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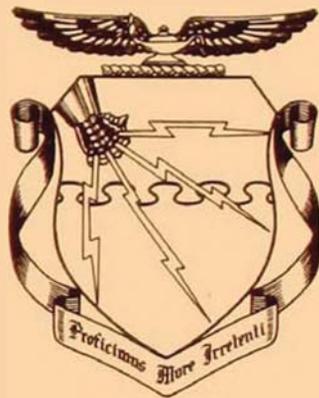
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*Error of opinion may be tolerated
where reason is left free to combat it.*

THOMAS JEFFERSON

THE IMPACT OF AIR POWER UPON HISTORY

Eugene M. Emme

IT was Voltaire who observed that to write about the recent past and the present invites attack on everything which one says and everything which one does not say, for a limited perspective readily lends itself to more divergent interpretations than do the events long recorded and historical processes long since expired. Even though the entire experience of applied aeronautical science has been contained within the memory of living men, the ability of nations to exploit aerial vehicles for strategical purposes in war or peace has been of profound influence upon the course of history. Dynamically shrinking the spatial and temporal separation of nations, the airplane has, in effect, balkanized the world. The ability of the airplane to carry weapons of destruction has alone made this third-dimensional vehicle one of the most influential inventions of the twentieth century.

History is the study of the dynamic forces which cause change, and by tracing the impact of aviation upon the course of history, objectivity can be obtained for clear thinking in an age when the Air Power of a nation possesses overwhelming implications with respect to the very existence or extinction of that nation. This article is an attempt to weave significant threads of past experience into a fabric for contemporary understanding, avoiding the confused pattern of antiquarianism and the flaws of propaganda.

The airplane was invented and perfected in an age of rampant nationalism and accelerated technology. Following the primitive achievement of the Wright brothers, the advances in aeronautical science were adapted to the designs of nations, as were the other triumphs of applied science.

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Although lagging in their exploitation of that which was technically possible, nations eventually adopted aerial transport as a diplomatic instrumentality. Whether the cargo of aircraft was passengers, freight, mail, or airborne armies and destructive missiles, the total ability of a nation to act through air space has been objectively defined as "Air Power."¹ Much confusion has been lent to the meaning of Air Power by the revolutionary impact of aviation upon the meaning and conduct of modern warfare, and the widespread consideration of the airplane as an engine of war rather than an agent of commerce. Military Air Power, however, has been but one of the elements which have contributed to the capacity of a nation to exploit air space, for the total Air Power of a nation has been indivisible. Civil aviation, commercial air transport, the aircraft industries, as well as the military air force, technological research and development, and the political intentions of a nation, have all been significant elements in the historical capacity of any nation to use air transport for strategic ends. Billy Mitchell's classic definition of Air Power "as the ability to do something in the air" remains a valid concept for contemporary reference even though the instruments for exploiting air space have been profoundly advanced since he formulated his doctrines.

THE foremost influence of Air Power upon history has been the accelerated emergence of military Air Power as the decisive factor in modern war. Having revolutionized the conduct and meaning of modern war in such a telescoped period of time, it is difficult to compare the airplane, and its airborne weapons, with the long evolving influence upon the past of gunpowder and the nationalizing of armies. The use of aircraft for military purposes, however, has appeared as a tardy exploitation, for no nation was prepared to reap any significant military gain from the use of aircraft at the outset of the first World War. Historically, time has always been necessary for the gearing of technological advance to accepted practices and concepts. The British Navy

¹For an excellent discussion of the meaning of Air Power see John C. Cooper, *The Right To Fly: A Study of Air Power* (Henry Holt, 1947), pp. 7-15; also "Notes on Air Power in Time of Peace," *Air Affairs* (September 1946), pp. 80-96.

was still using sailing vessels at the time of the Crimean War (1854) although the Atlantic Ocean had been crossed by steamship thirty years earlier. The court-martial of Billy Mitchell in the United States and the singular warnings of the threat of the *Luftwaffe* by Winston Churchill are familiar examples of the failure of nations to keep pace with the dynamic force of advances in aeronautical science.

The stern demands of war have compressed into brief periods of time the technological progress, and the incorporation of those advances to the designs of nations, which might otherwise have taken decades. Military Air Power was born in the intense conflict of 1914-18, and only the Armistice prevented the Allies from experimenting with a strategical aerial weapon. Within twenty-five years the art of modern warfare was completely revolutionized by the extensive and often exclusive use of aircraft in the second World War. The tactical and strategical use of the airplane supplied the answer for the ageless military problem of resolving the contradictory principles of mobility and firepower. As the sailing vessel had provided the small island of Britain with influence on the seven seas, so the railroad had enormously increased the mobility of firepower for land armies in the American Civil War, the Franco-Prussian War, and on the eastern front in the first World War. The airplane provided the conduct of warfare with third-dimensional mobility. The atomic bomb increased the firepower of aerial vehicles immeasurably. The ruins of European cities as a result of World War II, however, testify to the fact that concentrated aerial bombardment with ordinary explosives completely revolutionized the conduct of warfare before the atomic bomb was ever used.

The evolution of military Air Power as the decisive element in modern warfare is a subject of complex significance demanding intensive study beyond the brief confines of this article. It is also, however, but a partial manifestation of the impact of aeronautical science upon war, for military Air Power has played a predominant role in the complete alteration of the usage of war as an instrument of national policy. No longer are war casualties only found on battlefields, for the entire populace of a nation has become "fair game" in the modern form of unlimited warfare. The

Napoleonic doctrines of "absolute war" and the "nation in arms" have acquired a singular meaning in the twentieth century, for the material mobilization of a nation and the will of its people to fight have become as important as the generalship and the battles in modern war.

The accelerated evolution of the concept of total warfare has been enhanced by the swift and far-reaching destructive capabilities of the modern airplane and its airborne weapons, including the atomic bomb. The eradication of defense in depth and the enhancement of offensive warfare by the additional development of long-range rockets and guided missiles present serious problems for nations inclined to be traditionally peaceful and militarily careless because of the geographical immunity from invasion they have been blessed with in the past.

IN the science of destruction in this industrial age, the city, the nerve-center of modern society, has become the target of highest priority. Although the precision bombing of selected military targets has been primarily directed at severing the arteries of a nation's war effort, it has not been difficult for warring nations to rationalize the morale of the enemy population as a strategic objective for aerial bombardment. The tremendous currents of pessimism generated by the successful use of atomic energy for destructive purposes has been but a concern for a "city buster rather than a block buster," for the airplane remains as the primary means of conveying military pay-loads in retail or wholesale quantities.

The twice-taught lesson of the unlimited wars of the twentieth century has been that victorious nations stand to lose as much as the defeated. The impact of Air Power upon the meaning of war has created overwhelming implications, for no nation can now feel secure from wholesale destruction unless the institution of war itself is eradicated under a regime of law. The words which a severe critic of unlimited warfare, B. H. Liddell Hart, expressed over twenty years ago take on renewed meaning today, for indeed "the future of war lies in the future of peace."

Although the use of aircraft for military purposes has played a dominating role in the revolution of warfare, the

capacity of a nation to exploit Air Power for diplomatic and strategic ends in periods of peace has been of no less historical significance. In a diplomatic system in which sovereign states have been in a constant competitive struggle for security, the size of standing armies, armament budgets, the quantity and quality of military aircraft, and the reserves of trained men and war materials, have tended to be measures of the power of a nation to wage peace. Power has been a relative quantity and nations have made alliances and counteralliances, amassed ships, airplanes, and men, and even fought preventive wars to attain or redress a mythical balance of power among nations to preserve peace.

