years, the main issue will be an air battle for control of the air ocean: victory in the skies will be the decisive factor. That is why we dare not repeat the mistake of the last war and proceed to squander our resources by building anything that comes to our minds. We simply cannot afford to create an endless variety of weapons, lay them on the shelf and then, when war comes, pick those we think are needed and throw the rest in the ash-can. We simply haven't the manpower and the materials for such a wasteful, unscientific procedure.

In the future we shall face an opponent who has immense manpower and resources. If we try once more to build the greatest army, navy and air force and implement them all with every conceivable variety of weapon, we shall need not 135,000,000 population but billions; and natural resources of incalculable magnitude.

The only course in common sense, the only course that can equip us for victory, is to resolve here and now that first things shall come first. Unless we can achieve control of the air, all other weapons and strategies will be useless; they will never come into play. That being the case, we must immediately divert the major portion of our natural resources and labor forces to build an impregnable air cover in our skies.

There is of course no absolute impregnability in a true military sense -- but our air cover should be so strong that it would inflict on the enemy a rate of attrition beyond his capacity. Primarily we must build a striking Air Force -- the ramrod -- capable of penetrating and destroying the air walls of the opposing fortress. Destruction of the enemy will be achieved by waging war from overhead. And this will be an end in itself, not merely as a prelude to invasion. Personally, I am entirely convinced that there will be no need for military invasion. The victor may decide to occupy and hold the conquered area for political or economic reasons -- but invasion as a component of total military victory will be a thing of the past.

Even in the last war, we did not have to occupy Germany and Japan from a purely military standpoint. After we assumed control of the air over those countries we could have bombed them into a pulp, destroying the last vestige of their industrial civilization and leaving them to dig out of the debris for the next two or three generations.

We occupied those countries because occupation was the accepted, traditional, grand finale of victory according to old-fashioned military concepts. In the past, of course, the enemy's means to wage war could not be demolished without the entry of the victorious army to lay their hands on the industrial complex and prevent it from producing implements of war. The occupation and holding of enemy territory was thus the natural and necessary conclusion of the conflict.

The justification for occupation in the last war was essentially political. It happened that among our allies there was a nation of entirely different ideology. The devastated and defeated nations were ideal breeding grounds for that ideology. Therefore we had to occupy as much of that area as we could to prevent it from becoming totalitarian territory. We had to help the defeated people to rehabilitate their lives and reorganize society along lines akin to our own.

BUT IN the foreseeable future, there will be only two contending sides in the world. Whoever wins, there will be no third party to occupy and take over ideologically any of the

conquered areas. That is why the next war will end with the total destruction of the adversary and without need for military occupation in the old sense.

I am inclined to believe that General Devers' airborne army probably never will have to be used. Once our opponent is beaten, only civilian invasion -- let us say by businessmen and educators and industrialists and doctors -- will be needed.

Nor do I believe in outlying bases. In the past we needed bases, both stationary and floating, for our Air Power because aircraft did not possess sufficient range. In the future we shall strike the enemy across any distance from our home bases. Some will insist that, regardless of range, if you are nearer to the target you can use less fuel and carry more explosive. This slight tactical advantage, however, will be offset by big strategic disadvantages. Let me explain by an analogy with air transportation.

It is obvious that a plane flying from New York to Los Angeles could carry many more passengers if it made several stops to pick up fuel at frequent intervals. Why then do we prefer to fly non-stop? Because over-all efficiency makes a great number of stops impractical and wasteful. Similar over-all considerations -- which is to say strategy considerations -- apply to military bases, which are in the final analysis stepping-stones on the way to the enemy target.

True, such bases will perhaps enable us to add a little to the explosive load. But if in order to do that we have to spend enormous amounts of our national resources for naval and land power to hold and supply those stepping-stones, that will outweigh many times the tactical advantage gained. The cost of maintaining, protecting, and supplying such bases is ludicrously out of proportion to the benefits they offer.

In the future, with aircraft able to deliver explosives directly from the source of our power, the maintenance of overseas bases will simply not make military or economic sense. During the last war I had occasion to compare our action against Europe from European bases as against direct

action across the Atlantic. I had to figure out the labor and material that went into naval force to clear the Atlantic of submarines and supply the bases; to transport and supply the armies that occupied and serviced the bases. Obviously the investment was colossal.

Had only a fraction of that investment been put into long-range Air Power -- had we mounted our bombing offensive directly from, let us say, Newfoundland -- we might have deposited on Germany several times as much explosive for one-tenth of the cost of the same attack from close-up bases. What is more, the lives invested in fighting for those near-by bases could have been saved.

Advanced bases will be used in the future only for initial surprise attack. But even with atomic bombs, such surprise action can hardly give decisive results. And if these initial attacks from outlying bases fail to be decisive, then they will have to be immediately abandoned, unless we are prepared and willing to defend them with aerial strength equal to the enemy's -- which will mean equal to his entire Air Power.

Thus it is possible to prescribe a definite rule for employment of bases outside the heartland of a nation. With the exception of the initial surprise attack, *outlying bases intended for decisive action should be so located that any air counterattack against them will involve for the enemy a risk of joining in a major air battle to be fought to a conclusion.* In other words, these bases must be so located that they can be protected by our entire Air Force "in being." A base that cannot muster such aerial defenses will be flattened out instantly by the opposing air force.

When range or distance will no longer be of consequence, how will a small advanced base or floating bases, such as an aircraft carrier, withstand assault by the entire air power of the enemy? To ask the question is to answer it. That is why I feel that in the future all floating bases or island bases scattered through the ocean wastes will be utterly superfluous. The wealth and energy that go into implementing them will be wasted. The weapons being built to defend them will be put on ice and never drawn out for action.

BUT BEFORE I go on to discuss the implementation of direct, long-range air strategy, let's consider the atomic bomb.

After I had studied aerial destruction in Germany and Europe generally for five months, the Secretary of War asked me to make a similar survey in Japan. Accordingly, I put in two months in that country studying the results of our bombardment of Japanese targets. I spent several days in Hiroshima and Nagasaki. Later, after I returned from Japan, the Secretary of War sent me as his representative to Bikini for the atom-bomb test there.

Let it be understood that I don't "underestimate" the atom bomb. It is every bit as horrible a weapon as it is generally described. But I do believe that the military value a great many people ascribe to it is completely out of proportion. There is too much loose talk, scare talk, and exaggeration about the bomb, which confuse the average mind and distort understanding of our national-defense needs.

We hear talk about a bomb so terrific it will wreck continents at one blow and maybe explode the planet itself. If such a bomb could be built, we may be sure some scientist would explode it just for the devil of it, to prove it can be done. And obviously, if a bomb capable of wiping out a great nation or wrecking the planet is made available, our problem of national defense will be simplified -- in fact, it will be eliminated. Under those circumstances there would be no point in discussing military strategy at all.

But from all I know, including personal observation of atom-bomb destruction, such imaginative horror-mongering is a bit premature. The bomb may double or triple or quadruple its striking power, but for the predictable future there will still be a practical and tactical limit to its size, because further expansion of explosion in one missile will become wasteful.

For a long time, the atomic bomb will necessarily be of limited capacity, able to destroy only a specific target. And as long as that holds true, the art of war will continue to make sense. Strategic planning has not been cancelled out. Judging by what I saw in Hiroshima and Nagasaki, no single bomb of the Japanese type -- nor two, nor three -- will be able to destroy a large concrete-and-steel town like New

York or Chicago. Scientists who insist that one atom bomb will wipe out any major modern city are venturing beyond their depth.

With the courage of their military innocence, they calculate the number of stockpiled bombs needed to destroy the key cities of this or that country. Their assumption, of course, is that under all conditions the score of hits will be 100 percent. To military men this may sound funny, but the average layman accepts the one-bomb-one-target kind of accuracy without question. You've probably heard the joke that recently went the rounds; I repeat it because it reflects the prevailing assumptions about atomic magic.

The story is ascribed to Mr. Baruch. Presumably, someone asked him how many atom bombs would be required to destroy France. After thoughtfully counting the major French cities on his fingers, he replied, "I think about thirty-seven bombs." How many, he was then asked, would be needed to destroy England? Again he went through the process of hesitantly counting the main English cities, after which he announced, "I think it will take sixty atomic bombs."

"And how many bombs will it take to destroy Russia?" he was finally asked. To which he shot back without a moment's hesitation, "One hundred and thirty-eight!"

Well, I think it's a funny story and I go along with the ideology it implies. But in all seriousness, the notion of a bomb per city is too widely spread among ordinary folk for comfort and safety. It's a notion propagandized by scientists who, though great specialists in their own field, are totally ignorant in the field of military science.

Suppose we had operated against Japan or Germany on the basis of such simple arithmetic. We knew, let us say, that Germany had eighty-two major targets to be destroyed in order to cripple its capacity to wage war, and we therefore provided exactly the number of bombs theoretically needed to do the job, under ideal conditions with 100 percent accuracy, and no more -- this, mind you, before the issue of control of the air had been decided. Nothing more absurd can be imagined. People forget that even in target practice under peacetime conditions the average score is about 50 percent,

though some exceptional shots sometimes get 90 or 100 percent in direct hits. But the same men under battle conditions seldom exceed three percent.

When you begin to speculate on how many atomic bombs would be required to destroy New York, you ought at least to take into consideration the best accuracy that can be attained under desperate combat conditions. The notion of one bomb to a city is absurd but, granting that ten or fifteen bombs ideally spaced, under ideal flying and bombing conditions, could destroy New York, how about the defending forces? Considering past experience, when delivering explosive over a target against an enemy with its Air Power intact, it probably would require 300 bombs flown in the direction of New York to score ten or fifteen direct hits.

These bombs today cost hundreds of millions of dollars. They may be less expensive in the future, but still enormously costly -- in labor and materials, whatever the equivalent in money. If we relied entirely on atom bombs, and wished to destroy some of the major targets in Russia under combat conditions, we might need so many bombs that all our available manpower and materials would have to be devoted to that one atomic project, leaving no margin for production of aircraft to deliver the bombs and for other weapons needed to prosecute the war. It must not be forgotten that the over-all economy enters into the strategic equation.

BESIDES, the atom bomb is still a long way from the all-purpose weapon assumed by the layman. There will still be a number of targets in the foreseeable future that cannot be demolished by atomic bombs exploded in the air. We may find, for instance, that under some conditions the orthodox explosives in armor-piercing rocket-driven bombs are more effective. In any case, I feel that loose talk about the super-effectiveness of the atom bomb befogs popular understanding of the real meaning of national defense.

I'm afraid that some of our military men unwittingly contribute to this fog. I heard one officer lecture on plans for defending New York on the assumption that it will be subjected to bombs that can destroy four square miles each. He was followed by an officer who discussed the same problem

but raised the ante to four hundred square miles per bomb. A third indicated that a super-duper bomb, able to destroy 4,000 square miles, is conceivable.

There are those who go further. They eliminate the job of delivering the bomb. It will be exploded somewhere in the Pacific, after which deadly radioactive clouds of dust will roll over our continent to the Atlantic, destroying all life in their path. Why the clouds shouldn't keep on drifting to Europe, and European Russia, and then Siberia, isn't explained. Somehow, all the scare propaganda on the atom bomb implies that it is more effective against the American continent than against, let us say, the Russian continent. I don't want to make any accusations, but I am entitled to my suspicion that at least some of the scare propaganda is distinctly pink, if not red, in coloration. For one thing, it seems geared to stampede us into surrendering our atomic knowledge, which of course would be a tragic and stupid mistake. For another, it seems intended to spread a spirit of defeatism by implying that any defensive war will be tantamount to suicide.

Atomic energy as it stands today is essentially an explosive -- the most deadly explosive so far invented. Its proper military use is a problem for strategic thinkers and planners. It seems, though, as if all scientists have become military strategists overnight. They tell us with an accent of authority not only about the nature of the bomb, which is their proper province, but about military institutions, which is distinctly outside their province. I recall, for instance, an article by Dr. Einstein, the relativity genius, on an international army as the major instrument of the United Nations. Now Dr. Einstein is a great physicist and we should listen to him with unlimited respect on any aspect of physics, but when he talks military science and organization he is as likely to talk nonsense as any layman.

Some of the scientists, of course, were bright enough to read up on Air Power and to apply what they learned to atomic energy. Thus, one of them was quoted as saying that the more industrialized a nation, the more vulnerable it is to attack by atomic power. That happened to be a direct quotation from a book called *Victory Through Air Power*.

The mistake of this scientist was in treating atomic energy as if it were a new power in the strictly military sense, that is to say in the sense that we speak of the army, the navy and air force as military powers. In this he was wrong, and all others who treat it thus are wrong. A military power is a national force capable of imposing the nation's will on the enemy. The atomic bomb by itself cannot do this. It is simply a vastly improved explosive and, as such, a weapon of the existing military powers, and specifically of Air Power.

Atomic energy in the present stage is an explosive, pure and simple, and by itself it can never score a decision in war. It must still be carried to the enemy target by a military force or by a combination of several military forces. As long as the atomic bomb can merely destroy a target, it will remain simply a more efficient weapon at the disposal of Air Power. One of our military columnists stated after Bikini that the relative military strength of nations thereafter would be measured by their relative atomic stockpiles. That seems to me, militarily speaking, sheer nonsense. The stockpile as such is as meaningless as a stockpile of other explosive.

If an enemy should succeed in capturing control of the air over these United States, our stockpile would not do us the slightest bit of good. Once the enemy enjoys freedom of navigation over our country, he will proceed to demolish us at its own leisure: with atom bombs, or with old-fashioned TNT or, for that matter, with sacks of potatoes if they are heavy enough. As for the stockpile of atomic bombs under those circumstances, we might just as well use them for pins in a bowling alley.

My point is that the atomic bomb is a most powerful weapon, but only in the hands of a country that is prepared to achieve control of the air ocean and has the capacity to deliver said bomb at the right time and to the right target.

ANOTHER misconception about the atom bomb is that it represents the cheapest form of destruction. This is not true. It is a fallacy encouraged by the fact that Hiroshima, a city lacking active or passive defenses, was destroyed by a

single plane flying in broad daylight to drop a single bomb. The story would have been different had Hiroshima been a modern type of city shielded by modern types of Air Power. In the future we will not have such favorable conditions in time of war.

Those of you who took part in bombing Germany when Hitler's Luftwaffe was "in being" know that air bombardment is not a cheap procedure, measured in substance and in lives. In future, when the enemy will be thoroughly prepared to intercept our offensive action, the delivery of atom bombs will certainly not be an inexpensive undertaking. It will be very costly in aircraft and in life, because the main resources of every great nation will unquestionably be diverted to Air Power, and the skies will be the chief arena of action.

Let us not forget that the reason the last war ended with relatively small losses on our side was because we enjoyed the advantage of the surprise element. And surprise action is the only shortcut to cheap victory. That surprise element consisted of our strategic Air Power. Germany and Japan were unprepared for such use of our aerial potential. As a matter of fact, it was almost as big an intellectual surprise for our own top command, which at the outside did not believe it would work.

Strategic Air Power was virtually smuggled into our over-all strategy by a devoted group of our airmen with magnificent moral courage and at terrific personal sacrifice. We forget too easily, now that the truth of their conception is more generally recognized, that the men who nurtured the idea lost promotions, were exiled to minor posts and otherwise "discouraged," yet stuck to their vision and imposed strategic Air Power on the national strategy by their sheer tenacity. Their devotion brought us great dividends. It produced an intellectual surprise that caught our foes off guard and enabled us to finish off the war with comparatively light losses.