Satisfied and secure nations have favored a status quo and have attempted to sublimate the factor of naked force in international politics, favoring armaments only for defensive purposes. Nations ambitious for prestige or security have negated the principle of compromise in world affairs and have implied the use of armies, navies, or air forces to substantiate their political position. The invention of new weapons of war and new instruments of transportation have been significant factors disturbing the relative distribution of power among nations. Technological advances in the field of aeronautics and its related sciences have exerted a continuous influence upon national strategies, and in turn upon the foundations of international politics.

FROM the very beginning, the military potentialities of aircraft played a significant role in the conduct of peace. Frail airplanes and unproven Zeppelins were already instruments of national prestige and served to foster diplomatic tension in the years just preceding the outbreak of the first World War. Steeped in the tradition of sea power as the guardian of her periphery, England was one of the nations which early exhibited concern for the so-called "aerial menace." Even before the first international airplane flight by Louis Bleriot, a government commission reported that the peril of aerial bombardment to England's insularity was a justified concern. H. G. Wells also began to make his prophetic statements about the future of war in the air.

However, it was the growing diplomatic estrangement between England and Germany which exposed the usage of Air

Power as an instrumentality of national prestige in this period. By and large the most successful aircraft of the time was the German developed dirigible, and the mere size of the Zeppelins denoted power and strength abroad and was a source of patriotic pride to the German people. In France a concentrated effort was placed upon the development of airplanes, which was a direct result of the fame and fear of the German monsters. In England, fears of "Zeppelins or monster aeroplanes that would drop death from the sky and level England's might" mounted with the increasing diplomatic tension. Rumors that a German dirigible had flown over England were given frequent prominence in the press, and "ghostly flying machines" were constantly observed after midnight by nervous Englishmen.² The loss of the traditional feeling of geographical immunity in England in 1913-14, and the impact of a changing technology which was embodied in the "Zeppelin menace," strikes a significant parallel with the reoriented world position of the United States in 1948, and the widespread interest given aeronautical progress, the "flying saucer" reports, and international affairs in the American press.

The peace conference of 1919 faced the novel problems relative to Air Power with a predominant concern for the military airplane which had been vastly improved by the technological gains made during the war. The victorious nations attempted to substantiate their strategic positions principally by compromising means, disarming the Central Powers of their military air forces, and at the same time promising the defeated nations that general disarmament would be effected when collective security was realistically achieved. Ironically, however, it was the phoenix of German militarism, which the peacemakers had sought to prevent rising from the ashes of defeat, which led the world to war twenty years later. With the instrumentality of the *Luftwaffe* at his command, Adolf Hitler played the major role in reintroducing the factor of naked power in international politics.

A historical case study of German Air Power between the two World Wars reveals with clarity what elements of aerial

²J. R. Cuneo, *Winged Mars, I, The German Air Weapon: 1870-1914* (Military Service, 1943), pp. 121-127.

strength were untouched by the restrictions placed upon German aviation by the peace treaties, and the nature of the impact which Air Power has had upon the diplomacy of peace. The Versailles Treaty completely eradicated military aviation in Germany; but, it did not eliminate the sovereignty of the Weimar Republic over the air space above Germany, or prevent the intensive growth of commercial and civil aviation. The renaissance of German Air Power was initiated before the ink was dry on the peace treaty, but it was not the result of illegal machinations of German patriots.

Denied a military air force, Germany at once turned to the exploitation of commercial air transport as a means of aeronautical expression. By 1926, the year that Germany became a member of the League of Nations, she was one of the leading air powers in Europe because of her central location, advanced technological techniques, nationalized industry, and tremendous commercial development, even though she did not possess a military air force. It was this aeronautical development, blessed with legality by the peace mechanism, which for the most part enabled the Nazis to so rapidly rearm Germany in the air after 1933. It is true that Germany illegally possessed military units before the Nazis, which was primarily due to the secretive collaboration between the *Reichswehr* and the Red Army. However, the fundamentals of Air Power--the aircraft industry, commercial air transport, research and development of aircraft, and a government liberal with subsidies--were untouched by the Versailles Treaty and contributed significantly to the creation of the situation which Winston Churchill so aptly called "the locust years" immediately preceding the outbreak of World War II.

THE policy of the victors toward German aviation after the first World War fell between two stools, for it neither prevented the renaissance of German military and aerial strength, nor brought Germany into the League of Nations with a status of military equality, which was essential for the maintenance of peace by negotiation and compromise. Although the League was not a thoroughly imperfect creation, the failure of the major powers to carry

out general disarmament in accordance with the Versailles Treaty backfired in Hitler's repudiation of unilateral disarmament and the withdrawal of Germany from the concert of nations. With the loss of security under the League, the open rearmament of Germany with an apparent emphasis upon its aerial forces, and the divergent machinations of Japan and Italy, it is little wonder that the machinery for collective security came to a creaking halt. The repeated expressions by Hitler of a desire to negotiate a "Western Air Pact" served to foster rather than alleviate the concern of nations for the destructive potentialities of the *Luftwaffe*.

As a result of the seeming preponderance of the German Air Force, the air armament race of 1935-1939 was a serious attempt by the concerned nations to obtain some semblance to a balance of power which would assist in the maintenance of peace. Caught with their aerial defenses weak and their fleets and fortifications outmoded by technological advance, Britain and France seemingly had little alternative but to appease Germany's political demands until they could fill their own aerial scabbards. The attempt of the peacefully inclined nations to compete in international politics without the support of power, the lack of determination to use what power they possessed while it was still preponderant, and the failure of these nations to remain united in purpose, paved the way for Hitler's victories in the diplomatic war preceding the invasion of Poland.

Recent investigation substantiates the illuminating fact that the threat of terrible destruction which the *Luftwaffe* appeared to hold over the capitals of Europe in the period of appeasement was more the result of successful deception by propaganda techniques than the possession of a preponderant military air force by Germany. The inaccuracies of the estimates of the German Air Force were to a large degree the predetermined results of a subtle campaign by the Nazi leaders to enhance Germany's prestige. The boasts of Goering, the laudatory reports of foreign "experts" who witnessed superb aerial exhibitions, and the slogan that "Germany was to become a nation of fliers" were multiplied in diplomatic effectiveness by the bombing of helpless civilians in

Ethiopia, China, and Spain and the apparent expansionist designs of the Nazi State.

The foreign press was also guilty of exaggerating the strength of the *Luftwaffe* in order to outline the seriousness of the diplomatic situation and to hasten military preparations. At the time of Munich, when the representatives of Britain and France felt that even a united military effort would have been unable to stem the rain of aerial destruction, authoritative sources in Germany estimated the strength of of the entire *Luftwaffe* as being "at least equal to that of Czechoslovakia or Poland, but not of the two together." Even Hitler eventually fell victim to the exaggerated evaluation of the strength of the *Luftwaffe*, for when he was convinced by Goering that Germany's aerial strength could successfully blockade Britain, he embarked upon a coalition war for which Germany was unprepared.³ Although the *Luftwaffe* was highly successful in the early campaigns against single opponents, it was because of its superior strategy and operations in conjunction with land forces rather than the possession of more and better aircraft, the support of a sounder logistical organization, or the belief in the strategic concept of military Air Power.

ALL influences of aviation upon years of peace have been subordinated to the inescapable significance of military Air Power. Aircraft have presented a revolutionary means of transport, for they have ignored the traditional avenues of land and maritime commerce defined by the geographical landscape, and have continuously diminished the spatial separation of trade areas. Although technically capable of commercial exploitation after the first World War, air transport on an international scale was to remain more of a political rather than a commercial asset to nations. The omnipresent threat of aerial bombardment dominated the concept of Air Power within the strategies of all nations.

With visions of a planetary economy, the exponents of international air transport limited only by economic considerations have had their dreams frustrated by the subordi-

³Lt. Gen. H. J. Fieckhoff, *Trumpf oder Bluff? 12 Jahre der deutsche Luftwaffe* (Interavia, Geneva, Switzerland, 1945).

nated usage of air transport as an instrumentality of statecraft. Legislative and administrative decisions with respect to international air routes were based on a consideration of national prestige and diplomatic advantage rather than upon the calculations of cost and revenue. As the *Deutsche Luft-hansa* airline spearheaded the Nazi political and economic penetration into Latin America in the 1930's, so Pan American Airways served to bolster and maintain the diplomatic positions of the United States. Both of these airlines held monopolies of the foreign air transport of their respective nations, and were liberally subsidized in the name of diplomatic prestige or national defense.⁴

It was no historical accident that international air transport witnessed its greatest peacetime expansion in a period of intense competition among nations. When the collapse of Wall Street had chain-reacted around the world, nations sought to expand rather than withdraw their aerial spheres of influence in this period of economic nationalism. The greatest expansion of air transportation came with the globe-circling efforts of the Allied nations in World War II when the only limitations to that expansion were climatic, military, and technological rather than political and diplomatic. At the Chicago Conference of 1944, however, the major nations of the world (excluding Russia and the Axis nations) again subscribed to the doctrine by which each nation possesses absolute sovereignty of the air space above its territory. Although by definition a mere vehicle, the airplane as an instrument of international transport will continue to be subordinated to the strategical interests of nations until the concept of national sovereignty has been superseded by some international authority.

From the peace negotiations of 1919, through the Munich fiasco, to the Berlin Crisis of 1948, Air Power has maintained an increasing and dynamic influence upon the relations of nations at peace. Within three years after the conclusion of a global war of unparalleled destruction and the creation of an international organization to achieve collective security among nations, the factor of naked power has already assumed a prominent role in world politics. The overwhelming portent

⁴Oliver J. Lissitzyn, *International Air Transport and National Policy* (Council on Foreign Relations, 1942).

of Air Power makes it mandatory that every consideration be undertaken to negotiate or effect the establishment of a durable peace, for the alternative of war could well prove suicidal. The security of any nation or a durable peace will not be achieved by the self-righteous creation of power as an end in itself, for the armament races of the past have clearly demonstrated that such action in itself precipitates war. Even though the airplane has balkanized the world and the creation of the atomic bomb has made the Napoleonic and Hitlerian dreams of world conquest no idle fancy, the permanence of such a global domain established by force alone would not long endure.

THE great decisions in history have been moral ones, and the only comparable experience to be found for contemporary reference is that of Pax Britannica, which helped build an empire and was instrumental in maintaining a period devoid of any major wars from Waterloo to 1914. Great Britain's successful use of sea power as an arbiter of world peace was possible only because of the accompanying moral purpose of order predicated upon constitutional law, and peace lasted only so long as England was able to monopolize the rewards of early industrialization and advantageous geographical position, and maintain a preponderant numerical and technological advantage upon the seas. It is not probable today than any nation can long maintain a significant technological lead in the fields of nuclear physics and the aeronautical sciences. It is also quite apparent that the struggle for the creation of a constitution for world government has thus far failed to weaken the outmoded principle of national sovereignty. The dilemma of this age requires an intelligent consideration of the methods we choose to use, for that which we may seek to create may be destroyed in the process of its attainment.

When war overtook the United States, in December 1941, the Army Air Forces had on hand, in the theaters facing Japan, only some 600 airplanes.

--Vern Haugland

The AAF Against Japan (1948)

U. S. ECONOMIC PROSPECTS

Colonel Herman Beukema

A GLANCE at the business section of any metropolitan newspaper printed since V-J Day shows that the economic forecasters are having their troubles. They are far from being agreed among themselves on either their diagnosis of basic conditions or prognosis of coming developments. Such disagreement is, however, no startling departure from the long time record of business forecasting. Differences of opinion and conflict in recommendations have been the rule; agreement has been the exception.

Now as always the buyer and the entrepreneur, whether individual, corporation, nation, or group of nations, cannot afford to put too much faith in the pronouncements of the economic forecasters. Instead, they must depend on their own judgment in making economic commitments. The rule of caveat emptor has stood as a warning from the day when beads and clam shells served as currency down through all the repeated efforts of dictators to eliminate economic fluctuations by means of absolute control of their subjects' business affairs.

Economic uncertainties and the mistakes flowing from erroneous analyses of those uncertainties become increasingly important as they affect major policies of the great powers. It may be a bit trite to say that no period of history has placed a higher premium on sound economic judgment than today; nevertheless, that is the truth. The economic decisions of today will play a considerable part in determining "the course of history for a thousand years to come," to quote a dead dictator. In the large they boil down to the single question: What are the economic prospects of the Western World, and particularly of the United States?

The question divides itself logically into two parts, short term prospects and long. A rounded examination of both

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the short and long term economic prospects would require the detailed inspection of conditions prevailing in all the European Recovery Program nations, not only the economic conditions, but the political and social factors as well. The most important key to an overall answer, however, is to be found here in the United States. For it is the American people who must provide from their output a sufficient margin of economic support to see the Western World through, or at least well advanced toward, its convalescence if the Western tradition is to survive. We can fairly paraphrase the old political slogan in saying, "As America goes, so goes the Western tradition."

Forecasters are fairly agreed that short term U. S. economic prospects, if not completely rosy, are not bad. Effective demand for both capital and consumers' goods should remain strong enough to support a high level of employment for many months to come. Abundant crops assure a moderate drop in the cost of living. Similar conditions in the textile and clothing fields indicate a stop to the progressive price rise which has featured this item of the consumers' bills since 1945. Taken together, these stabilizing factors should remove a substantial part of the leverage behind any demands for a fourth round of wage boosts. Hand in hand with the trend toward stability in prices of consumers' goods comes the modest effort of government agencies to restrict excessive credit. Taken together, these factors impel the optimists among the forecasters to foresee full-scale productivity at a fair margin of profit well into 1949 and--except for a possible minor recession--a few years longer.

THE reverse side of the picture provides some argument for the pessimists. Economic pipelines in many lines of production are full or rapidly filling. Consumer resistance to high prices has definitely reduced the rate of turnover to a degree where production rates are being stepped down, markedly so in some instances. Inventories, largely acquired at high prices, are becoming burdensome in some cases. This recent source of paper profits in a rising market may well be converted in 1949 balance sheets into substantial, and real, losses. In fact, the upward trend in commercial failures is uncovering many instances where weak

units have been kept alive only by the rising markets of 1945 to early 1948. So long as the distress goods made available by bankruptcies can be absorbed by stronger elements, the weeding out of the weaklings serves a sound purpose. The danger is that dumping in any substantial amount may undermine the whole economic structure, destroy public confidence, and open the way to a real collapse.