I repeat that in the entire history of military science wars have been won in only one of two ways: either through tremendous preponderance of force, in which the loser was smothered under the weight of the conquering military

machine, or through surprise action. There will be other kinds of intellectual strategic surprises in future wars -- but not the strategic use of Air Power. Every country capable of engaging in modern war is now thoroughly cognizant of the meaning of Air Power and must in simple common sense channel its major resources into the third dimension.

The latest news from Russia leaves no doubt that Stalin's country is also gearing for strategic Air Power, though Russia did not fully appreciate this kind of force until the end of the war, when it was able to appraise the destruction wrought by Allied Air Power in Europe. Right after V-E Day I had occasion to talk to a good many Russian generals. They tried to tell me that what we did with Air Power they did with artillery; the two things were equivalent, to their way of thinking. But apparently they changed their minds after they studied the results of strategic bombardment. Since then, Russia has begun to produce long-range bombers.

I want also to point out that those who expect the next war to be short -- a matter of days, or even hours -- may be seriously in error. After analyzing the effects of Air Power on Germany, I am impressed at the amount of punishment a country at war, with its life at stake, can absorb. Even if the atomic bomb of tomorrow will be several times as destructive as it is today, there is still the likelihood of a prolonged struggle.

Looking at the havoc visited on Germany, it was hard for me to believe that people could have stood so much misery for such a long time. But they did. Their morale and resistance were extraordinary. It proved to me once more that it is not the anticipation of horror that compels an enemy to surrender but the actual physical destruction and elimination of its means of waging war. That is why I do not believe it will be possible to cow a nation merely by the threat of atomic warfare. It will be necessary to obliterate that nation's war-making capacity, as in the past. Germany gave up when 80 percent of its industrial potential was paralyzed. Whatever explosive had been used, that much paralysis would still have had to be inflicted.

The essential novelty of the atomic bomb, aside from its vastly greater power, is its three-in-one character. It is

an incendiary through flash-heat; it produces blast; and it is poisonous through its radioactivity. There is as yet no defense against the radioactive feature except distance and mass. Six feet of concrete or several inches of lead can shield human life. That, obviously, is entirely too heavy for mobile defense, but passive types of defense could be organized. Shelters and distribution of population and other measures could minimize the lethal action of the atom bomb to the point where resistance can be maintained for a long time.

In the atomic age, as before, the physical source of an enemy's power will have to be destroyed before he collapses. To put it another way: a specific amount of destruction of the proper kind will have to be produced -- the fact that deadlier explosives are used will not in itself bring earlier victory.

To sum up: The next war will be fought in the air. The side which will first assume effective control of the skies over the enemy nation, and thus destroy its ability to deliver atom bombs, will win. After that, as I have already indicated, there will be no reason for invasion unless the beaten country has something to which the winner wants to help himself. In the case of America, as far as I am aware, there is nothing we crave to take over anywhere.

(To be concluded in the next issue)

Military recognition of the significance of an informed public is the greatest single post-war stride toward support of adequate security. If the men in charge of public information in the military services can keep the American public abreast of its requirements in armed strength, there will be peace on earth.

Gill Robb Wilson
in *New York Herald Tribune*
(15 August 1947)

High Sub-sonic Speeds for Air Warfare

Colonel Bruce K. Holloway

OUR PRESENT doctrine of air warfare and military air operations is predicated mainly upon experience gained in World War II. With the exception of lessons learned from a limited amount of tactical operations by the 1st Fighter Group with jet-propelled P-80 fighters, we know little of the problems and capabilities of military aircraft with a maximum speed in excess of 400 m.p.h. As speeds are increased beyond this point, the attendant problems naturally increase also, and as aircraft speeds approach sonic speed, these problems are considerably compounded.

Range Extension

Aerodynamic Trends. Unfortunately, aircraft range and speed are not compatible functions, yet both are necessary to place bombs on a well-defended target. The controlling variables are the lift/drag ratio and specific fuel consumption, or more generally, aerodynamic and power efficiencies.

One of the latest aerodynamic trends in improved high-speed performance of aircraft is stabilization of boundary layer air. Smith and Roberts of the Douglas Aircraft Corporation conducted some very interesting studies on boundary layer air removal for jet propulsion, whereby the intake air of the jet engine is bled from critical surfaces by incremental controlled removal. One significant calculation made in the report of this research was that a large jet aircraft with controlled boundary layer air intake can excel a conventional aircraft of the same size in payload capacity at ranges up to 2020 miles, whereas a jet aircraft with ram air intake can excel the conventional plane up to only 1310 miles (the respective speeds of these boundary layer, ram, and conventional aircraft are 430, 400, and 200 m.p.h.). The

conclusion of the report states:

> Apparently a means for crossing the laminar boundary layer stability barrier has been found, and the returns from penetrating this hitherto forbidden region are so great that extensive research should be initiated to learn more about this system, its problems, and its possibilities.

Power Trends. In contrast to the propeller-driving power plant, the turbo-jet engine uses quantities of air considerably in excess of actual combustion needs, but necessary as the accelerated agent which produces thrust. Hence it cannot be throttled in the manner of throttling a conventional power plant. Further, its thermal efficiency drops rapidly if it is operated much below its maximum design thrust for any given air density. Therefore, since both the maximum design thrust and the airplane drag vary almost directly with air density, or altitude, the jet-propelled airplane must fly high to realize its maximum range capabilities. It must also fly fast, since its propulsive efficiency drops off with decreased speed. This inflexibility of cruise control and consequent high fuel consumption at low altitudes is the biggest disadvantage of the jet-propelled airplane.

Although steady progress is being made in the efficiency of the turbo-jet engine, experts now believe that it cannot achieve the cruising efficiency of the piston-prop or turbo-prop power plants at lower sub-sonic speeds. Recent developments in propeller design indicate that the propeller-driven airplane may still be usable for a good many years to come. The Curtiss-Wright Corporation, a most enthusiastic proponent of the turbo-prop power plant, has done some fairly extensive research in this field, and reached the following conclusions:

(a) In comparing turbo-jet and turbo-prop power plants in a fighter type aircraft, studies show the turbo-prop to be superior in both speed and climb at all altitudes to 45,000 ft. and speeds to 500 m.p.h.

(b) Actual test of a propeller designed for 450 m.p.h. was made on a P-47D-30 at a diving speed of 592 m.p.h. (MO .84). Efficiency was 62%. Efficiency of same propeller at 500 m.p.h. was 80%.

(c) Theory for swept-back blades shows possible propeller efficiency of 89% at 600 m.p.h. aircraft speed and 800 ft./sec. propeller tip speed.

Naval Carriers. The navy believes that jet-powered medium bombers can be operated off carriers without extensive modification of either the airplanes or the carriers. The strategic possibilities afforded by high-speed bomber operations from surface carriers are tremendous, provided the carriers can cruise to within bomber range of desired targets without being sunk. Of course, the fallacy in this type of thinking is the assumption that a carrier could cruise around most any place and not be eradicated. If another war comes, the seas of the world will probably be a "no man's land" for surface vessels of any type until the war is practically over. Aircraft and greatly improved submarines will make topside ocean travel extremely unpopular, and will force all participants in war either to pull in their tentacles and operate their air weapons from fortified interiors, or to develop air and undersea communications. If a submarine can be developed which will carry a high-speed bomber to a foreign shore and launch it on a one-way mission, it will be a very useful piece of equipment.

Air-Refueling. Air-refueling has been investigated several times, and for reasons varying from increasing ferry range to establishing endurance records. For military purposes, it has shown very little promise up to the present time. However, in view of the fact that in the near future only the bomber operating near sonic speed may be able to reach a target well-defended in depth, air-refueling may warrant more research.

Drones. The value of drones may not lie so much in range extension as it does in bombing accuracy. It is believed that the use of high-speed drones for precision delivery of bombs is entirely practicable. One control plane pacing two or three drones could remain in relative safety at high altitude while it guided each drone into a target with deadly accuracy.

The range of a control plane might be increased over the normal bomber by additional fuel equal in weight to the

displaced bomb load less added control equipment and crew. The range (or bomb load) of the drone version might also be increased slightly if the added receiver control equipment weighs less than the replaced crew and crew equipment.

The use of drones for a war of the near future seems sound and entirely logical. Their successful employment would offer three great advantages:

(a) An operational method for placing bombs on a desired target with precision accuracy.

(b) Economy of crews for one-way flights (the more drones controllable by a single queen, the greater this economy becomes).

(c) Economy in aircraft production for one-way air warfare. A drone should be considerably cheaper to build than a normal bomber since it would require no crew oxygen, no pressurization, and no equipment of any kind for crew comfort and sustenance.

Towing. Other than for airborne operations, snatch rescue, and as a means of ferrying fighter aircraft, little work has been done on air towing. In the fall of 1944, the P-59-equipped 412th Fighter Group initiated a project of its own for towing jet-propelled fighters as a means of increasing effective fighter escort range. Using a C-47 tug airplane and a simple nylon rope arrangement resembling a railway mail pick-up device, the P-59 coupled and uncoupled in flight. The operation could be repeated as often as desired during the flight. The 412th Group was extremely enthusiastic about the possibilities of towing, and in spite of a mishap in bad weather which lost a P-59, convinced Headquarters, AAF that a P-80 towing project should be undertaken without delay. This project was initiated, but due to the scarcity of P-80 fighters at that time, the end of the war in Europe, and the capture of Iwo Jima, it was not pursued with much vigor.

Although towing by bombers is a simple and mechanically workable solution for providing jet fighter escort at long ranges, it has limited value in view of the fighter pilot fatigue problem. However, in considering the mechanical and operational simplicity of such a system for range extension

of a high-speed penetrating bomber, towing offers some spectacular offensive capabilities.

Since we must think of the possibility of having to bomb our future enemies from such places as Salina, Kansas, and since we should proceed into the fortified target area with the fastest bomber it is possible to build, it is inevitable that we must investigate the corresponding means of accomplishment. It is believed that of those methods mentioned, towing has the most to offer.

Tactical Formations

Against Enemy Fighters. During that part of the war in Europe when Luftwaffe fighter activity was at its height, the 8th Air Force determined that the best method for daylight penetration into Germany was by means of large formations. Two reasons for this decision were:

(a) A better curtain of interlocking fire power could be effected with the flexible guns of the B-17s and B-24s.

(b) A large single formation was more easily defended by escort fighters than a number of smaller ones with the same aggregate number of aircraft.

This doctrine of large penetrating formations was evolved from a vast amount of concentrated experience, and was unquestionably sound. It may not, however, be sound in future situations involving aircraft operating at speeds immediately below Mach number one. Consider, for example, the position of the enemy interceptor commander. His mission to destroy invading aircraft must be accomplished with high-speed, fast-climbing interceptors of short duration. These aircraft will probably burn great quantities of special fuel, and will have to be vectored to targets by ground radar control or by radar installed in the aircraft. The main problems of interceptor control will probably be somewhat as follows:

(a) Launching of interceptors at the precise time for allowing a maximum amount of their total duration to be spent in contact with the enemy.

(b) Precision climb direction in order to effect the shortest possible course which will place the interceptors in an attacking position. If a slight error is made in either launching time or intercept control, contact with a

small force of high-speed bombers would probably not be made.

(c) Making a quick estimate of the disposition of the invading forces and scrambling available interceptors so as to cover a maximum number of the attacking formations. In view of the probable short duration of any interceptor of the near future with enough speed to accomplish its mission, and of the probable increased servicing time required, the controller's decision on the timing of his launchings against successive formations will be of utmost importance. Unless he has unlimited interceptor forces, to err in this decision might mean "the missing of the boat."

Accurate radar-controlled interception of small formations of high-speed aircraft is believed imperative, particularly in the absence of vapor trails. Interception problems conducted by the 1st Fighter Group of P-80 fighters against single B-29s were almost invariably unsuccessful. If the collision course was inaccurate by more than two miles, the bomber usually was not spotted. When bombers were spotted, not more than two attacks could ordinarily be made, although the P-80 enjoyed a speed advantage of over 100 m.p.h. Frequently when contact was made and an initial attack completed, the B-29 would subsequently be lost while the P-80 was maneuvering for a second attack.

For Escort Effectiveness. The large bomber formation of World War II was easier to protect with a given amount of fighter escort than a number of smaller formations of the same total number of aircraft. There is no reason to believe this will not be true in the future, but the value of the escort fighter seems questionable for future operations regardless of the disposition of bomber aircraft to be protected. This subject will be discussed further in ensuing paragraphs.

Against Anti-aircraft. Anti-aircraft protective measures for future high-speed bombers should be about the same as for bombers of the past. A large formation offers greater hit probabilities than a small one, particularly for barrage fire; a tight formation is more vulnerable than a loose one. Speculation as to protective measures against seeking

missiles with proximity fuzes is at the present time largely guesswork. The successful guided missile for defense is probably about as far in the future as the super-sonic aircraft, and until the characteristics of control and behavior of these missiles begin to shape up in semi-concrete form, evasive tactics therefore cannot be very well studied. Basically, the problem of bomber security against guided missiles appears similar to that against anti-aircraft guns. In a small, loose formation, no missile could possibly destroy more than one aircraft, whereas in a larger or tighter one, it might. However, an example of merely one aspect of guided-missile protection which might change this axiom is electronic jamming. If the necessary jamming equipment is so large and bulky that it constitutes a sizeable amount of bomber payload, it may not be feasible to equip each bomber with this equipment. Thus, a point would be scored in favor of larger formations containing a certain percentage of jamming aircraft. One thing about avoidance of guided anti-aircraft missiles is fairly certain: there will be few places on a well-defended nation's map which will not be marked as flak areas. The powered, guided missile will have many times the effective range of the best anti-aircraft gun.

General Theorizing on Formations.

(a) A consideration of the foregoing reasoning indicates that for future operations with high-speed bombers against areas defended with high performance interceptors and conventional type flak, small formations are more desirable than large ones. Further, the target area should be approached from different directions by relatively small formations of varying sizes. These formations should be scheduled on an attack timetable which takes maximum advantage of the enemy's interceptor problems of short duration and time-consuming reservicing.

(b) Best defensive formations may require modification at times to achieve a particular bomb pattern or to increase the accuracy of a particular type of bombing.

(c) Low-altitude bombing of a heavily defended target with high-speed strategic bombers will continue to be very

costly as it has been in the past. The speed advantage over small-arms flak will be overcome by better flak and flak control. The speed differential of the interceptor fighter over the bomber will be greater at low than at high altitudes because the interceptor will have a higher power loading and a higher tolerance to turbulent air.

(d) Tactical Air Force fighters should work in pairs as part of a larger force. The pairs should be allowed an amount of freedom of action in cooperative missions according to the degree of local air superiority enjoyed. Turbulence at low altitude will be a defensive advantage to the tactical fighter if under attack by an enemy fighter or interceptor of superior speed.

(e) Assembly of formations over the point of take-off before proceeding on course to the target will be virtually impossible with high-speed jet bombers. Present jet aircraft must climb to altitude on course at the maximum rate of climb in order to achieve maximum range. Any deviation from this procedure results in drastic reduction of range, and jet power engineers predict that no material improvement for this characteristic is forthcoming in the immediate future.

(f) Even though it might be desired to place only one bomb on an enemy target, the bomb-carrying aircraft should not proceed alone to the target. The bombing of Hiroshima and Nagasaki will cause all nations to regard a single approaching bomber with mercurial suspicion for a long while to come.

Fighter Escort

The present conception of fighter escort is due for a considerable revaluation within the next several years. In fact, until successful super-sonic airplanes are produced, the justification for escort of high-speed bombers is regarded as a good subject for debate.

The single-seat fighter which meets established speed and range requirements, and which depends on its speed and maneuverability to engage in effective combat with enemy interceptors, has about reached its limit of marginal utility. There are two main reasons for this limit:

(a) Little expectation for the development of fuels of increased energy content. Nuclear energy is a white hope for solving many power problems, but a feasible method of harnessing it in anything smaller than a locomotive is not known.

(b) Human limits of fatigue. During the war in the Pacific, the seven-hour P-51 missions from Iwo Jima to Tokyo, and the nine-hour P-38 missions from Morotai to Balikpapan were extremely hard on the pilots. These missions could have been flown in half the time required had they been accomplished by 500-m.p.h. aircraft. The higher cruising altitude of jet aircraft would have increased the fatigue rate, but the shorter mission would nevertheless have been much less tiring to the pilot. If we go a step further, though, and assume that we may not be able to maintain bases within a thousand or more miles of our future strategic targets, the human fatigue problem of the single-seat, subsonic, ground-based escort fighter is still large.

If we build a fighter which can cope with enemy interceptors by offensive action, it is believed that we cannot possibly incorporate more than 2000 miles' range in its design -- and probably less in accordance with the quality of the enemy interceptor. If, then, we must plan on not having fighter bases (dry or floating) as close to potential strategic targets as we would like, we must look to new methods and concepts of escort if escort is considered necessary. As an example, the following might be considered:

(a) Fighter towing.

(b) Fighter refueling.

(c) Parasite fighters (air-based).

(d) Fighting aircraft with a 5000-mile radius of action.

The first two of these methods are precluded by the pilot-fatigue problem, and will not be further considered. The third and fourth might be acceptable.

The parasite fighter is one designed to attach on or into a carrier aircraft which serves as the fighter's base. Considering its uncomplicated design and operation, and assuming it has adequate armament, the parasite should prove to be at least an equal match for the enemy interceptor.

Providing enough of them for the defense of any given formation is the most questionable aspect of their practicability.

The idea of an escort fighter with 5000 miles' radius of action seems a little fantastic to those initiated in traditional escort tactics. Such an airplane would necessarily approach in size the bomber to be defended, and would probably substitute turreted armament for bomb load. Its method of protecting the bomber (and itself) might best be accomplished by remaining always in formation with the bomber and firing on any interceptors which ventured within range.

The practicability of flexible defensive armament will depend on how much speed is sacrificed for its incorporation. If the described flying fortress is slower than the unimpeded bomber operating just below sonic-speed, then the flying-fortress type is obviously worthless.

Security Value of Speed

With one exception, the United States fighter plane has always been faster than its contemporary bomber. There exists no theoretical reason why this should be true, and that it actually happens can be traced mainly to two interdependent causes: relative time for fighter and bomber development, and available power. The first cause is explained simply in that the production bomber of any given time was initially designed at an earlier date than the production fighter of that same time. The second cause is exemplified in the development of the B-50. The B-50, which is powered with the R-4360 engine, but which has essentially the same airframe as the B-29, is as fast as the best World War II conventional fighter. Thus, if the B-50's engine had been available during the initial development of the B-29, this famous bomber would have been as fast as any of its contemporary fighters, and the XX and XXI Bomber Commands would have had little annoyance from Japanese interceptors.

It is believed that the forthcoming period of high-speed sub-sonic flight offers a great opportunity for the strategic bomber. The speed of sound is currently asymptotic of the maximum speed which any type of aircraft can achieve, regardless of whether it goes up or down, or straight and

level. Further, in considering such factors as engineering problems yet to be overcome, and time lag between design and production stages of aircraft development, it seems reasonable to assume that the speed of sound will remain a barrier for aircraft in quantity production (not experimental or service test articles) for at least ten years. This should hold true for any country in the world, and if such analysis is correct, there is no foreseeable reason why we should not be able to have bombers in four to six years which are as fast as the best fighter or interceptor in existence.

Against such a bomber, a sub-sonic interceptor would have little chance of success. If the interceptor pilot made a precise interception on his initial climb, he would get in one shot at the bomber; if he cut across the bomber's path with exact precision, he would get one more shot when and if the bomber turned to go home. These two shots might be enough, but against small formations of bombers the interception precision required would probably occur very infrequently. Of course, if the interceptor were armed with accurate long-range rockets it might intercept sufficiently close to the bomber's rear to remain within rocket range, but it should be assumed that bomber tail armament will consist of rockets comparable to those of the interceptor. Moreover, the effective range advantage is in favor of the armament of the pursued in a direct stern chase. Other similar possibilities of position could be assumed, such as the interceptor in front firing back, or to the side firing flexible or fixed deflection armament. These will not be seriously considered, for at negligible speed differentials, gaining of position and delivery of fire would be most difficult.

Speed has always been of utmost importance in military air operations. Today, it is of greater importance than ever before. The undiscriminating limit presently imposed by the speed of sound reduces the effectiveness of the escort fighter and enhances the position of the high-speed strategic bomber. We must build our bombers to operate in the immediate vicinity of sonic speed, or they will probably have great difficulty in reaching future targets.

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GEOPOLITICS *versus* GEOLOGISTICS

Lt. Col. Harry A. Sachaklian

PERHAPS the most striking manifestation of the growing consciousness of geography in the United States has been the acceptance of the word "geopolitics" into the modern lexicon.

Yet, a careful examination of the origin of the term, the uses to which it has been put, and the apparent impossibility of arriving at a satisfactory definition of this word, causes serious doubt as to its applicability to the conditions that face the world today. It would appear reasonable to assume that the usefulness of the term and the concept ended with the defeat of Hitler's Germany.

Geopolitics is a word of German origin. It was conceived in the German language to reach a German audience and was dedicated to the proposition that Germany deserved more of the wealth of the world than it then possessed. It is an empty quibble to point out that Rudolf Kjellén, in whose writings the word first appeared, was a Swede. Lord Haw Haw was indisputably an Englishman but no one has yet suggested that his concepts were anything but German.

To emphasize further the German origin of the word, it must be understood that Kjellén coined the word *Geopolitik* in 1917 as one of a group of five such words. They were: *Geopolitik* (geography and the state), *Demopolitik* (population and the state), *Oekopolitik* (economic resources of the state), *Sociopolitik* (social structure of the state), and *Kratopolitik* (governmental organization).

The Germans, under the guidance of Haushofer, chose to consider *Geopolitik* as being all-encompassing and they virtually ignored the other classifications. It is a matter of record that Kjellén was a little disturbed at this partial acceptance of his concepts, but since his concepts found favor only in Germany, he had little further influence on subsequent developments.

From the moment this word was seized by the Germans, it became the best descriptive term of the guiding philosophy of German neoimperialism. It was designed and developed as a guide to those statesmen and military men in whose hands the destiny of Germany rested. The connection between Haushofer and Hitler was close, enduring, and well publicized. The principal use of the term by the German state was to salve the conscience of the German people for murders, past, present and future. Its success as a conscience salve is measured by such institutions as Buchenwald. Its success as a concept is measured by the state of Germany today.

The term *Geopolitik* was not generally known in the United States until about 1937. At that time, American journalism learned about Haushofer and his *Institut fur Geopolitik*. With typical journalistic fervor and in true Sunday-supplement style, large segments of the American public were introduced to this mystic, geographic alchemy, this invincible blueprint for world conquest.

Despite the thoroughgoing criticism of *Geopolitik* by numerous American geographers, the war-induced hysteria caught on and a number of books were published explaining the principles of this new "science." Certain educators and educational institutions responded to this stimulation and began teaching something called *geopolitics* in American universities.

AN EXAMINATION of the existing literature on geopolitics reveals certain significant things. In the first place, practically all American books on the subject coincide in their condemnation of the German view of it and call the German view a perversion of geopolitics. In all honesty, it must be argued that the originators of a term or concept have the sole right to define and delimit the term or concept they originated. If American authorities refuse to accept the German definition of a German word, then they, the American authorities, are guilty of perversion if they continue to use the term or concept but ascribe a different meaning to it.

In the second place, the American authorities who choose to use the word are by no means agreed as to the different

meaning or the variation from the original theme they believe is most applicable. Though there are as many different shades of interpretation as there are authorities on the subject, American use of the word, geopolitics, can be classified in general into three major groupings:

a. Approximately the German view, namely, geographical determinism, or as one German writer put it, "the geographical conscience of the state."

b. A synonym for political geography.

c. A general term to indicate planning for national security.

With meanings as widely varied as those listed above, serious doubt is reflected on the value of the word itself. A word that has meaning only to the speaker is no better than gibberish. A word used as a synonym should clarify and not obfuscate.

In the third place, the mere examination of the dates of publication of American books on geopolitics indicates a remarkable coincidence. People simply stopped writing about geopolitics when Germany succumbed. Books on geopolitics reached their peak of profusion between 1942 and 1944 and then fell off sharply to nothing. An intensive search for recent reference matter on the subject reveals that only two obscure articles in an obscure journal were written on geopolitics since 1945. Yet, the long established and respected fields of geography, political geography, economic geography and political science continue to exhibit healthy activity in research and discussion.

In the fourth place, all texts exhibit basic weaknesses by failure to incorporate adequately two prime factors, the effect of Air Power and the even greater effect of social, ethical and cultural values on geopolitical concepts.

The contradiction of Air Power to one of the basic themes of geopolitics, the heartland theory, was posed on the very day the heartland theory was announced. It was not adequately answered then and has not been adequately answered to this day.

The concepts of morality and culture have been opposed to deterministic theories since mankind emerged from the jungle. Geopolitics in some ways is a reaction against

Marxism, but geopoliticians make the same mistakes as the Marxists. Instead of economics, space becomes the absolute yardstick. Geographical determinism is as void of moral evaluation and restraint as is economic determinism. Geopolitical materialism states that space and soil is the determining factor rather than any independent Man. This is as much as saying that mankind acts as does either the lemming of the frozen North, that responds to some mystic urge beyond its comprehension and dashes headlong into the sea, or the army ant of South America, that periodically gathers its fellows and sets off across country devouring everything in its path, again in response to some mystic urge beyond its comprehension.

In the fifth place, many of the American books on geopolitics, though vehement in the denial of determinism in geography, insist on perpetuating the myth that geopolitics is dynamic. This is an incredible contradiction, since if it is dynamic it must have momentum and if it has momentum it must be deterministic.

THERE ARE other things about geopolitics that make it even less desirable as a guide to the military and political leaders of the United States.

Geopolitics is essentially pessimistic. It assumes that the wealth of the world is limited to that which is now discovered and that peoples can acquire more wealth only by seizing wealth belonging to others. This is obviously as erroneous as the "Mature Economy" theory of the early New Dealers or the "Share the Wealth" doctrines of the Huey Long group.

Such concepts are not new and have been disproved time and again by visionaries who, looking into the future and finding it good, kept right on adding to the wealth of the world.

For example, geopolitics considers the world ocean either as a separation of land masses or as a connection between land masses but, in any event, not as a source of wealth except possibly for sea flora and fauna. Yet the ocean itself as well as the bottom of the ocean is an almost completely unexplored and unexploited source of wealth.

Today, the extraction of magnesium from sea water is commonplace. Today, the oil resources of the continental shelf appear within reach. Who knows what else tomorrow?

Geopolitics is concerned only with the state. It assumes that the state is the beginning and the end of everything. It traces this concept back to Aristotle, as if Aristotle were the beginning and end of all reasoning. Aristotle is quoted by geopoliticians as saying, "The state is natural to man, and man is by nature a member of the state." From this hypothesis his reasoning progresses as follows: nature always works for the best; what is best, therefore, is the product of nature. The state, as a product of nature, is the *summum bonum*, the best form of life to which man can aspire.

In the days of the Spanish Inquisition, it was worth a man's life to quarrel with the doctrines of Aristotle. The best place for geopolitics would appear to be in a museum along with a bust of Aristotle and relics of the Spanish Inquisition, for both Aristotle and the geopoliticians completely ignore the fact that the state is a man-made institution and, as such, is equally subject to the imperfections of everything that is man-made. In ignoring the fact that the state is man-made, the geopoliticians overlook the possibility that man may change or even abandon that which he has made. Instead, the geopoliticians substitute the divine right of states for the long since exploded divine right of kings.

The German geopoliticians even went so far as to say that the state is a biological entity and, as such, is subject to Darwin's laws. This is like saying that the Germans are a separate species and can not breed with other nationalities. The occupation armies in Germany are proving the fallacy of such belief, if proof is necessary.

Perhaps the most poisonous inconsistency of geopolitics is that it poses instability as the fundamental principle of international relations. It sees but one certainty, everlasting struggle, and urges states to seize what they can before some other state seizes them. When states carry out this recommendation they succeed only in verifying a hypothesis that otherwise is not necessarily true, for if all states refused to respond to this urging, everlasting struggle no

longer would appear certain.

In any event, if the everlasting struggle is for wealth, it should be apparent that the process of seizure consumes wealth rather than adding it. The net result of any aggression is to reduce the wealth of the world, since even the preparation for aggression diverts wealth. "Guns instead of butter," the Germans said. They now have neither.

In the last analysis, geopolitics is nothing more nor less than a rationalization of why people must be killed, based on a reprehensible refusal to admit that people can be fed.

The quiescent and tacit acceptance of geopolitics on the part of the military services appears to be sciolism in its purest form. It is reminiscent of the fable of the king who hired two rascals to make him a suit of clothes so finely woven and so exquisite in texture that only an honest man could see it. According to the fable, these early-day confidence men extracted large quantities of valuables from the king and sat for days weaving imaginary cloth from imaginary thread. Naturally, neither the king nor his courtiers would admit to dishonesty by exposing their failure to see the beauty of the material. The author of this article hopes he is playing the rôle of the child who, on seeing the king at last dressed in his imaginary finery, said in a loud, clear voice, "But mother, the king has no clothes on at all!"

Part of the reason for the acceptance of the term geopolitics may be the lack of a better one. There appears to be a definite need for an all-encompassing term to describe the relationship of people and governments to environment. It is argued herein that geopolitics is not apt and does not fit for, among many others, the following reasons:

a. The originators of the term have the sole right to define the term they originated and their definition is largely unacceptable outside of Germany.

b. The term has been used as a justification for aggression.

c. The term ignores all ethical or moral values.

d. American use of the term is very loose and unscientific in that it does not mean the same thing to all people.

e. American use of the term appears to be rapidly dying

out and if retained for use by the military would end up being a purely military term.

f. The entire concept is permeated through and through with assumptions that suit the purposes of bandits far better than civilized human beings.

THE ACCUMULATION and interpretation of geographical data for military, political, economic and social purposes are both valid and necessary. The term heretofore partly used to describe this process is subject to misinterpretation and obviously incapable of scientific definition. A new term seems to be required.