Indications that confidence has already been checked, or indeed has never been strong in the postwar period, are clear from the behavior of the stock market. At no time since V-J Day has its level reflected the earnings of American business and industry. The public simply is not in the market for equities. Its refusal to buy has in turn compelled industry to plow back into the business the major part of its earnings. In other words, industrial expansion and replacement must look to earnings rather than to the investor for new money. High income tax rates act as an additional brake to investment and reinvestment. The principal drag, however, lies in the lack of confidence on the part of the potential investor. Added together these items give ground for concern as to our economic prospects for 1949.

The optimists would have the better of the argument if certain major doubts could be cleared up. Here at home the measure of self-restraint shown by organized labor in its demands for further wage rises is all-important. So too the strength of employers' determination to resist further general boosts. Either the boosts or prolonged strikes, curtailing the output of needed goods and services, would serve as a further push toward full inflation. The same truth holds for the ERP nations. Each such check to production cuts into the available supply of badly needed goods, thus forcing up demand for the reduced supply. The resultant rise in prices and the dearth of goods go hand in hand to retard economic recovery.

Our long term prospects are no clearer than those of the shorter period. We would do well to begin with the six point national security program laid down by the so-called Compton Commission in 1947. The economic requirements for our security, broadly sketched in the Compton Commission Report, were spelled out in more detail by General Eisenhower in his

Final Report as retiring Army Chief of Staff. Paraphrased to serve the purpose of this study, they may be listed as follows:

- (1) Adequate raw material resources.
- (2) A well-developed, properly distributed industrial plant, transport system, and communications network, capable of prompt and adequate expansion and flexible enough to adjust itself to wartime interference by enemy attack.
- (3) Retention of our premier position in technological research and development.
- (4) A skilled labor force, willing and able to make its proportionate contribution to the national welfare.

LET us begin by looking at our raw materials situation. If the war has proven anything, it is that no nation can be stronger in the long run, particularly if vulnerable to blockade, than the strength of its raw materials base. By comparison with other powers in this age of technological evolution, the United States could not be classed as a weak power. Public opinion polls since 1944 have clearly shown that all but a minor fraction of our people believe that we are in fact invulnerable insofar as raw materials can make us so. Nothing could be further from the truth. Our national appetite for the good things of life, when added to the bounty we have been extending to needier peoples over the past seven years, is rapidly turning us into a "have-not" nation. A first glimmer of the reality of our situation was driven home to the public a year ago last winter by the shortage of fuel, chiefly furnace oil and gas. The average consumer, however, was unwilling to see in his cold radiators anything more serious than temporary hardship. By the time another winter rolled around, the press was telling him that perhaps there might be enough fuel for all with a mild season and efficient distribution. In the meanwhile, other annoying shortages seem to persist--notably in steel products and practically all metal goods, building materials, and meats.

The major facts in this progressive decline of our reserves of national wealth are relatively simple. They may be classified under two headings--farm products and minerals.

If we had only to feed our people the danger of food shortage would hardly worry us for some years to come, even with the average person eating about twenty per cent more than he did ten years ago. But if we look a bit further we discover that in the past 150 years some 282 million acres of our farmland have been destroyed by erosion, leaving 400 million acres still available. Some months ago the Secretary of Interior announced that each year sees the loss of enough topsoil to provide food for 175,000 people. Apparently the rate of destruction is declining. Otherwise, by 2000 A.D. we would be down to 120 million tillable acres, a bare seventeen per cent of the natural patrimony which lay waiting for the white man's plow four centuries earlier.

Our forebearers discovered in this one-time virgin continent a topsoil averaging eight inches in depth. Today that average is down to six. History has shown that without exception a nation which can boast of no more than four inches of topsoil must look to foreign sources for a substantial part of its foodstuffs.

Of course, all such figures have to be related to the number of mouths which must be fed. In 1940 our population experts set the peak figure of our ultimate development at 156 million, to be attained in about three decades. Thereafter, ours would be a declining population. Also, they predicted that in 1950 we would have a population of 140 million. But what has actually happened to date? The Bureau of the Census has estimated the United States population as of 1 July 1948 at more than 146 million. A figure of 150 million in 1950 is possible.

Why this thumping mistake in prediction, wrong by perhaps ten million over a ten year period? There are several reasons, one of which is of special interest, since its influence is definitely long term. We find it in the unbalance between the Old World and the New; a population surplus and a weak raw materials base over there, in sharp contrast with the better conditions over here. Whenever such contrasts have arisen in the past, the surplus peoples have spilled over into the emptier spots. Add to that rule the deep conviction of the European peoples that their lands will again become a major battlefield, and we can foresee a powerful and lasting pressure which over the years will get

over and around any immigration barriers we may set up. The first boatloads of displaced persons are only a beginning of the flow that must be anticipated. Add also the substantial improvement in our living standards over the past decade, and the prospects of its continuance for some time to come, and we must look to heavy crops of new babies. The trend of our future consumption of farm products will, of course, reflect this population boom, reducing in like proportion the surplus available for the hungry people abroad.

THE carrying power of our land is more than adequate to provide for our domestic needs over an indefinite period to come, barring a repetition of the well-remembered "dust-bowl" disaster. That proviso is an important one in a day when peak prices for grain induce farmers to plow up millions of acres of prairie lands in low precipitation areas. A few months of drought, followed by high winds, can soon convert such an area into a desert. But even if we get away with our wartime gamble and reconvert these semi-arid regions into grassland under the pressure of declining grain prices and the high price of beef, there remains the problem of sustained foreign demand. Our concern is with world needs, not merely those of our own population. In his *Road to Survival*,¹ William Vogt balances requirements against the total carrying power of all tillable and grazing lands, takes note of the undiminished rise in the world's population, and sees no hope of permanent relief. He finally advocates a five-year moratorium on all human procreative activities while the problem of hunger versus supply is studied on a world scale.

What we have done to our fields we have repeated in our forests. Two wars have merely accelerated a process which from the first has been guided by the principle of getting every possible dollar out of each acre of trees. Now we face the fact that the amount of saw timber available over the years ahead is far short of the expected domestic demand. Experts tell us that we might bring supply and demand into balance a hundred years or so hence through large-scale reforestation, controlled cutting, and the maintenance of adequate, but costly, forces of forest rangers. In other

¹See book review by W. A. Heflin in this issue. *Editor*.

words, we could adopt techniques common to European practice for many generations past and thus in time atone for our earlier mistakes. No modern nation has put itself on such a sustained yield basis of timber production except when no other choice was open. We are in precisely that position. But we have yet to face the facts.

There are corrections for the shortcomings in our handling of what we might call the field-and-forest problem. A good part of those wasted 282 million acres of farmland can be restored to fertility if we are willing to spend the time, money, and effort it takes. When, on the other hand, we take a ton of iron ore out of the ground, we cannot grow another ton in that spot. Our extractive industries extract for all time. Except for the fractional recovery of secondary scrap, Nature's basic stores are lost to future generations the moment the ore scoop drops its load into the dump truck. That fact is enough to call for periodic balance sheets of our mineral reserves. Such a balance sheet was drawn up shortly after World War I by William Redfield, President Wilson's Secretary of Commerce. Its title is *Dependent America*, depressing enough to keep the sale down to about a thousand copies. Secretary Redfield, unfortunately, was swimming against a flood of Fourth-of-July orations, a flood so deep, so muddy, and so full of mental debris that he lost distance with every stroke.