The term *geologistics* is offered. This word is derived from the Greek, *geo*, meaning the earth or pertaining to the earth, and *logistikos*, meaning calculation or accounting. Geologistics, then, would literally mean the calculation of the earth and its resources.

Geologistics could properly be defined as being an inclusive term used to describe the process of concentrating all knowledge for the purpose of utilizing the resources of the world for the welfare of mankind.

Geologistics would not necessarily be connected with states as such but would deal directly with the relationship of human beings to environment. Geologistics would thus avoid the intellectual pitfalls of geopolitics wherein German (or other) "scientists" can say, "geopolitical maxims are valid only if they operate in favor of the Reich (or other nation)."

There would appear to be three major phases of geologistics:

a. The identification of resources.

b. The inventory of resources.

c. The technique of placing resources in motion to attain human aims.

Identification of resources is the function of the research scientist. His work in the past fifty years in adding to the list of things that are of use to man is one of the most remarkable achievements in all history. Uranium, plutonium, radium, and the products of organic chemistry such as the various coal-tar derivatives and the range of

products derived from cellulose, all add up to an imposing list. Yet, the most significant conclusion to be reached from this half-century of investigation is that the true value of the earth and its component materials is limited only by the ability of men to comprehend it.

Having determined that a substance is of value to mankind, the next logical step is the determination of where and in what quantities this substance exists. Even to this day, the world has never been adequately surveyed to determine the location and quantities of such widely recognized and utilized resources as iron and oil. In North America alone, huge areas remain comparatively unknown in respect to the mineral and other resources that may exist. In recent years clues to the existence of tremendous quantities of oil have been discovered at the northern rim of the North American continent. In northern Laborador, large deposits of high-grade iron ore have been discovered, with the true extent of the resources there yet to be determined. Recent newspaper accounts credit the Soviet Union with a plan to make a complete survey of their own natural resources. This is geologistics in action.

The third step, after identifying and locating resources, would be to place them in motion. Resources lying inert are not resources; they must be utilized. They must be utilized profitably or the system breaks down. Profit can be measured in terms of the value of resources expended to acquire the new resources. If expenditure exceeds return, obviously wealth has not been added to the sum total available to the world. All resources must be carefully utilized to avoid waste, since waste is an expenditure of resources without return and consequently the waster is depriving the world of wealth otherwise available to it.

Human resources are not always so highly prized as material resources. This is the gravest error of all, since human resources are the only ones capable of placing other resources in motion. It must be one of the prime functions of geologistics to point out that human resources are the most important of all, and that careful utilization of these resources is the paramount key in adding to the wealth of the world. Human life is the only resource that is beyond

easurable value.

A geologistical study made on a world-wide basis would ast a new light on the attempts of states to achieve autar- ny (economic self-sufficiency). It would indicate that no tate, as presently constituted, can achieve meaningful utarchy without access to the resources of other states. It ould indicate that true world autarchy is unattainable ithout world domination by a single power, unless existing owers are able and willing to produce that which they are est qualified to produce and to forego production of items hat are best produced elsewhere. It would indicate that xisting powers might be willing to relinquish their dreams f complete autarchy.if they knew for certain that they ould not be deprived of essentials at the whim or prejudice f an alien state.

THE VALUE of geologistical study to the military and politi- al leaders of the United States would be considerable.

If the world were studied as a logistical problem, con- lusions would be reached that, in all probability, would ary considerably from a study of the world as a political roblem. The difference is akin to the old intelligence dmonition to study capabilities instead of intentions. The olitical steps a nation takes are strictly in the category f intentions and as such are transitory and eminently sub- ect to change. The very fact that a nation has learned that ts intentions are suspect can cause it to change its in- entions. A changing national capability is as obvious as he rising and the setting of the sun to the trained ob- erver.

The environmental and geographic factors that have a earing on national logistics or national capability are ixed and firm and are capable of scientific measurement. lthough national power, like individual power, is composed o a considerable degree of certain intangibles that do not end themselves to statistical expression, there is an ulti- ate beyond which national effort cannot be exercised. The ntangible factors mentioned before will determine not the ltimate, but how close to the ultimate the specific nation an come. The requirement, when considering a rival nation,

is to determine the ultimate and then base judgement on the assumption that the ultimate will be reached. In war, the requirement is to render the nation in question incapable of exercising to the utmost its latent or potential power. The requirement, when considering one's own nation, in peace or in war, is to determine how this ultimate can best be reached.

There would appear to be ten general categories of environmental and geographic factors that must be thoroughly studied before the ultimate expression of a nation's power can be assessed. They are: (1) The Land Mass, (2) Water Areas, (3) Climate, (4) Political, Economic and Social Organization, (5) Manpower Resources, (6) Agricultural and Forest Resources, (7) Mineral Resources, (8) Transportation Capabilities, (9) Fuel and Power, (10) Industrial Development.

By making such studies a basic part of military and political knowledge, the nation can best determine the course of action it must take to accomplish the aims of its people. This course of action by no means needs to be armed conflict. In fact, if such a study were made by the United States today, it would probably indicate that the aims of the people of the United States, including relative security, could best be accomplished by the better development and utilization of those resources now available to the United States. It might also indicate that certain resources not now available to the United States in sufficient quantities could probably be acquired at once, at the best possible terms.

Geologistics would teach that the most practical step a free people can take to increase its own security is to add to the wealth of the world. The farther away from stark hunger the world travels, the less attraction and control tyranny can have. Tyranny fears prosperity, since hunger is its principal weapon. The best, the most practical kind of power politics for the modern world is to use power to create world prosperity. This means trading with and taking from the world. This means *quid pro quo*, something for something. Such is the essence of geologistics.

The need for another concept of the relationship of men to one another and to the world in which they live is more than urgent; it is the most important feature of modern times. World union of some form or another seems to be the

alternative to eternal strife. Geopolitics produced a blueprint for world union by world conquest. It failed, as has every previous attempt to conquer the world.

Modern science has produced weapons and forces that might appear to make world conquest feasible. Yet, it is a basic law of physics that force creates counterforce. World conquest would be meaningless if the world conqueror had nothing but radioactive rubble over which to rule. Perhaps a study of geologistics will produce a practical road to world union based on something other than force and conquest.

Let us understand once and for all that the human will cannot be conquered by force and controlled in perpetuity by penalties and reprisals. The human will can be won only by sincere motivation and deep, spiritual perception. Deterministic theories cannot supply the necessary motivation and certainly lack the necessary perception.

The best answer to an idea is a better idea. The best answer to theory is demonstration. Germany has demonstrated that the concepts of geopolitics are truly the concepts of narrow-minded fatalists and offer nothing but more despair to a despairing world.

The world has demonstrated throughout its history that when hope fades, progress ceases. The United States has demonstrated that the concepts of geologistics are the concepts of hope and, in adhering to the concepts of hope, the United States can offer hope to the world.

Let us not abandon the concepts that have served us well. Instead, let us work to correct the lack of balance we find in our own society and, by so doing, demonstrate our continuing faith in our own concepts. If we look into the future with the intention of adding to the wealth of the world, we will find the future good.

Unless we maintain clearly adequate Air Power in being, no matter at what sacrifice of goods and treasure, all else may well be futile.

Major General Muir S. Fairchild,
in graduation address at the
Air University (4 June 1947)

MOBILITY IN THE NEXT WAR

Colonel Clifford J. Heflin

THE UNITED STATES, having been the deciding force in two world wars by virtue of its industrial might, must face the realization that the next war may commence, without warning, with a paralyzing blow directed at its vital industries, transportation, and fuel supplies. In any plan to meet this eventuality, the Air Force must consider two factors:

(1) The force necessary to neutralize the exterior force or maintain the strategic situation, whenever and wherever it might strike, and,

(2) The striking of a retaliatory blow, with the time element being constantly in mind.

With respect to the force necessary to maintain the strategic situation, the British Navy presents itself as a good historical example, from which several conclusions can be drawn.

The British Empire owes its foundation and continued existence to trade, dependent mainly upon sea power for its security. This sea power was itself dependent upon a strong merchant fleet, a powerful navy and a chain of strategic naval bases and refueling stations in all parts of the world. On these bases fleets could pivot or concentrate the "coherent dispersal about a strategic center" of which Corbett speaks in *The Principles of Maritime Strategy*. There is no sea or ocean across which British trade routes passed in which she did not possess naval bases. The range of her sea power was world-wide. Wherever the center of gravity shifted, fleets could sail to look after her interests, as bases for their reception and maintenance were available in all quarters of the globe, increasing their mobility.

Applying this same strategy to the Air Force, there can be visualized a system of primary, secondary, and transit bases, fully equipped and manned, enabling forces to concentrate, pivot or disperse, meeting any threat of aggression.

Given dispersed targets, against which there could be no hope of a quick knock-out blow, and given, too, the threat of counter-attack from widely separated bases against one's own vulnerable areas, it is unlikely that any nation will wisely embark upon war. Our national aim, therefore, should be to deploy our Air Power so as to prevent war by threat of action, rather than allowing a traditionally tardy policy of seeking to reply to blows already delivered and received.

Concentric rings of strategic air bases could threaten almost any possible enemy. Our blows could converge on a common center, while those of the enemy would of necessity be absorbed by scattered points upon the circumference. The principle of concentration would be achieved as well by making the enemy disperse his forces as by our own actual physical concentration in time and space. The classic example, in this regard, is Lee's use of Jackson in the Shenandoah valley campaign of 1862. Against the overwhelming Federal forces advancing upon Richmond, the Confederate capital, the obvious defense was the concentration of all available Confederate forces in that vicinity. Instead, Jackson's bold handling of his detached force in the Shenandoah valley created such alarm in Washington, the Federal capital, that the forces closing on Richmond were dispersed or recalled to meet the created apparent threat, and Richmond was saved. Similarly, our dispersed bases, aided by the mobility of Air Power, could create the necessary threat which would force an enemy to scatter his own forces. If such a widespread potential danger to the enemy could be achieved and kept before his mind even prior to the beginning of any war, actual hostilities in armed conflict should not be necessary.

The main responsibility for defense and attack will rest with the Air Force in the future, to an even greater degree than in the past or during the present. The essence of the successful use of Air Power in either defense or international enforcement action is mobility. Our Air Force must be capable of offensive or defensive action in any part of the world upon short notice. It is a common fallacy to assume that air forces are inherently mobile. They are governed in their own sphere by the same limitations as

naval forces. They must have fully equipped bases in all areas where they are called upon to operate.

Their mobility goes up in inverse ratio to the supplies they have to take with them. Experience in the last war has shown that a very complex ground organization has to be set up before modern aircraft can be operated, and this is not likely to prove less true in the future. Such an organization cannot be improvised, nor will future wars allow the breathing space to which the United States has become accustomed in the past. Experience with planning for overseas forces in the last war shows the difficulty of moving modern aircraft without a previous base organization into the required area. In spite of the supposed mobility of air forces, it actually proved easier to operate naval vessels far from their nearest base than it did to operate aircraft within that same area. The conclusion, therefore, must be drawn that Air Power, like sea power before it, depends, for its effectiveness, upon the possession of a chain of properly equipped bases. Without them its mobility is largely illusory, and without this mobility the structure of defense is not sound.

The necessary requirements for a base system would seem to be:

(1) The provision of facilities for rapid deployment of forces in any desired direction.

(2) The provision of adequate and immediate logistic support.

(3) Sufficient strength and depth to restrain enemy forces from penetration of vital areas.

(4) The provision of sufficient base sites in any given area to permit adequate dispersion and alternate location.

(5) A capability for rapid expansion.

Because of peacetime economy, always a problem to the armed forces, the Air Force should develop the best system of employment of fighting units and their logistic support, consistent with budgetary allowances, keeping in mind the lesson which democratic peoples so often must be taught, namely, that potential power and actual power are not at all the same, and must be kept in rational balance.

IN MAJOR de Seversky's own presentation of the case for Air Power, the outstanding feature which characterizes him above all other students of that subject is an insistence on the vital importance of large radii of action for bombing aircraft, and the possibility of even increasing ranges to distances far beyond comparison with any heretofore available. He emancipates the air force of the future from any concern with extensive ground organization which Douhet conceded, and from all the island stepping stones of the Arctic routes in the Atlantic and Pacific, to which Mitchell attached such importance. He prophesies the early realization of non-stop flight around the world, using terms similar to those which Mitchell had used 17 years before. In his book, *Victory Through Air Power,* de Seversky says that, "within five years at the outside, the ultimate round-the-world range of 25,000 miles becomes inevitable." He may prove to be almost correct; but in order that he may have his prediction materialize, technical progress in airplane design and improvement in power-plant economy, to say nothing of navigation problems and the sonic barrier, will have to be much more rapid during the present and immediate future than at any time in the past twenty years. For an airplane to circle the world without stopping, at the present time, it would necessarily have substantially more than 75 percent of the total load in the form of fuel, leaving less than 25 percent of the gross weight for structure, engines, crew, military equipment and anything else which must be carried.

The idea of operating from home bases, without the burden of establishing and maintaining advanced and intermediate bases, would be welcomed by every Air Force officer, if it could be realized without paying too prohibitive a price. From the inherent characteristics of the airplane as developed during the last 40 years, however, it appears probable that the price of such a method of operation will continue to be extremely high in the measurable future. Even if aircraft had attained the range necessary to launch bombing attacks from a distance of 6000 to 8000 miles, it would be likely to remain much more economical in matériel, and therefore more efficient, to operate from nearer bases

wherever they could be obtained, with fuel supplies secured locally, or brought in by tanker at only a fraction of the cost in manpower and matériel, should they be brought in by air.

Even if one disagrees with de Seversky's statement that the air forces can operate from their home grounds without concern for establishment and maintenance of advanced and intermediate bases, there is every reason to hold that the flight elements should not be concerned with the ground organization, except as bases for their reception and for logistic support, enhancing mobility.

After a discussion of the base system, and its importance in maintaining the strategic situation, logically the next question should concern the kind of units which could be designed to operate in and out of these bases.

If we consider a fighting unit as such and only as such, we note that the composition of the tactical organizations is based upon tables of organization and equipment which are further broken down into flight echelons and ground echelons, with flight echelons moving in their own unit aircraft, and the ground sections transporting by ground means. It is well to state here that there are some plans now in existence whereby ground echelons will move by air, also. The two main drawbacks to such proposals are shown in the amount of air lift that must be made available versus that which is in being and, secondly, the time factor involved in preparing for, embarking, and debarking from, such an air movement.

Based on *AAF Staff Officers' Manual 115-65-1*, a typical example of such a unit is a Bombardment Squadron, Very Heavy, Table of Organization and Equipment 1-167R. There are 74 officers and 254 enlisted men, or an aggregate of 328 within this organization. The flight echelon is composed of ten crews of six officers and five enlisted men each, manning ten aircraft, limited initially in mobility only by the range of their aircraft. This, then, is the fighting unit, and the remainder of the personnel, the ground echelon, composes the supporting elements of that combat organization. The mobility of the squadron would not be hindered too much if it involved only the movement of ground personnel, but 294,613 pounds of equipment is on hand to be transported. It should

be borne in mind that this is only one squadron, and that a Very Heavy Group would have a total of 1,261,172 pounds of ancillary equipment.

Excluding this excess baggage, and considering the air echelon only, would result in freedom of movement, giving the air commander complete flexibility by being able to add to or subtract from the required effort and mobility, in order to concentrate upon or disperse the fighting units wherever the center of gravity dictated. Blows could converge upon a common objective, while those of the enemy would of a necessity be dispersed against the scattered bases around the circumference.

Having divorced the air echelon completely from the ground components, and being free from any responsibility other than the mission of fighting, we can now devote all energy to the effective use and employment of modern Air Power by development and application of the most profitable tactics and techniques. The conclusions from this type of reasoning can only resolve themselves into one big factor, true mobility.

THE BRITISH, in planning their postwar air force, realized the need for a system of bases strategically located throughout the British Commonwealth. They foresaw also the requirement for keeping the fighting elements mobile by the separation of the air echelon and the ground echelon. These points are demonstrated in their Planned Flying and Planned Servicing System, now in effect. Under this plan operations, administration and maintenance are divided into three wings, under a station commander. The operational units upon arrival at a base submit an estimate of their needs to the technical wing, which, in turn, arranges for the logistical support and plans the work load. Such a system permits the required freedom of movement to the operational units, wherever the situation dictates, without the dependency upon the ground elements, since the technical staff at the planning level is cognizant of the situation and has alerted or manned the necessary bases prior to their actual arrival.

The basic principle of planned flying and planned servicing can be described in general terms as the

marshalling of the available resources of the Royal Air Force in order to produce the maximum possible useful effort. The amount and general pattern of effort required, and the degree of operational opportunity, are forecast by the air staffs of Air Ministry and the commands, as well as circumstances permit, and can be used as a basis for the establishment of aircraft, manpower, airfield and supply requirements.

The British, in the use of their system, specifically hold that Planned Flying and Planned Servicing is a joint matter for Air Staff, Technical and Administrative branches. Its success, they hold, is entirely dependent upon wholehearted coöperation between the personnel of these branches at all levels. The Air Staff must, however, take a leading part, since they are the consumers, and must be expected to voice their desires and anticipated achievements.

The concept applying correctly to one nation is not necessarily applicable to another; this will depend a great deal upon a number of variables, together with the situation in general. However, logic can properly be applied toward a conclusion whenever it is noted that any nation or number of great nations, known to be at least normally canny in their military ideas to the point of recent successes, seem to be in accord with respect to any one particular school of thought along a specific line of application. With this in mind, it should be profitable to examine the known ideas of such countries as Russia and Germany, the former at present a great military power, the latter now fallen but previously accepted by world standards as a most formidable foe to the entire world, a power with a proud, methodical, and precisely successful military machine.

Russia, it will be seen, has currently in effect a system of logistic support which provides for the desired quick movement and general characteristic of mobility for the tactical elements, in that she completely separates the logistic and operational functions, down to and including all levels. In addition, as a matter of information on the same subject, her command structure of logistic elements differs from those of the United States, in that each department head receives orders from his opposite number at

the next higher echelon. Thus, a signal officer at base level would obtain instructions, technical and otherwise, from the signal officer at next-higher level. It must be admitted that such a practice goes even further than the action recommended in this paper, if, indeed, such action proves to be the desired, logical step.

Up to this point, then, it would appear that two of the three currently great powers are in accord upon this one idea, namely, the method of logistic support to be provided to the operational elements of a fighting machine in the air. The United States, it would also seem, has not been in agreement with this.

As an additional factor which should be given a certain amount of weight, consideration should be given the German Air Force system of logistic support. As previously mentioned, concession must be given to the historical fact that Germany was defeated, and must not necessarily, by virtue of that fact alone, be given credit for possessing an efficient method of waging successful air war. Further investigation into this field, however, presents an entirely different picture. The foremost military minds of the world, almost without exception, have admitted and still maintain that the German Reich must be given credit for unusually sound thinking, along with methodical and precise planning, in all matters concerning the application of the principles of war. Indeed, such German military men as Clausewitz, Bismark, Schlieffen, Moltke, Ludendorff and Frederick the Great have been given to posterity as the foremost exponents of the art of warfare. Weight, then, may be properly given to their considered opinions as practices of the German military machine, although their relation to that organization does not in itself establish the wisdom of those opinions and practices.

Here, too, it is found that logistic support was given to the German Air Force through a system of organization and bases entirely disconnected, with respect to command channels, from the tactical units. Two separate chains were constantly in operation; the first, a system of tactical organizations with emphasis upon rapid employment and mobility, and the second, a supporting system of logistic support, capable of handling the entire support picture, and

giving emphasis to the degree of mobility and effect attainable by the fighting units. It is to be noted that when the German machine actually crumpled, the logistic machinery was still in efficient operation, and that the failure of supplies at various points of the huge pipeline was occasioned, in every case known by the writer, by the failure in the actual production of supplies, or in some instances, by the failure of the logistically supporting machinery outside the jurisdiction of the German Air Force. Despite this failure, the average American combat pilot seems to have wondered, on various occasions, as to the apparently uncanny ability of the German Air Force, especially intercepting fighters, to move, upon a few moment's notice, entire fighting organizations from one section of Western Europe to another, or even from Eastern to Western Europe, with no apparent need for rehabilitation at the new point, nor any shown necessity for removal back to the original base upon termination of that current phase of the air battle. If the basic system of logistic support used in the German Air Force is taken into consideration, these performances seem much simpler.

THE UNITED STATES could easily adopt a similar system, by the establishment of areas to be controlled by a Regional Service Command; all bases within such areas could be assigned this headquarters, as it could be located in the numbered Air Force headquarters and could have command jurisdiction over all the service elements. The service commander could, by adding or subtracting specialists and equipment from the service group, enable that organization to maintain any type of aircraft. This seems important in view of the differentiation which must be made between jet engines, reciprocating engines, and the various types of airframe and airfoil construction. The service commander could, by moving these logistical resources from one base to another, increase the effort of some bases while decreasing that of others, according to the dictates of military experience, and with the very apparent gain of economy of force, flexibility, and overall efficiency.

This proposed service commander, being closely allied in

actuality with the air force commander, would properly be expected to foresee the needs of logistic support, and could make plans accordingly, without interfering with or detracting from the mobility of the fighting elements. In like manner, the air force commander could mass or disperse his forces, without the added worry of bringing into play the various ground echelons.

The base itself would be operated by the service group, having the mission of logistic support of the fighting unit. This would unquestionably place the tactical commander in the position of having more of the comforts of home without shouldering the responsibilities of ownership. While subordinating in no way one commander to the other, it would, rather, place each in the position of being supreme in his own field, yet understanding the other's mission, and creating an atmosphere of cooperation and mutual understanding.

Before we proceed to another point in this dissertation, a few words may well be said concerning the question of morale. Much has been said of the detrimental effect to the morale of personnel within the logistic elements adjacent to the tactical organizations. In this regard, no morale problem can logically be blamed upon any one element or practice; secondly, there is room for reasonable belief that any such lack of good morale may have been due, indeed, to the fact that the service organization, by its very integration into the operational unit, lost the right to any identity, organizationally speaking, with the function it was performing. Finally, if such an argument is to be allowed against the separation of logistic and operational elements, certainly one cannot place such weight upon the value of morale as to allow the air arm to be deprived of the greatest single factor justifying its existence, namely, mobility. The value of the supplying and repairing force is quite important; equally important is the morale of the airplane builder and the miner who produces the metal for them; can it be seriously suggested that they, too, should become a part of the fighting unit in the theater?

The day of the knight flying about in his trusty airplane, with his scarf waving in the breeze, has passed into

history. It has given way to the use of mass personnel, all performing duties peculiar to their talents. It is inconceivable that this new idea will not become even more pronounced, as advances are made in industrial and technological fields. As expressed by Major General Hugh Knerr at a recent interview, it may be assumed that in any future war, the major weight of its application will be necessarily provided through the efforts of the industrial and technical might of the country, rather than the military itself. Further, in practicing the principles used successfully by business concerns the world over, it is necessary that each individual be shown the effect of his efforts in tightening the bolt, rather than to inveigle him into believing he is a member of an organization which has an entirely different mission.

PROFESSOR Arnold Joseph Toynbee, in his book *A Study of History*, states that:

> The theory of history is a dialectic, that is, it reports the challenge of something by an exterior force. If the response to the initial challenge is successful, the process involves new challenges, with new responses. If the last responses are not successful, the community breaks down.

He states further that in the study of history, events and cycles are repeated in somewhat similar forms, regardless of the civilization being considered:

> At first, the community is led by a creative minority. The masses, stimulated by the common challenge that has called the society into being, and by the creative leadership that has guided its response, follow without undue questioning. Response to a challenge, however, calls forth a further challenge.

Thus, the challenge of overpopulation on a weak soil, to which the Athenians responded by taking to the sea as a maritime empire, called forth a new challenge as a result of Athens' new relation between its ships and the sovereign community of Sparta.

The United States seems to be now facing a nation which apparently is trying to respond to such a concept of world domination. Herein we have a dominant minority, ruling by

force. A time of trouble ensues -- a time of internal struggle and foreign wars, which more and more take the form of world conflicts. This period can be terminated only when the dominant minority, among its distracted fellows, delivers a crushing blow to all its rivals and becomes the "universal state." Rome, having crushed Carthage and Macedonia, thus became the universal state of Hellenic civilization. It has happened before, in the seemingly endless cycle of history.

If we apply such a formula to modern times, an interesting picture presents itself. The Air Force, having succeeded the navy as a first line of defense, faces now this challenge, and its response to the summons will, in all probability, set the pattern of civilization for many generations to come. The Air Force has made a successful reply to World War II in itself, but this cannot presuppose success in answer to the next bid for power. On the contrary, one success tends to make the responder more self-satisfied. He comes to believe that the previously given solution is surely the successful answer to the next arising problem. The elasticity of thought and effort, essential in such a response, may be lost. The forms, concept, organization and policy in which the successful reply has been made, tend to freeze and to impose themselves upon the solution of the latest question of tactics, strategy and overall need for new ideas, for which they are wholly unsuited.

With this nation putting its trust and faith in the armed forces, particularly the Air Force, failure in proper response cannot be risked. It must be realized that the operations of an air force can no longer be considered as being local in extent, or limited in range. Bombers, with their present capability of ranging the world, must have the necessary facilities, such as well-equipped bases, meteorological information, communications, and other items of logistic importance, always including radar. There must be developed, in addition, the most effective tactics and techniques, through sound organization, in order that these may be properly applied.

An attempt has been made in this article to show the specific and urgent need for immediately considering the

separation of operational and logistic functions. This country should plan and build its Air Force with full knowledge that the methods of waging war are changing at a rate never equalled in history. It is believed that the separation of the fighting units from the service elements will give this country a sound basis with which to meet any of the eventualities.

There should be nothing startling about the proposed solution. Navies throughout the world have used just such a system with fantastic success. It can be as successfully applied to the vast oceans above the ground.

Finally, since it has been seen that the other two remaining great powers of the earth, Britain and Russia, have already in effect such a system, it would appear that, for such a reason alone, serious consideration should be given to the idea. Judging from the evidence at hand, a fair tryout of the proposed solution could do little harm, and should benefit the armed forces to a great extent.

Closely connected with the growth of air transportation is the new coöperation which has sprung up between religious groups in a drive toward common goals. The Air Age promises much, in fact, in the whole broad field of human relationships. The peoples of the world will intermingle more freely; each will come to appreciate the problems and aspirations of the other. Such appreciation cannot fail to lessen and eventually to erase the national and racial suspicions and prejudices, always a prime factor underlying turmoil and conflict.

W. Stuart Symington in *Air Affairs*

EDITORIAL

THIS is the second issue of AIR UNIVERSITY QUARTERLY REVIEW, which was established by Major General Muir S. Fairchild in February 1947. His initial memorandum clearly outlines the purpose and scope of this new outlet for the expression of thought on a subject that is intimately related to the life of every individual in this world today -- Air Power. The memorandum reads in part:

"This journal of Air Power will not be just another newsmagazine, nor is it intended as a periodical of interest only to the Air University. Rather, it will be a professional publication in the highest sense of the word and will reflect not only the high scholastic standards and educational accomplishments of the Air University, but also -- and more important, perhaps -- the best professional thought concerning global concepts and doctrines of air strategy and tactics.

"Thus, in certain respects, the AIR UNIVERSITY QUARTERLY REVIEW will be an extension of the concepts and doctrines developed at the Air University and which underlie its program of instruction. Articles published in the journal will be confined to subjects related generally to Air Power and its application, and appropriate emphasis will be placed upon the trends of technological development and their indicated effects on military aviation of the future.

"Contributors should bear in mind that articles submitted for publication must represent a significant contribution to present thought concerning Air Power, and that they are not to be merely narrative or anecdotal in form, or devoted to technical matters of relatively minor importance.

"I feel sure that to have an article published in this journal of Air Power will be considered a mark of distinction to the credit of Army Air Forces officers and other contributors."

The response to the first issue, both inside and outside the Air University, was gratifying. This journal is now on a subscription basis at two dollars a year; individual copies are fifty cents. Orders may be placed through the Air University Book Department, Maxwell Field, Alabama. Because of the paper shortage, only a limited number of subscriptions will be available.

Free distribution is made to students and faculty of all schools of the Air University in which the journal can serve as appropriate textual material. Distribution is also effected to other Service School libraries and similar agencies. Exchange has been established with university and college libraries and public libraries.

The QUARTERLY REVIEW particularly solicits the thought of all Air Force personnel, whether on active duty or not, which contributes to the development of Air Power. Articles are also welcomed from other professionally qualified contributors who are interested in the various phases of this development. Articles should normally not exceed 3500 words, although they may go over this margin when the material justifies expansion. Short articles of the monograph type are also desired.

The articles appearing on these pages suggest the kind of subject matter and treatment in view. They have been approved on the score of security, propriety and good taste by the Office of the Director of Information, Headquarters, AAF, in accordance with AR 600-700. They do not all agree with established policy and doctrine: it must be made clear that *articles appearing in this journal reflect the author's opinions and do not necessarily coincide with, nor are they those of the War Department; of Headquarters, Army Air Forces; or of the Air University.*

Correspondence and articles attempting to controvert any of the material published in these pages will be welcomed. The Editorial Board hopes that Air Force Personnel, both on active and inactive status, will give AIR UNIVERSITY QUARTERLY REVIEW the first opportunity to present their original thinking on the subject of Air Power.

M.K.D.

AIR ANTHOLOGY

THE AIRMAN'S ALPHABET

(From *Journal of an Airman*)

MY MOTHER'S dislike of my uncle, the people's satisfaction at crashes. "If the Lord had intended people to fly He'd have given them wings," compared with their daydreams of looping the loop, the falling leaf, dragging their chum from blazing fuselage -- signs of a mixed character. Most people mixed characters -- the two-faced, the obscure and amazed, the touch-line admirers.

Note. -- The aeroplane has only recently become necessary, owing to the progress of enemy propaganda, and even now not for flying itself, but as a guarantee of good faith to the people, frightened by ghost stories, the enemy's distorted vision of the airman's activities.

ACE --
Pride of parents
and photographed person
and laughter in leather.

BOMB --
Curse from cloud
and coming to crook
and saddest to steeple.

COCKPIT --
Soft seat
and support of soldier
and hold for hero.

DEATH --
Award for wildness
and worst in the west
and painful to pilots.