In the middle thirties, Brooks Emeny made a second effort with his *Strategy of Raw Materials*, written after he had spent two years of study and research at the Army Industrial College. He managed to get a little further upstream than Redfield. By 1939 a small but growing group of specialists in the Armed Forces, a handful of research-minded industrialists, and a few members of Congress were definitely interested.

FOR some years previous the Army and Navy had been asking for money to build stockpiles of strategic materials, but without much success. The list finally agreed on was not long--thirteen items. Then in 1940, when the war shadows began to close in, the President's Economic Advisory Council recommended that a half-billion dollars of the gold reserve impounded at Fort Knox be made available for the

immediate purchase of strategic materials, obtainable in quantity only from foreign areas to which our access might easily be denied if war came to us. The recommendation was turned down. What followed down to the time of Pearl Harbor is a perfect illustration of too-little-and-too-late; too little even to balance our consumption of materials in supplying our future allies, too late to prevent a long and costly delay in building our offensive power.

By the end of the war that list of strategic materials had increased from thirteen to sixty-five. The present figure is a few pegs higher. From 1940 to September 1945 we imported materials from abroad to the value of 4.6 billion dollars; more than two billion dollars of it in the form of minerals and metals. In the same period we consumed more than five billion tons of domestic minerals, a figure which helps to explain why the list of essential materials went up from thirteen to more than sixty-five items in the space of seven years.

Let us look at the record of our reserves of mineral wealth, expressed in terms of proven commercial-grade ores. The Geological Survey announced in 1946 that such reserves of twelve items would be exhausted in from two to forty years--namely, mercury, silver, lead, gold, chromium, vanadium, bauxite, manganese, tungsten, zinc, copper, and petroleum. Six more items will be consumed in forty-five to sixty years; antimony, fluorspar, sulphur, anthracite, natural gas, and iron. And ninety years at postwar consumption rates will finish our molybdenum, potash, and phosphate rock. Of course there will remain low-grade reserves for a much longer period, but each drop in grade spells an increase in cost. Moreover, we should note that after the figures cited above had been prepared this nation jumped its consumption of minerals in 1947 to an all-time high, about forty per cent over the 1946 rate.

It is worth repeating that these drafts on our mineral resources represent permanent losses except as minor amounts become available in the future as secondary metal through scrap. If the simple arithmetic involved in equating our reserves against future needs appears too alarmist, one should note a comment made by Professor E. L. Woodward of Oxford University in a recent lecture at the United States

Military Academy. He remarked, ". . .it might be maintained that the cost of repairing the material damage done by war in Western Europe since 1914 is not immeasurably greater than the cost to the United States of making good the loss of national capital due to the reckless exhaustion of the natural resources of the country during this period." The older generation of airmen who have seen at first hand the devastation left by the wars and the younger generation whose handiwork and memory are limited to one war have in Professor Woodward's comparison an excellent yardstick of war's material and permanent cost to the American people.

THE picture is not all black. The search for new sources of mineral reserves, greatly stimulated by the war, is bringing some comforting discoveries. Rich fields of oil along the east face of the Rockies, particularly in Alberta, Canada, are newly indicated, though their extent has not yet been established. Other fields are believed to lie below the Continental shelf. If technology can find a way to tap them at ocean depths of 200 feet or more without running into prohibitive costs, our reserves will be greatly increased. Within the past year official pronouncements have indicated the presence of some ninety-two billion barrels of oil in our domestic shale deposits. Gravity and other tests have shown that its quality is low, compared with natural petroleum. Production costs, however, will not be high, a factor which helps to balance the low quality. Coal affords an even richer source of oil, whenever we are willing to pay the bill for the increased cost of the product. But, in wartime, the real payment is measured in terms of man-hours, and a barrel of oil derived from coal costs much more in terms of man-hours than a similar barrel that gushes out of a hole in the ground. Also, the rosy estimates that our coal reserves were sufficient for 3000 years or more, long accepted as Gospel, have been cut to less than 300 by the recent guesstimate of expert geologists and mining engineers.

Steel men tell us that there is plenty of iron ore in the United States, admitting at the same time that nearly all of it can be had only at steadily increasing costs. The high grade Mesabi Range ore, scooped out of open pits by power shovels and ready for the furnace, is all but exhausted.

Within the past year, however, we have had news of similar deposits in the Quebec-Labrador region. A 350 million dollar development is planned to bring the ore to Canadian and U.S. furnaces. Despite new discoveries, the trend is toward constantly increasing dependence on low and still lower grade ores. Every drop in grade spells a higher production cost for the finished product.

That story repeats itself in every item of the list of essential minerals. Nature left a reasonable amount of mineral wealth on or near the surface of the land. The ore from the richest and most convenient beds went to the smelter first, regardless of what that policy did to the heritage of future generations. We can now dig deeper, of course, and we can tunnel a bit under the seas which lap our shores, but in the long run we must exhaust Nature's bounty. Lastly, we can tap foreign sources, at least in time of peace. But when war comes those foreign sources are partly, perhaps largely, denied us, and this at the very time when demand is at its peak. Moreover, such peaks rise higher with every war. Before the discovery of gunpowder the minerals consumed by war were negligible in amount. By 1870 they comprised about seven per cent of total production. In World War II this figure rose to seventy-five per cent. In Atomic War I, if or when it comes, minerals may well be the major component in more than ninety per cent of the materials used.

For the short run our concern is with having on hand enough minerals and metals to make sure that an all-out war effort would not be blocked at the outset by: (1) denial of access to important foreign sources; (2) deficiency of domestic reserves; (3) time lag in stepping up imports and domestic output. The one and only way to break those bottlenecks is peacetime stockpiling. Public Act 520 of 1946 authorized the creation of stockpiles, at least in theory. Unfortunately, it guards the vested interests of marginal producers to a degree where the nation's needs may be badly served. The original plan to complete the buying program within five years shows little promise of success within that period, if one can judge from results to date. Moreover, purchases have been limited largely to items of secondary importance. The acquisition of such highly critical items as the non-ferrous metals is retarded by a global demand which

substantially exceeds current global supply, with the result that the price factor has become a deterrent to stockpiling action.

SUCH delays make up one of the "calculated risks" which are being taken as international tensions raise the temperature of cold war. In taking them, however, memory should not be too short to forget the price paid for the bauxite and other materials acquired from foreign sources in the disastrous days of 1942. Only a little foresight in the months after 1939, a moderate step-up in our imports of strategic and critical materials prior to Pearl Harbor, would have spared us the loss of shipping which added up to a greater total than the output of our shipyards during that year. It was no calculated risk that produced that balance sheet, but rather a gamble unsurpassed for recklessness in the history of a nation notable for its gambling policies.