ENGINE --
Darling of designers
and dirty dragon
and revolving roarer.

FLYING --
Habit of hawks
and unholy hunting
and ghostly journey.

GAUGE -- Informer about oil
and important to eye
and graduated glass.

HANGAR -- Mansion of machine
and motherly to metal
and house of handshaking.

INSTRUMENT -- Dial on dashboard
and destroyer of doubt
and father of fact.

JOYSTICK -- Pivot of power
and responder to pressure
and grip for the glove.

KISS -- Touch taking off
and tenderness in time
and firmness on flesh.

LOOPING -- Flying folly
and feat at fairs
and brave to boys.

MECHANIC -- Owner of overalls
and interested in iron
and trusted with tools.

NOSE-DIVE -- Nightmare to nerves
and needed by no one
and dash toward death.

OBSERVER -- Peeper through periscope
and peerer at pasture
and eyes in the air.

PROPELLER -- Wooden wind-oar
and twisted whirler
and lifter of load.

QUIET -- Absent from airmen
and easy to horses
and got in the grave.

RUDDER -- Deflector of flight
and flexible fin
and pointer of path.

STORM -- Night from the north
and numbness nearing
and hail ahead.

TIME -- Expression of alarm
and used by the ill
and personal space.

UNDERCARRIAGE -- Softener of shock
and seat on the soil
and easy to injure.

VICTIM -- Corpse after crash
and carried through country
and atonement for aircraft.

WIRELESS -- Sender of signal
and speaker of sorrow
and news from nowhere.

X -- Mark upon map
and meaning mischief
and lovers' lingo.

YOUTH -- Daydream of devils
and dear to the damned
and always to us.

ZERO -- Love before leaving
and touch of terror
and time of attack.

Three signs of an airman—practical jokes--nervousness before taking off--rapid healing after injury.

OF THE ENEMY --

His collar was spotless; he talked very well,
He spoke of our homes and duty and we fell.

Three kinds of enemy walk--the grandiose stunt--the melancholic stagger--the paranoiac sidle.

Three kinds of enemy bearing--the condor stoop--the toad stupor--the robin's stance.

Three kinds of enemy face--the June bride--the favourite puss--the stone in the rain.

Three kinds of enemy eye--the lobster--the boot-button --the submarine.

Three kinds of enemy hand--the march--the claw--the dead yam.

Three kinds of enemy clothing--fisherman's pockets--Dickens' waistcoats--adhesive trousers.

Three enemy traits--refusal to undress in public--proficiency in modern languages--inability to travel back to

the engine.

Three enemy occupations--playing cards--collecting--talking to animals.

Three terms of enemy speech--I mean--quite frankly—speaking as a scientist, etc.

Three signs of enemy letter--underlining—parentheses in brackets--careful obliteration of cancelled expressions.

Three enemy questions--Am I boring you?--Could you tell me the time?—Are you sure you're fit enough?

Three enemy catchwords—insure now--keep smiling--safety first.

Three enemy don'ts--don't kiss your baby on the mouth--don't lean out of the carriage window--don't miss that.

Three signs of an enemy country--licensed hours--a national art--nursery schools.

Three signs of an enemy house--old furniture--a room called the Den--photographs of friends.

Three warnings of enemy attack--depression in the mornings--rheumatic twinges--blips on the face.

Three symptoms in convalescence--nail-biting--nightmares --short-sight.

Three results of an enemy victory--impotence--cancer--paralysis.

Three counter attacks--complete mastery of the air--ancestor worship--practical jokes.

- W. H. Auden, "The Orators" (from *Poems*, Random House, N.Y., 1935)

W. H. Auden, born in England in 1907 and now a resident of the United States, is generally regarded as the leading poet of his generation. The foregoing selection from one of his early books shows that Auden is a master of humorous allegory as well as one of the first to see aviation symbolically. The poetry above is patterned after Old English verse forms.

FOREIGN HORIZONS

ARMAMENT AND HISTORY

A book review reprinted from *The Royal Air Force Review*, March–April 1947.

MAJOR GENERAL J. F. C. FULLER has written in his *Armament and History* (Eyre & Spottiswoode, 12 shillings and sixpence) a most important book. First of all, it is not just another hotch-potch of personal reminiscences of a Commander's despatches written from tank or tent. As its subtitle says, it is a study of the development of arms since western history began and of the influence on our traditional civilization.

Much research (his quotations range from Caesar to Clausewitz, from Thucydides to *The Times*) has resulted in a serious and philosophical essay. It is not long--just over 200 pages--nor is it dull; the manner is stimulating and one is continually coming across titbits of information, as "Without trial Napoleon was shipped aboard the 'Northumberland' . . . and sent to St. Helena. At the Admiral's table he and his staff of seven and six British officers consumed: port, 20 dozen; claret, 45 dozen; madeira, 22 dozen; champagne, 13 dozen; sherry, 7 dozen, and malmsey, 5 dozen. It is instructive to contrast with this the treatment meted out to Goering, Doenitz, Keitel and Ribbentrop."

That quotation is not so irrelevant as you might suppose. The veneer of civilization is cracking, and under specious, wordy banners, we are retreating into barbarism and the Dark Ages. And yet it is no retreat; it is rather "The March of Progress," the progress of war. For peace is no longer the normal condition of our life. It merely gives us a breathing space now and again. War was once regarded as a continuation of policy; now, policy is the continuation of war.

The discovery of gunpowder began the elimination of the human element in war. We have gradually fashioned an un-

controllable monster whose heart, the "Constant Tactical Factor," swings like a pendulum, perpetually between attack and defense, producing new weapons. For the right weapons "form 99 per cent. of victory . . . . Strategy, command, leadership, courage, discipline, supply, organization and all the moral and physical paraphernalia of war are nothing to a high superiority of weapons."

As the technical efficiency of armaments has increased throughout the centuries, so we have lost what few virtues we displayed in the Ages of Valor and of Chivalry. Once humanitarians tried to restrict the ravages of war, and the clear-sighted saw that "to destroy that for which a war is undertaken is an act of madness, and madness of a very violent sort." But since the Thirty Years' War ideals and self-interest have been losing ground. We no longer go to war for romance or for concrete advantages; we fight for intellectual abstractions, and man is forgotten. Ideologies, unlike human beings, know no compromise; their rigid logic demands the annihilation of all that they are not, and this in an Atomic Age can end only in mutual destruction and the wreck of civilization. Such is the author's diagnosis.

What is his cure? That it is no use trying to abolish war, but, "so long as the urge to fight remains part of human nature, to impose the will of the victor upon the vanquished with the least possible destruction to either." Force by itself is no solution; and a Super-State, even though brooding over its atomic eggs, will have no powers of moral persuasion to prevent war. Our only hope is to build on reason. You may question this, as I would certainly question the author's politics; indeed it would be surprising if you did not, for it is the opinion of an "Unconventional Soldier." Eccentricity is bound to provoke arguments, but it is this type of mind which looks out over the past and into the future that we need to-day.

It is this, together with his outstanding ability as a strategist, that gives Major-General Fuller his strength.

All officers who go to the Staff College should read this book, whether the curriculum demands it or not. Everyone should read it who pretends at all to be interested in the fighting service to which he belongs.

THE AIR MINISTER'S POINT OF VIEW

An Interview with French Air Minister Maroselli, from *L'Armée Francaise*, July-August 1947. Translated by Miss A. W. Herling, Air University Library staff.

Question - The various plans for the reorganization of the army generally lay down the principle of unified inter-arm command of the military areas. Do you consider that this unification can be achieved in the near future and that it is fundamentally desirable?

Answer - The experience gained during the last conflict has shown incontestably the advantage of setting up a supreme command for one and the same theater of operations. This, then, concerns a principle that is not only desirable but also logical. Thus, starting in peacetime, France and the French Union might be divided into a certain number of theaters of operations, the extent of which would vary in accordance with a multiplicity of factors: density of population, strategic importance, etc. Metropolitan France would thus constitute one theater of operations, North Africa a second, Indo-China and the Pacific islands a third, Black Africa a fourth, etc.

On the other hand, to limit the exercise of unified command to the cadre of military areas intended in peacetime to play only the rôle of territorial administration is in no wise justified.

Question - What do you think of unification of the services of the three branches (ground, air, sea)?

Answer - Each of the general staffs, whether ground, naval, or air, has its own needs which are met by specialized services. Their unification for the three branches of the service would automatically entail the creation of organizational sub-directorates. The final pay-off of the system would be not a real and tangible economy but additional difficulties of liaison, and consequently a lowering of the efficiency of the services. However, it seems to me necessary to draw up statutes which will standardize the position of personnel in the different staffs doing the same work or assuming the same responsibilities.

Question - It has often been thought that the modernization of the army would be effected through increasing the relative strength of the air force. Do you consider that this relative increase has up to now been sufficient? What proportion would it be advisable to give it on the basis of an active army composed: partly of a one-year contingent and partly of personnel of the regular army?

Answer - Whereas in England and the United States the strength of the air forces reaches one-third of the total strength of the armed forces, the proportion in France represents only one eighth of the total strength, that is about 70,000 men, of whom the various indispensable services absorb at least 60,000 "ground" personnel. This number includes the personnel charged with air safety and the equipment of the bases and with services utilized not only by military aviation but also permanently by French and foreign civil aviation. This number also includes the engineers of research offices and the specialists who surround them, not to mention the various technicians with irreplaceable skills who are temporarily attached to the various ministries.

Is it not indeed aviation which, by its mobility and the power and rapidity of its intervention as well as by its "dividend-paying" character for the commonwealth, must become the surest guarantee of the security of France and the French Union at the same time that, through the many forms of its activity, it contributes to its development?

One may therefore state that the place accorded to aviation at the present time is absolutely pitiful. Following the example of our Russian, English, and American allies, it is around aviation that our national defense must be reconstituted.

Finally, it seems difficult to maintain a constant and fixed balance between the annual contingent and professional army personnel. In any case, the air force will be the national force rightly desired by all, for, in reconstituting our military power, in contributing to the economic development of France and the French Union, the air force will become integrated, in the true sense of the word, with the nation itself.

Question - Do you think that the "airborne arm" should be an independent branch of the service or be combined with the air force?

Answer - There is every reason to think that in an emergency the armed forces will have to include an offensive corps and a corps of occupation.

In order to accomplish its hazardous mission, the offensive corps or "airborne arm" will have to act by surprise through a swift and sometimes distant mass action. Aviation alone is capable of this action, the condition essential to success.

Question - Again, the advent of new weapons (flying bombs, guided missiles) raises the question of a "boundary" between aviation and ground artillery. Is this question settled or must we come to the idea of new and independent "complex arms (branches of the service)"?

Answer - During the last war there never arose any need of establishing a border-line between aviation and artillery. Although artillery is limited by the range of its cannon and the zone of action of the great unit with which it is connected, its action has never been hindered by aviation. On the contrary, the superposition of the means of the two branches of the service has often been achieved through the smashing intervention of bomber fighters.

New and improved matériel will in no way change this close cooperation. It seems evident that radio-guided rockets or missiles, since they can traverse very great distances, will be used by the air force, whereas the utilization of other weapons intended for immediate intervention on the battle field will be reserved for the artillerymen.

Finally, it remains to be seen to whom the use of anti-aircraft rockets or weapons will be assigned. This use, closely linked, for many reasons, with that of aviation properly speaking, must unquestionably be entrusted to the air force.

Question - What do you think of the utilization in the air force of the annual contingent and of trained reserves? Will the air force have to be composed, as certain people have claimed, almost entirely of professional soldiers?

Answer - The contingent is not readily utilized in aviation which, being in the vanguard of technology, needs above all expert specialists.

You will easily understand that mechanics and radio operators, kingpins of the safety and efficiency of our aviation, cannot be trained in a few months.

Open to all energetic youth, the air force is nonetheless the national army in the strictest sense of the word, since it shows daily, through the missions it accomplishes and the work it carries through, that it is an integral part of the nation.

Question - What do you think of premilitary aviation training? Should there not be revived the strong trend which in 1936 began to draw youth into the flying-clubs and popular aviation?

Answer - Premilitary training is essential especially for the air force, whose requirements in specialists, as I have already told you, are particularly urgent. It is the only way of raising, in the case of young recruits, the training standard which is, unfortunately, still much too weak, as I have recently ascertained.

I have before me this very day an SOS in which the president of the National Aeronautic Federation, alarmed by a recent article of the appropriation bill calling for the discontinuance of premilitary training, tells me in touchingly sincere words of his profound disappointment.

To discontinue premilitary training is, as far as aviation is concerned, to deal a very hard blow to the popular aeronautical associations which find their full flowering and a part of their resources in gathering together and educating young men whose ambition is to serve in the air force when they are called to the colors.

Now, can one interrupt this current which attracts precisely our youth to the flying-clubs? Personally, I think not, and I shall here repeat the words I expressed, at the closing session of the Third National Congress of Aviation, with regard to popular aviation: "It constitutes the very foundation of the renaissance of our wings."

In brief, I consider premilitary preparation indispensable for the air force.

The annual contingent must be raised to 90,000 men, then to 120,000.

It is quite evident that the discontinuance of military preparation would oblige the air force to assume the complete training of this complement.

And it is quite certain that this personnel will have to have not just training but advanced training, if one wishes to increase efficiency of performance.

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AIR POWER AND STRATEGY

By

Air Vice-Marshal E.J. Kingston-McCloughry, C.B.E., D.S.O., D.F.C.

A condensation of an article from the *Royal Air Force Quarterly*, June 1947.

THE AIM in war is to destroy the enemy's will or ability to make war. Before the rise of Air Power, warring nations were unable to adopt direct means to achieve this aim because the source of the enemy's war power was inaccessible until the barriers which protected it were overcome.

The advent of the aeroplane made it possible, for the first time, to engage directly targets at distances far beyond the range of other weapons. The new weapon was also highly flexible in that it could be switched from one target system to another rapidly and easily and thus could concentrate a crushing weight of bombardment at the selected time and place. The characteristics of long-range and flexibility combined with accuracy--an accuracy which scientific devices will continue greatly to increase--demand that the operations of Air Forces should conform to a different strategy from that of armies, whose function as the prime offensive instrument of war they have inevitably to assume for the future. Since aircraft can attack and destroy vital targets in the rear of the enemy's surface forces, the relative importance of disorganizing those surface forces is greatly reduced. Air Forces, in other words, can strive directly towards the achievement of the aim which an army has had to pursue by steps.

As the characteristic which exercises the most powerful influence upon our conceptions of grand strategy is the

potentiality of air forces as agents of long-range strategical bombardment, it is on this potentiality and its future trend that our attention should be focused. World War II produced two revolutionary developments in the field of strategical bombardment. The first of these was the development of long-range pilotless aircraft and long-range rocket projectiles. The second was the development of the atomic bomb. The former provided a new and unconventional method for the delivery of a conventional explosive. The latter provided, for carriage in conventional bomber aircraft, a new and unconventional weapon of immense destructive potency. It is conceivable that future joint development along these lines may eventually supersede our current technique altogether, so that, in the history of warfare, bomber aircraft may appear merely as a transitional phenomenon in the evolution of long-range bombardment. Since, however, the strategic function of all devices for long-range bombardment is identical, it is important, during this process of evolution, that the development of new long-range weapons and techniques should be pursued jointly with the operational development of the current bomber aircraft which at present constitute the prime agent of destruction at long and even medium ranges.

From the fact that air forces are at present the most directly effective and economical agents for operating against the enemy's will or ability to wage war, it follows that the employment of air forces and associated instruments of long-range bombardment to the best advantage must be the prime consideration in the grand strategy of the armed forces as a whole. We can no longer think of warfare as consisting primarily of land campaigns supported by sea and air forces. All campaigns against the enemy's war will or ability must now be prosecuted by the most powerful combination of our armed forces. The primary objective is the very heart of the enemy's war power; his armed forces are secondary. Thus the primary instrument of war today is the long-range bombardment force; the navy and the army are essential partners.

Airman's Reading

The Right To Fly, by John C. Cooper (Holt, $5).

Reviewed by
Fletcher Pratt

THIS volume is likened by its publishers to those of Mahan --a somewhat dangerous simile when one recalls that foreign critics pronounce the style of the classic sea-power volumes "deplorable in any language." In this respect, the resemblance is, alas, all too clear, what advantage in readability there is lying with Mahan. Mr. Cooper is out for the standing broad cliché-jumping championship (he has seven of them in a single paragraph), and expresses his ideas in prose of unparalleled dullness.

Nevertheless, there is gold in them thar' hills of words, especially as they deal with definitions of such fundamental matters as the elements of Air Power, national sovereignty over airspace, and the terms to be accorded Germany and Japan with regard to aviation. Mr. Cooper points out that as long ago as 1910 the battle for juridical freedom of the air in the sense that the seas are free, with rights of harborage and commerce, had been fought and lost. The doctrine of the fullest national authority over airspace was established as early as that. But in considering the failure of the air provisions of the Versailles treaty, he points out that the analogy between freedom of the air and freedom of the sea is a false one.

On the water it is quite easy to differentiate between ships of war and commerce and when the latter are converted to military uses they give poor performance. No such line is perceptible among airplanes, as the Aeronautical Commission at Versailles quite sharply told the framers of the treaty, who turned down the advice of their own experts and tried to keep German civil aviation alive while prohibiting military aviation. Among the best passages in the book are those in

which Mr. Cooper traces the obstinacy of Wilson and Secretary of State Lansing on this point, and the actual assistance given to the growth of the Luftwaffe by unworkable regulations; and these passages are full of meaning today, with new peace treaties coming up. Mr. Cooper declares that the dividing line is sharp--either you have no aviation at all or you have Air Power; or in the words of a French electioneering poster a few years back, "Any factory can make a bomb that any airplane can drop."

He would seem to be on fairly solid ground there, and also in his definitions of what makes up Air Power, a vast and intricate complex hitherto inadequately investigated. It is the feeling of the present reviewer that he has given less than complete consideration to guided missiles and their effect on the whole Air Power problem, and that this, with the signature of definitive peace treaties, will cause large portions of the book to become obsolete before very long. But the book is fairly important reading for today if one can stand the style, and the definitions should stand up for a long time.

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No Peace for Asia, by Harold R. Isaacs (Macmillan, $3.50). The Future of Freedom in the Orient, by Ralph Coniston (Norton, $3).

Reviewed by
Albert Parry

OF THE two books, *No Peace for Asia* is by far the abler and more pessimistic one. During the war Mr. Isaacs was a correspondent in China and Burma; after the hostilities he traveled in Indo-China, Japan, Korea, the Dutch East Indies, and other lands of the Far East. This competent correspondent of *Newsweek*, this deeply analytical author of a previous book on the Chinese revolution, uses his latest first-hand material for the gloomiest conclusions possible, as witness the very title of the present volume.

His book is full of sustained and powerful indignation because things are so bad in Asia and the rest of the world when they can be so good. He bitterly marvels at the height of man's ingenuity and the lowness of human prejudice. This

graphic bit about the construction by Americans and natives of a road in southeastern Asia is typical: "These were all men building a road where none had ever passed before, overcoming the craggy mountains and the great monsoons and the wildness of the jungle. They could drive great steel muscles against a natural wall and break through. But none of their strength, their techniques, or their tools could break through the great walls of prejudice that separated them from each other."

The author's attitude is that of plague-on-both-your-houses as he denounces the Chinese Communists and as he pens an acidly brilliant and thoroughly annihilating portrait of of Chiang Kai-shek. Somewhat overidealizing the early phase of the Russian revolution, he dolefully and angrily describes the Soviet imperialism of today. But he plays no favorites with his own country either. He is sad about the wartime behavior of American troops in Asia and its effect upon Asiatics. He is also disheartened by the negative influence of the Far Eastern and Middle Eastern experience upon these many young men from the United States, airmen and infantrymen both. What should have been a priceless opportunity for making a fine contact and cementing good bonds was perverted by implacable circumstances into a mutual revulsion or at least indifference between Americans and Asiatics. In some respects this particular chapter, "American Soldiers in Asia," is the most melancholy in the book. The author blames our government and high command for this failure. Only a little less morosely does he survey the role of the British, French and Dutch in Asia.

Is Mr. Isaacs entirely too bitter and too gloomy? Events will show. The author himself protests that he is not too dire in his prognosis. And certainly he is not so funereal as, say, James Burnham is -- Burnham, who tells us that we are already in the midst of World War III.

Mr. Coniston's book is more cheerful if only because of its optimistic title, which presupposes both a future and some freedom for the Orient. Taken by itself, this volume may conceivably leave a positive impression of the sort it aims to make. But if you read it right after Mr. Isaacs' book, as I did, you won't be impressed. And it seems to me

that if you had read it before *No Peace for Asia*, the effect would be even slighter. For Mr. Coniston is diffuse, has no appreciable amount of either new facts or arresting observations, and ends his eyewitness account of Asia with sheer generalities bordering on platitudes, such as this one: "We are witnessing the labor pains presaging a rebirth. These are the beginnings of a renaissance, political, cultural, economic, which in time will transform the Orient." If Mr. Coniston predicts trouble at all, it is in a rather vague future, and not so much between the two major powers of the white man -- the Soviet Union and the United States -- as between the natives on the one hand and the white conquerors on the other.

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Revolution and Warfare, by B.H. Liddell Hart (Yale Univ., $2).

Reviewed by
Colonel Charles G. Kirk

THE REVOLUTION in warfare has been long recognized by the military airman. Mr. Liddell Hart is a little late in his recognition, and his concept of the path of revolution is both confused and contradictory. He offers a picture of a golden age in the past and dies hard in his efforts to resist inevitable change. His nostalgia for the days of the quarter-deck and the saddle are not quite tempered by his acceptance of the lessons written in the skies of World War II.

With some of Mr. Liddell Hart's thinking we have no quarrel. Certainly the aircraft, the guided missile, the passage of the sonic barrier, and the explosive charge of fissionable material, have wrought a change in warfare since ground, or surface, forces no longer offer the most economic medium through which the blow against the enemy should be delivered. And total warfare which does not consider "the post-war effects which earlier statesmen were wise enough to bear in mind" can mean destruction and ruin of cities, nations, and ways of life.

But Mr. Liddell Hart is dying hard. He relegates the Air Power of the nation to a role as an ancillary arm: "The Air Force now needed is one composed mainly of fighters for defense in general, and of fighter-bombers for coöperation

with the army." He then makes matters worse by advising complete economic ruin, this time more complete than the destruction of ésprit and morale which was the concomitant of his defensive Maginot-Line philosophy, by his statement that nations in the future must "seek to prevent an aggressor attaining any serious initial success, and that aim can only be attained by a fuller and more specific development of defense." He would limit defensive action by his recommended air-force composition and would dissipate air strength by committing a major portion to action limited by radius of operation of the surface forces.

Whatever validity might still be claimed by Mr. Liddell Hart is considerably weakened by such naïf assertions, whereby he translates his Maginot-Line complex into the third dimension. The air weapon and the medium in which it operates are such that the installation of a cordon final defense by air weapons opposing air weapons is prohibitively costly. The concept of the effectiveness of the final air-defense line has been dangerously overrated, and an attempt to build such a defense adequate in strength and depth necessary to insure security would lead to national bankruptcy and economic ruin. Following such a policy would inevitably lead to dissipation of national resources on an ineffective final defense and would provide no military structure capable of extending defense in time and space. The military mind which can place a realistic value on the Maginot-Line concept will immediately perceive that the solution to the air-defense problem lies not in a three-dimensional Maginot-Line, but rather in an extension of defense in time and space.

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Yank: The GI Story of the War, by Debs Myers and others (Duell, Sloan and Pearce, $5).

Reviewed by
William Frye

HERE, written by himself, is the fact and the legend of the GI. It is not a long book. The type is large, and nearly a third of its 316 pages are devoted to pictures. Yet it seems both long and tiresome.

only as an indication of the relative magnitude of these loads and cannot be used for actual design purposes. A static stability analysis of helicopters of the counter-rotating and single main rotor type is presented.

The book should give the advanced aeronautics student, who is interested in helicopters, a good working knowledge of the principles involved in design and performance calculations. It is recommended, however, only for those interested in the technical aspects of the helicopter.

The Story of the Helicopter is exceptionally interesting to all those interested in this subject and in the men whose perserverance in the face of seemingly overwhelming odds have given it a permanent place in our "air world."

Since the days of Leonardo da Vinci, man has attempted to simulate the flight of birds. The ability to ascend vertically, hover indefinitely and fly in any direction at will, with the advent of the helicopter, has finally become a reality. This book tells, in the language of the layman, of the experiments and failures of the pioneers of rotary wing aircraft and of the eventual ingredients incorporated in the now successful craft.

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American Military Government in Germany, by Harold Zink (Macmillan, $4).
Report from Spain, by Emmet John Hughes (Holt, $3).

Reviewed by
Raymond Estep

THE FIRST of these volumes is written by a well-known and profound political scientist, a member of the faculty of DePauw University. Professor Zink's work, the product of his service as a Military Government officer during World War II and of additional study financed by the Social Science Research Council, should be required reading for all career military personnel. The author relates the history of the efforts to create a military government organization for Germany from the initial phases connected with the establishment of the School of Military Government at Charlottesville, Virginia, through the additional training stages in

this country, the long period of relative inactivity at English bases, the actual activities on the continent during military operations, and--most important--the functioning of the organization in the post-hostilities period.

When no longer on active duty, Professor Zink was free from many of the restrictions--official or implied--that military routine prescribes for the writer of an official report. Some of the condemnations of high level inertia, "higher brass," armed forces regulations, and military and state department routine, customs, and privileges will not be kindly received by top-echelon Washington civilians and Military Government personnel.

Not all is gall and vinegar. The author finds opportunity for some commendation to all ranks and activities. It is his conclusion that the military government of Germany by the United States has been reasonably satisfactory, far more satisfactory than many sensational newspaper reports would lead the citizens of the United States to believe.

The second of these studies of a European subject was written by a former member of the diplomatic corps who served on the staff of the U.S. Embassy at Madrid from August 1942 to May 1946. In the first two parts, "The Regime of Franco" and "The Battle for Spain," which are devoted primarily to a study of internal struggles and party conflicts, Mr. Hughes has made a noble but by no means successful effort to clarify a picture that will always be difficult for most residents of the United States to interpret or understand.

In his discussion of the rôle of the Franco government in World War II, "Spain and the Democratic World," the author makes his greatest contribution, for here he treats events of which he was a witness. For a study of Spain in World War II this third part of Mr. Hughes' work supplements the report of our ambassador to Spain, Carleton J. H. Hayes, which was published under the title *Wartime Mission in Spain, 1942-1945.*

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Democracy's Air Arsenal, by Frank J. Taylor and Lawton Wright (Duell, Sloan & Pearce, $7.50).

Reviewed by
Watson O'Dell Pierce

AN Aircraft Production Council was formed on the West Coast in 1942 to unify the seven major aircraft companies: Boeing, Consolidated-Vultee, Douglas, Lockheed, North American, Northrop, and Ryan. Powerful as this group was, the national spread of the air industry is shown by the statement, "No plane came from a single factory," and by the fact that this group were primary airframe builders. The objectives of the Council was the pooling of all specialized knowledge from each company for the benefit of the remaining six. The East Coast followed with its own councils. Both Councils united in 1943 in the National Aircraft War Production Council, Inc.

What was outstanding in the Council was the extent of the collaboration beyond the usual research-institute type of exchange, to every phase of production and the organization of the human beings who were the producers. The book tells graphically of what this cooperation meant. The chapter entitled "Imagineering" is a fascinating account of the over-all problem in developing the B-29, very readable in spite of its synthetic title. "Tooling up" is the story of mass production of aircraft as illustrated by the B-24, very clearly described even to the artist's rôle in making sketches for assembly line workers to "see" what they were to do with the bits and pieces in front of them. The plant facilities were pooled, and production lines interchanged, until the Boeing Seattle plant was able to change from B-17 to B-29 with the maintenance of continuous production. The Council and its pools had 162,000 subcontractors as feeders to the main assembly lines. The continuous development of plane models is well illustrated, and credited with final victory over the axis aircraft. The problems of manpower utilization are also thoroughly described.

This book skillfully tells the story of these achievements and does not forget the ramifications of the military requirements into every phase of the social structure of the

West Coast; hence it re-emphasizes the truth that total war demands a total effort which requires planning down to the necessary baby carriages and the essential wash room equipment. The story of the industrial organization which lies behind the AAF is presented so that it will interest the aircraft specialist as well as the general reader. The illustrations are numerous, of high standard, and significantly placed.

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You Can Learn To Fly, by Beverly E. Howard & William D. Strohmeier (Prentice-Hall, $3.75).

Reviewed by
Colonel Noel F. Parrish

A FEW libraries contain a few small volumes on the subject of learning to fly. Almost without exception, these works are confused, incomplete, highly opinionated and awkwardly written. *You Can Learn To Fly* is a refreshing exception. Readers of that excellent little magazine *Air Facts* know that William Strohmeier is one of the few experienced pilots who can write as smoothly as he flies. Air Show visitors know Beverly Howard as a pilot's pilot who can handle a light plane as easily and accurately as a mathematician uses a pencil.

Primary flying today follows the pattern perfected at Air Corps schools in the thirties, but war-time training in volume has helped to standardize the system and to place the emphasis where it should be -- on the student. Strohmeier writes from the student's point of view instead of aggressively displaying his own knowledge. This is an achievement rare among teachers. He also manages to give advice without preaching, and to avoid the stiffly self-conscious condescension and the pontifical platitudes which so often make instruction hard to take. This book is recommended reading for the present and prospective student pilots and all ordinary mortals who would like to understand their conversation. Unpretentiously and neatly it tells all, including some tolerant advice on the best method for buzzing a railroad station.

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BRIEFER COMMENT

Not As Briefed, by C. R. Greening.

COLONEL GREENING'S prison-camp paintings have attained a considerable reputation, and the reprint of them by a St. Paul advertising firm provides a most welcome addition to the art work of World War II now available to the public. Colonel Greening's water colors depict the various theaters in which he fought: we see a B-25 strafing a shark-like Japanese patrol boat in pale green water, Ploesti oil tanks eaten by flames and black smoke with B-24s overhead, and P-47s shooting down a ME-110 above the farm fields of Germany. All the paintings of this type have a fine feeling of participation heightened by the fact that Colonel Greening was a combat pilot as well as an artist. The pictures of the bleak streets of Stalag One will bring some interesting memories to former POWs--the barbed-wire compounds, the guards, and the American prisoners in costume for their production of *The Man Who Came to Dinner*. Altogether, this portfolio of fifty water colors is one of the best available souvenirs for those who were involved in these and other aspects of the war.