The second item in the previously cited list of economic requirements, industrial plant and transport facilities, makes a better showing. In this respect we do not have even a near rival among the world powers. Even so, American industry has not been able since Pearl Harbor to meet the aggregate of foreign and domestic demand. In the event of war, demand would necessarily rise sharply. And, in a day of technological warfare, the ability to meet promptly the minimum military requirements of the United States and its allies would go far toward determining the ultimate cost of war in men, time, and goods. It might spell the difference between victory and disaster. A first concern of the Armed Forces, in consequence, is the availability and adequacy of standby plants to insure a swift rise to peak output.

Reserves of transport, particularly the ocean going fleet, are of the same order of importance. Such provisions are necessarily costly. Eating up a sizeable chunk of the federal budget and producing no immediate return, they are hard to defend against the thrust of the taxpayers' spokesmen. They can be sold to the public only as a form of insurance, an item in the question: "How much would you pay to survive?"

No less a problem is one of distributing and safeguarding essential industrial units against vital or even obliterating enemy action by air and guided missile attacks. Industry,

business, and government experts are spending thought on this problem, but to date nothing that is politically or economically feasible has come out of the research. From time to time spokesmen for various groups come forward with plans of retaliatory or preventive action against a potential enemy without serious thought as to what either of those lines of strategy would entail. Sound defense against atomic warfare is hardly a problem for an economist, but rather one to tax the best brains from every walk of life until a solution is found.

Coming to the third economic requirement, we can agree that American science, both pure and applied, easily leads the world today. In large part World War II is responsible. Our competitors, enemy and allied, were cut down or badly hurt by the war while at the same time the scientists, industrial engineers, and Armed Forces specialists of the United States were pooling their efforts to attain a common end. Wise provision has been made to continue and improve that integration at all levels, from the top of the federal executive system down to the university laboratory, the industrial assembly line, and all elements of the Armed Forces concerned. If we can count on the continued support of Congress to supply the needed funds, there should be no reason to fear that any potential enemy will surpass or even approach our technological efficiency over the next decade or two.

THE fourth requirement is for a skilled labor force. Everyone is familiar with the laudatory comments which represent the picture of labor's wartime effort. The yardsticks employed are uniformly the same: the rise in gross output of all goods and in particular the production of munitions and military supplies, as compared with prewar norms. The statistics are convincing, so much so that we have yet to hear the questions: "Could we have done a better job? If so, how did we fail, and wherein?" If the answer to the first is in the affirmative, the conclusion follows that we could have had more men when and where they were most needed--at the fighting fronts. And they would have arrived there sooner. The enemy in turn would have been

beaten earlier, the total destruction would have been reduced, and our current reconstruction problem would have been simplified in like proportion.

Part of the answer appears in the statistics published by the Bureau of Labor. There we discover that the peak work week was reached in 1944 with an average of 46.1 hours. Corresponding data for other belligerents, friendly or enemy, is less clear, but indicates that a sixty hour week was standard. In instances (Germany, Japan, and the U.S.S.R.) it was very much higher, attaining eighty hours at times. No reasonable person would consider an eighty hour week as viable except in a last-ditch defense situation. Sixty hours may be a bit high. But can we conscientiously defend a forty-six hour week in wartime?

The net impact of these apparent shortcomings in production is deserving of the same critical examination that is being applied to every phase of the tactics and strategy of the war. In no other way can we learn the lessons involved or find the correctives needed to prevent repetition of past mistakes. Simple arithmetic, disclosing a twenty-four per cent differential between the sixty hour week and one of forty-six hours, might lead to the dangerous conclusion that congressional action to boost the standard wartime work week to forty-eight hours or more would give us a corresponding boost in wartime industrial output. That is an oversimplification. There are many lines of work where even the forty-six hour week is no doubt too much to ask in terms of the resultant wear and tear on the human system. In other lines, sixty hours would be no hardship. Certainly, the sun-up-to-darkness day of the farmer, seven days a week at seeding and harvesting times, is a valuable item of evidence.

The objective to be sought is one of equivalent output for all, whether on the firing line or the assembly line. In a last-ditch fight it would soon be reached. In such a crisis political exigencies could hardly stand in the way of subordinating group interest to the national welfare. Should we wait for the crisis to arrive, or should we take thought beforehand to conserve precious lives and all the other values involved in war by insisting that in the matter of work we shall share alike?

TO sum up, the basic economy of the United States remains fairly sound in spite of the strains imposed and the resources drained by war. The continuance of strain and drain resulting from our active participation in Old World reconstruction, the exigencies of cold war, and the need of defense rearmament raise certain questions, as we have seen, both for the short and the long term.

The major short term question is simple: How, and to what extent, can our strained economy spare the manpower, the money, and the machines to reconstitute the minimum defense force deemed necessary for the attainment of our security objective? If potential rival nations had already mastered the techniques of modern technological warfare, the alternative would boil down to the simpler query already cited: "How much will we pay to survive?" Until others have reached that stage of development, the American electorate can be expected to put its major emphasis on the needs and wants of domestic economy, with a corresponding curtailment or retardation of rearmament. Time alone will tell whether such a course of action is a calculated risk or a dangerous gamble.

The long term questions are equally grave. Basic to all of them is the fact that we have indeed become the dependent America pictured thirty years ago by the late Secretary Redfield. Both our economic well-being and our lasting security will rest increasingly on the degree to which we are able to buy abroad the materials once obtainable at home, but now permanently withdrawn from the "carrying power" of our homeland. Hand in hand with provision for a rising flow of imports must come the realization that we can never again afford to be profligate in spending what is left of our natural heritage. The question is no longer one of merely being damned by future Americans as wasters of their inheritance. Instead, it reads: How and to what extent can we provide in the future the assured supply of materials demanded by a healthy and growing American economy? The military corollary follows; without adequate security for such commerce from source to port of entry, our economic future will rest on a gamble.

GEOGRAPHY--ARMIES AND DISEASE

Colonel William H. Powell, Jr.

FROM ancient and prehistoric times to the present, there has been a relationship between geography, armies, and disease. History does not record when the first prehistoric man or group of men returned from a victorious campaign and brought with them a scourge that cost far more than the value of the booty acquired. That scourge may have been the cold, the itch, measles, or lice, but it could well have threatened the very survival of the group. Ancient man did not recognize from whence his troubles came, but blamed them on his gods, gods of good and evil, and on other mysterious or supernatural machinations.

When we come to recorded history we find numerous accounts of the conquests of warring peoples. Health problems, in connection with these conquests, have been primarily concerned with the subject of wounds and injuries rather than disease. However, papyrus records (1500 B.C.) show that the Egyptians well recognized the effects of the hookworm disease. The Mosaic Laws of the Israelites, which proclaimed that lepers and persons infected with venereal diseases be banished from the community, is a basic text of preventive medicine of that time. Here is found the first direct reference to avoiding a disease. Included in the *Iliad* and *Odyssey* of Homer are discussions of both epidemic diseases and war wounds of the Trojan War period. The epidemics experienced by the early Greeks were in all probability the dysenteries; the same malady in 1915 nearly immobilized an Allied army which was fighting in the same area of Italy. The Greek physician, Hippocrates, who lived 2400 years ago, made many astute observations which are as true today as they were then. His recommendations regarding a sanitary survey are

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

enlightening:

When one comes into a city to which he is a stranger, he ought to consider its situation, how it lies as to the winds and the rising of the sun. . . and concerning the waters which the inhabitants use, whether they be marshy and soft, or hard, and running from elevated and rocky sites, and then if salty and unfit for cooking; and the ground, whether it be naked and deficient in water, or wooded and well watered, and whether it lies in a hollow, confined situation, or is elevated and cold; and the way in which the inhabitants live, and what are their pursuits; whether they are fond of eating and drinking to excess, and given to indolence, or are fond of exercise and labor and not given to gluttony and drunkenness. From these things he must proceed to investigate everything else. For if one knows all these things well, or at least the greater part of them, he cannot miss knowing when he comes into a strange city, either the diseases peculiar to the place or the particular nature of common diseases And, in particular, as the season and the year advances, he can tell what epidemic diseases will attack the city, either in summer or winter.