Brown and Bigelow $10

The Strange Alliance, by John R. Deane.

THIS story of our efforts at wartime cooperation with Russia is a record of jurisdictional disputes, of secrecy and concealment, of obstructionist tactics, and of apparent fear of post-war "capitalistic encirclement." General Deane, who headed our military mission to Moscow, 1943-45, is at his best when discussing military and diplomatic matters. The concluding chapters, dealing with the ideological confusion of the post-war world, are not particularly illuminating. Yet this book is a vital aid to understanding the strategy of the Soviet leadership and knowing how to deal with it. Whether one agrees with the "tough" or with the "tender" school, this volume offers realistic information as a basis for future action. As a significant commentary on the burning question of Soviet-American relations it deserves widespread consideration from all types of readers at this time.

Viking $3.75

A Program for National Security, Report of the President's Advisory Commission on Universal Training.

THIS government report warrants the attention of Air Force personnel. Published 29 May 1947, it contains the considered recommendations of the Commission based on a thorough study of the question of military training. The Commission concludes that "such training is an essential element in an integrated program of national security designed to protect the United States against possible aggression." Besides presenting a program for universal training, the report discusses the vital issues of the world situation and the preservation of peace, the nature of possible future warfare, essentials of an integrated national security program, and the role of universal training in supporting the requirements for national security.

Government Printing Office $.75

Political Handbook of the World, 1947, edited by Walter H. Mallory.

THIS volume, published for the Council on Foreign Relations, makes available in condensed and convenient form the essential political information regarding all countries of the world. Useful data are provided regarding the composition of the governments and the programs of the political parties and their leaders, as well as the political affiliations and the editors of leading newspapers and periodicals. In addition, the organization and functions of the United Nations are described in in a special section. The *Political Handbook* is designed to furnish the necessary factual background for understanding world political developments. Air Force personnel attempting to follow world events as they are reported in the press from day to day will find this volume invaluable for reference.

Harper $3.50

The History of Japan, by Kenneth Scott Latourette.

WITH OUR occupation responsibilities, our destiny has become bound up with that of Japan. This gives special value to Professor Latourette's book, which has evolved out of his earlier *The Development of Japan.* A professor at Yale and a noted oriental scholar, Professor Latourette has been for many years one of the supreme authorities on Japan and China. His brief but full-bodied account of the evolution of Japan from earliest historical times to the present moment (the last chapter describes "Japan in Defeat and Occupation") is a book of the highest informational value and has the virtue of being readable.

Macmillan $4

Scientists Against Time, by James Phinney Baxter, III.

THIS official story of the Office of Scientific Research and Development, winner of the latest Pulitzer prize in history, is as exciting as any battle-front account of the war. It tells how allied scientists had to beat their German opposite numbers in perfecting radar, rockets and, of course, the atom bomb.

Atlantic-Little, Brown $5

The Struggle for the World, by James Burnham.

THE WORLD has reached a serious crisis. Its elements are the development of a global economy, the breakdown of the international political order, and the existence of atomic weapons. A world organization is essential to prevent mass, total, world war. There are only two real alternatives now. One is the conquest of the world by totalitarianism. The other is a democratic world order, led by the United States and backed by the atomic bomb. In stating this challenging thesis Professor Burnham calls upon America to choose, or "it may be that the darkness of great tragedy will bring to an end the short, bright history of the United States."

John Day $3

The Hidden Weapon, by David L. Gordon and Royden Dangerfield.

THIS book is an authoratative analysis of the techniques of economic warfare as used in World War II. The economic struggle between the Allied and Axis powers was a little known phase of the whole conflict. Yet as a contest

of strategy, timing and surprise, this book unfolds a sensational story. The volume will be of vital interest to everyone concerned with the conflicts of world strength, since some variation of economic warfare "will, no doubt, be on the agenda in the next very difficult and trying phase of international relations into which we are now moving."

Harper $3.50

U. S. Army Aircraft, by James C. Fahey.

THIS publication catalogues the Army's airplanes, from the first flimsy pusher through the full roster of gasoline-engined models to the latest mentionable jet, turbo and rocket-propelled craft. Compiled from official documents and original source material, it shows the development of each military type, in tabular text and pictures. The projects and model designations which were cancelled through the years are accounted for.

Ships and Aircraft $1

IX Air Force Service Command.

THIS book provides an interesting photographic record not only of the achievements of the IX Air Force Service Command but also of the geographical background of its operations. The many excellent photographs show war activities, stations, and personnel at work and at recreation; there are also some fine scenic shots of the parts of England and France with which the men and women of this Command became thoroughly acquainted. Although its emphasis is on pictures, this volume also has plenty of informative textual material.

Phillip Andrews Pub. Co. $1.50

There Will Be No Time, by William L. Borden.

THE AUTHOR'S experiences as an 8th Air Force Liberator pilot provide the basis for his Cassandrian thesis that World War III will begin with a surprise atomic attack on the United States. There will be no diplomatic warning and no small-scale aggressions as a preliminary. The issue of national survival may be decided in a few hours. The enemy objective will be quick elimination of our military forces and stock piles in being. This objective will have priority over destruction of civilians and our urban-industrial plant, which are obsolete as weapons. The atomic bomb is a tactical rather than a strategic weapon. This is the revolution in strategy visualized in this provocative book.

Macmillan $2.50

A 20th Century Congress, by Estes Kefauver and Jack Levin.

THE AUTHORS make a timely contribution in this book to understanding of the organization and operation of Congress. Informed by personal experience and close observation, they describe the machinery and methods of our national legislature. They show that Congress has not been efficiently equipped to perform its functions under modern conditions. It has been inadequate in regard to information and inspection facilities, internal structure, liaison with the Executive, and surveillance of administrative performance. Much of its time has been consumed by petty local and private matters. After describing what is wrong with Congress, the authors analyze current proposals for legislative reform and outline their own program for a "Twentieth-Century Congress."

Duell, Sloan and Pearce $3

The Aircraft Year Book for 1947.

THE twenty-ninth annual edition of this volume, edited by Howard Mingos, once again offers the most thorough coverage of the subject of American aviation, military and civilian. It is technically sound, with many diagrams of new aircraft and other illustrations; it is one of the most valuable current books which Air Force personnel may own.

Lanciar Publishers $6

Introducing Alaska, by J. B. Caldwell.

Introducing Alaska is a pleasant and informal account of a land which has become increasingly important in the Air Age. There is no strategic or political import to these interesting discussions of prospecting, ranching, and mining. Mr. Caldwell makes an Alaskan tour most beguiling to the hunter or fisherman, and awakens that desire, common in most of us, to stumble on a "strike" in some out-of-the-way valley. This book is recommended to those who like to hunt and fish, or who look on possible duty in Alaska with some misgivings.

G. P. Putnam's Sons $3.25

The Royal Air Force and U.S.A.A.F., (October 1944-September 1945) by Air Commodore L.E.O. Charlton.

THIS large volume of nearly 300 pages is the fifth and concluding book Hutchinson has published on the operations of the RAF and the AAF. Naturally, the principle emphasis is on the British achievement, but this does not mean that the American contribution is slighted. This volume, like its predecessors in the series, is an unusually rich collection of photos showing every phase of the war -- bombing pictures, damage pictures, and many well-selected illustrations of life behind the lines. The text is thorough and authentic. The contrast to American books of this kind is particularly engrossing from a technical point of view, as the British do not "bleed" their pictures off the page but have margins around every photo. And various other points, such as the difference in phraseology used in technical and descriptive matter, give the book an added interest.

Hutchinson & Co., London, 21 shillings

Air Force Diary by Lt. Col. James H. Straubel.

LT. COL. JAMES H. STRAUBEL, who edited *Air Force* magazine throughout the war, from the time it was the mimeographed *Air Forces News Letter* until it became the *AAF Review* in 1946, has compiled an anthology of selections from that periodical. Under Colonel Straubel's expert editorship, *Air Force* magazine became one of the outstanding service journals, whose contents and format represented a great advancement over its humble beginnings The 492 pages of the present volume contain some of the finest on-the-spot writing done about the war, including the original version of "Regensburg Mission," by Colonel Beirne Lay, Jr., and "Three Years Over Europe," by Major Arthur Gordon. These and various other notable contributions to *Air Force*, representing every phase of AAF activity, provide an excellent memorial to those activities by the most skillful writers who were on hand to report them.

Simon and Schuster $3.75

THE CONTRIBUTORS

Col. Dale O. Smith, last year chief of the Research Division, Air University, who is now studying at the Air War College, was on the General Staff of the anti-submarine commission and flew 31 missions as commander of the 384th Bomb Group, 8th Air Force. . . **Capt. Robert O'Brien** of the Air University's Academic Staff, a Dartmouth graduate and former faculty member in the Philosophy Department of that college, was group bombardier of the 333rd Bomb Group during the war in the Pacific. . . **Maj. Alexander P. de Seversky**, Air Corps Reserve, latest winner of the Harmon Trophy, is one of the world's outstanding airmen for his achievements as a combat pilot, a plane designer, and an authority on Air Power; his lecture to the Air University, delivered last May, will be concluded in the next issue. . . **Col. Bruce K. Holloway**, pioneer jet pilot, flew 110 wartime missions and commanded the 23rd Fighter Group in China, later serving as chief of the Fighter Requirements Branch, Hq., AAF; he is a recent graduate of the Air Command and Staff School. . . **Lt. Col. Harry A. Sachaklian**, instructor in the Logistics Division of the Air Command and Staff School, graduate of the Army-Navy Staff College, was Air Logistics Member of the Joint Plans Staff, Allied Force Headquarters. . . **Col. Clifford J. Heflin**, former base commander of Wendover and Roswell Army Air Fields, flew 25 wartime missions as an 8th Air Force Bomb Group commander; he was graduated from the Air Command and Staff School in June. . . **Fletcher Pratt**, one of America's foremost military experts and a contributor to leading newspapers and magazines, is the author of several books on the science of war, including *America and the Total War, Empire and the Sea, and Fleet Against Japan*. . . **Albert Parry** (Ph. D., Chicago), whose latest book is *Russian Cavalcade: A Military Record*, is Associate Professor of Russian Civilization and Language at Colgate University. . . . **Col. Charles G. Kirk**, currently studying at the Air War College, served two years in the ETO with the 8th Air Force as Assistant A-3, VIII Bomber Command; he was one of the founders of the AIR UNIVERSITY QUARTERLY REVIEW. . . **William Frye**, one of the best-known Associated Press war correspondents, is the author of *Marshall: Citizen Soldier*. . . **Maj. Donald M. Alexander** (M.S., New York University), formerly with the Guided Missiles Section, Air Materiel Command, is now assigned to the office of Deputy Chief of Air Staff for Research and Development, Hq., AAF. . . **Raymond Estep** (Ph. D., University of Texas), former AAF Historical Officer, 3rd Air Force, is a member of the Documentary Research Section, Air University Library. . . **Watson O'Dell Pierce**, recently appointed vice-president of Nejelski and Company, New York, Management Counsels, previously on the faculty of the Industrial College of the Armed Forces, is the author of several books on Air Power. . . **Col. Noel F. Parrish**, wartime commander of flying training at Tuskegee, Alabama, and last Spring a graduate of the Air Command and Staff School, is currently studying at the Air War College.

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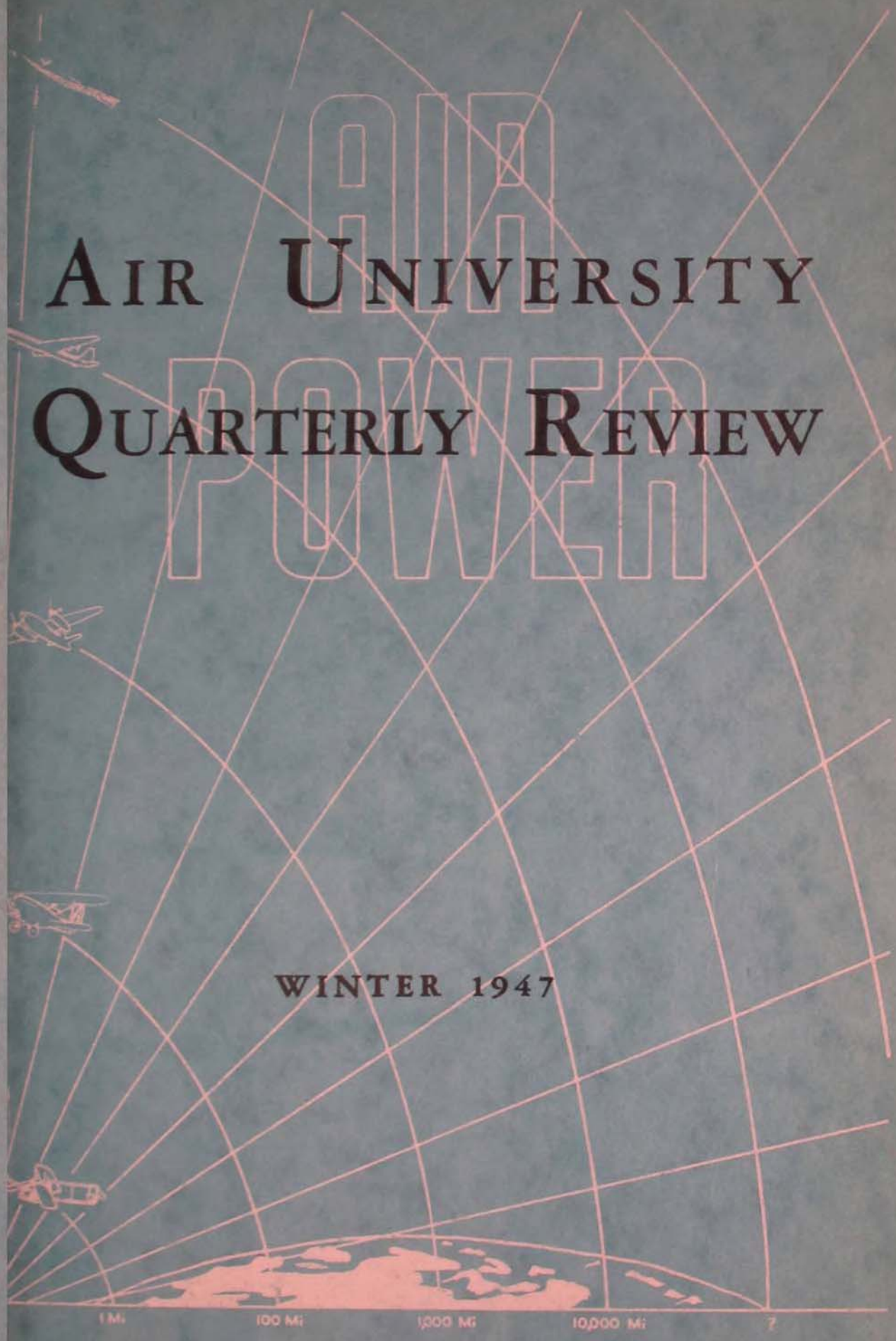

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