To this idea, that geography and certain diseases are associated, little was added for years. Certain unhealthy areas of Europe, however, came to be known far and wide. The Pontine Marshes south of Rome have long been avoided because of fevers. The various plagues present at different times in ancient cities were avoided by all, although those who fled from the diseases usually caused them to spread.

TO attempt to list the wars or campaigns whose outcomes have been governed to a large extent by disease would mean listing nearly all of them up to recent times. No war escaped the ever present threat of epidemic disease. History furnishes no evidence that the presence of disease ever dissuaded an attacker in ancient times, but it does tell of many sieges that were lifted as disease came to the aid of the besieged. And while the besiegers fled the plague, the besieged also fell before it.

This was the situation in 1374 when Venice, then at the height of her power and glory, issued this decree: "All infected or suspected ships, travelers or freight must wait for forty days before they enter the Venetian realm." From the number "40," *quaranto*, we get the word quarantine. At the time this was occurring in Europe, a tale of medical

interest was being told by Indian tribes in what is now Montana. This was the story of a valley, filled with game, in which whoever hunted was sure to sicken and probably die. To this day science has not explained why this disease, known as Rocky Mountain Spotted Fever, has been so much more common and virulent in that particular area than elsewhere.

Among the plagues that ancient and even modern armies feared and spread, and against which steps were taken to prevent the spread, were bubonic plague, epidemic typhus, smallpox, syphilis, anthrax, erysipelas, and leprosy.

Control of contagious diseases has, of course, undergone a decided change. Instead of banishing an infected person now, he is isolated in a hospital where he has only minimal contact with other persons and then only under controlled conditions. Very contagious cases are quarantined from any contact with other patients until it is certain that the latter group will not develop the disease.

Time and knowledge have controlled or conquered nearly all the plagues or grave epidemic diseases. Modern sanitation, immunization, and hygiene have caused the nearly complete disappearance of such diseases from modern armies. Thus, in World War II, the total time lost from such diseases as bubonic plague, epidemic typhus, smallpox, anthrax, and leprosy was infinitesimal compared to the time lost from other diseases. Venereal disease control measures reduced the number of infected. Penicillin treatments have permitted ninety per cent of the gonorrhea cases to lose no time from duty, while the average case of syphilis now loses only two weeks or less from duty. However, as we have discovered new ways of controlling many diseases, we have been confronted with the increasing importance of certain others. Among the diseases in this category are: infectious hepatitis, atypical pneumonia, common respiratory diseases, and in certain geographic areas malaria, scrub typhus, coccidioidomycosis, rheumatic fever, streptococcal diseases, and others.

Infectious hepatitis is a disease affecting the liver. The first warning that it might become a problem came with the epidemic of jaundice that followed the administration of a contaminated yellow fever vaccine at the beginning of the war. Soon after this, increasing numbers of cases began appearing that were similar but had no relation to the

yellow fever vaccination. Despite the study of thousands of cases, little is known of this disease except that it is a virus type that might be carried by fingers, flies, food, water, and possibly droplet infection. Victims become incapacitated for long periods of time and repeated recurrences may occur. In the Mediterranean, European, and some parts of the Pacific theaters, infectious hepatitis was among the leading disease causes of non-effectiveness during the recent war. Cases also occurred in lesser numbers among troops in other parts of the world. At present there is no geographic connotation to the epidemiology of the disease.

THE relationship between geography and malaria has long been known. As mentioned earlier, the Pontine Marshes south of Rome were avoided because of malaria. An even better example is that of Panama and the canal. But for malaria, France, and not the United States, might well be the present keeper of the locks. But for the fact that we began to work on the canal at a time when malaria control became possible, it could well be that the canal would still be unfinished. When man moves into an area he must be prepared to control the diseases peculiar to that area. The work of many made available to General William Gorgas the knowledge of how to control malaria, and by applying their discoveries he was able to preserve the working strength that enabled the army engineer, General George Goethals, to build the canal.

Scrub typhus was a little known disease prior to the last war. Because it was known to exist only in certain river valleys in Japan, text books referred to it as Japanese river fever and stated that it was transmitted by a mite or chigger. Carried by the Japanese soldier to the islands of the Pacific, this disease became one of the most urgent medical problems of that war theater. Today in Burma and Malaya vast areas of plantations cannot be worked because of the presence of this disease. We must be able to control the diseases of an area if we are to be successful in that area in war or peace.

We do not need to go so far afield, however, to find diseases peculiar to limited geographic areas. Our own country offers many examples of such diseases. Some of them

vitaly influence phases of our civilian economy. The recent "orange blight" in California, which killed 25,000 orange trees last year, was caused by a disease called "quick decline." A person would hesitate to move into that area to establish a citrus ranch. In northern Michigan and around a few lakes in Wisconsin a disease called "swimmer's itch" is prevalent. This malady is caused by a worm that is carried from one lake to another by birds. Part of its life is spent in snails and part as a free swimming worm. During the latter period it bores into swimmers' skins and causes an itchy eruption, a situation which might ruin that section's resort business if no practicable control is found.

Similarly, there are geographic diseases in this country which have important military aspects. The common cold is the best example. Vast amounts of study have been performed in an attempt to find a preventive or even a treatment for the common cold. Such studies are still continuing. With such a widespread incidence we can assume that our troops will have colds, but we know from past experience that certain types of troops are more subject to common colds, or respiratory diseases, than others. Respiratory diseases include the whole group of afflictions of the nose and throat and are classified as either upper respiratory or common respiratory diseases. Those most affected by the common respiratory diseases are new recruits. In the time of ancient Rome, it was noted that recruits were much more susceptible to disease than seasoned troops. Vegetius, a physician of the time, advised recruiting officers on this subject as follows: "Recruits from cold climates are hardier and more resistant to disease than those from warmer climates."

In our own Army it has been understood for years that such was the case, but during times of mobilization the most important factors in the control of upper respiratory infections were overlooked. Troops from all over the United States arrived at training centers with the germs of their home localities. Congregated together, they had abundant contact and cross-contact with each other, and traded back and forth the germs they carried, together with any new strains common to particular localities and to which most of them had no immunity. Thus we concentrated in one training center all of the local diseases in the United States.

Bacteriologists learned years ago that the virulence of germs can usually be markedly increased by successive passage and growth through several bodies of the same specie of animal. Crowding is an important contributing factor and has always been worse at training centers than any other type of military installation. Statistics on all illnesses of soldiers during the war, especially those with less than six months service, are not available. However, if we select those stations which were designated as basic training centers and compare their illness rates with the rates of the rest of the Army in the continental United States, we get some interesting results. With only two exceptions, the rates at basic training centers exceeded the rest of the Army stations for all disease admissions and for common respiratory disease. The same is true for meningitis, mumps, scarlet fever, measles, and other contagious diseases.

HOWEVER, when we compare a southern basic training center with a northern one, we see that the rates are much lower in the South. Thus, we invite a high disease rate when we select northern stations for the recruit training of our troops. Even if we are training for an Arctic war, we must consider the saving from disease by "seasoning" recruits for six months under the optimum conditions found in the South before sending them elsewhere for cold weather training.

Another disease of military importance which has a geographic aspect is coccidioidomycosis. This disease is caused by a fungus, or microscopic plant, which is pathogenic to man. Most people at one time or another have had a common fungus infection such as athlete's foot or jockey itch. These, however, are simple skin infections while coccidioidomycosis is a general systemic disease which is found only in the United States. It first appeared in the San Joaquin Valley in California, and until recent years was not known to occur elsewhere. However, cases of skin tests reveal that it is now rather widespread in the southwest. Infection is by inhalation of dust containing the fungus which grows in the soil.

Coccidioidomycosis, though not a widely known disease, has had a decided affect on this country's Air Force. During

the past war the Air Corps' Western Flying Training Command had many stations in the southwestern section of the country and at many of them this disease was a major medical problem. During the period June 1942 to July 1943, 800 cases occurred in this command. A sample of these cases revealed that they averaged thirty-five days hospitalization, although sixty-two per cent of the cases were hospitalized less than that period of time. Therefore, roughly one-third of the cases were ill for a period of several months.

The cases mentioned above are those known as primary stage coccidioidomycosis and constitute nine-tenths of the total cases of the disease. The primary state usually consists of a mild fever which lasts a few days, moderate malaise, and often symptoms of nasopharyngitis and a cough. About three per cent of these cases will relapse once a month with a recurrence of fever and often a skin eruption. Thus, in the majority of cases, it is a benign disease, although a small percentage (variable up to ten per cent) goes on to develop a pulmonary disease similar to tuberculosis in that a cavity or cavities that are extremely slow to heal form in the lungs. Of the initial cases about one-half of one per cent continue on to what is called the disseminated form in which the fungus spreads to other organs. This stage of the disease is uniformly fatal. It is difficult to determine the number of deaths that have resulted from this disease. When a man is suffering from the severe pulmonary cavitation, or the disseminated type, he is often transferred to the Veterans Administration. Medical Corps records show only those who died in service.

One of the most important diseases the Air Force faced in this country during the last war was streptococcal disease and its sequelae. Streptococcal is a general term covering a large number of conditions due to the streptococcus: scarlet fever, erysipelas, tonsillitis, streptococcal sore throat, and others. The most important sequelae is rheumatic fever, one of the most insidious diseases in the United States today. Heart disease, the biggest single killer of them all, often follows rheumatic fever among persons under forty-five years of age.

RHEUMATIC fever is a systemic disease that is characterized in its early stage by fever, sore joints,

general malaise and certain electrocardiographic signs of cardiac involvement. In some instances no further complications arise, but in all cases the first stage requires two to three months or more of bed rest followed by a like amount of graduated convalescent activity. However, very often this first stage results in permanent or even fatal damage to the heart. This damage is usually a deforming of the heart valves and results in the heart acting as an inefficient pump. To compensate for its inefficiency it overworks and soon fails. If such pitfalls are avoided during the initial attack, the disease often recurs and many of those who previously escaped heart damage develop it during the recurrence. Thus we have a disease which not only causes a long period of disability during the initial attack, but frequently results in heart damage that either cripples for life or actually shortens life. This disease has been likened to poliomyelitis, but is actually worse. There are more cases of it, and whereas the damage in poliomyelitis may be expected to improve with time, in rheumatic fever where there is heart damage no improvement is to be expected and in most cases a gradual limitation of activity occurs.

Although much is known about rheumatic fever, many essential points to a thorough understanding of the disease are missing. We do not know what causes the disease, we have no immunizing protective, and we have no cure. It has long been known that the disease is more common under certain conditions, particularly those present in military life during training. These conditions include:

- (1) A population composed of young adults to which increments are constantly being added.
- (2) An intensive training program with its necessary change from civilian habits.
- (3) A marked cross-contact between personnel in training.
- (4) Cold, damp weather.
- (5) The presence of streptococcal infections.

It is impossible to control the first three elements, as they are inherent in a mobilization program, but it is possible to exert some control over the last two.

It has long been noted that these diseases are most common in the northern part of the United States. Scarlet fever is rare in the South, while hospital statistics show a

great increase in the number of admissions of rheumatic fever cases in the North as compared with the South.

An even more striking example of the relationship between geography and disease is illustrated in the association between the Rocky Mountain area and streptococcal disease. While the number of deaths from acute rheumatic fever is higher in the northern states than in the southern, it is particularly high in the Rocky Mountain area. During the last war this situation had a decided influence on our Armed Forces. A number of training stations were established in that area and many problems due to streptococcal disease arose.

Rheumatic fever was especially severe in the Rocky Mountain area in 1944. Air bases at Denver, Colorado, had the highest rheumatic fever rates, while those at Kearns, Utah, Sioux Falls, South Dakota, and Lincoln, Nebraska, were next highest. It is significant to note that there was an almost complete absence of the disease at similar stations in the southeastern United States, such as those located at Biloxi and Gulfport, Mississippi, and Boca Raton and St. Petersburg, Florida, despite the fact that similar groups of personnel were involved. At Chanute Field and Scott Field, both in Illinois, Jefferson Barracks, Missouri, and Amarillo, Texas, intermediate rates prevailed.

In 1943 Buckley and Lowry Fields in the Denver area had 995 cases of rheumatic fever, or about one-sixth of all the cases in the entire Army that year. At the same time Fort Francis E. Warren at Cheyenne, Wyoming, then an Army installation but now an Air Force Base, had almost twice as high a rheumatic fever rate as either Lowry or Buckley. Those three stations had thirty per cent of all the cases in the Army that year.

WHAT do these figures mean in terms of cost? Since we can expect the average rheumatic fever case to lose about six months from duty, the Army lost a million man-days in 1943, plus an undetermined number of medical man-days by personnel required to care for the cases. But that is only a small part of the story. It is estimated that thirty per cent of the cases suffered permanent heart damage. Sixty per cent of the remaining cases have had, or will have before ten

years, a recurrence which will result in heart damage for half the number. Thus, thirty per cent of the cases of rheumatic fever have cardiac damage. The life expectancy of the majority of these cases is less than twenty years. Therefore, of the 1000 cases of rheumatic fever in 1943 at Lowry and Buckley, 300 will probably be cripples of whom 150 will not live to 1953. And the remaining 700 still face the threat of recurrence.

We can see that there are definite relationships between geography and disease, and that the advice of the ancient Vegetius was sound. We must know the diseases common to specific areas and the particular nature of these diseases.

The selection of sites for future Air Force Bases, as well as the determination of the mission of those bases, should not be made without thorough consideration of the medical aspects involved. Although research in medicine has evolved preventive and curative measures for many diseases, there are still places in this world that exact extremely heavy medical costs to military operations. Those costs must not only be considered, but given their proper evaluation in relation to the operation of the United States Air Force.

There are specific examples from the recent war which prove that selections of sites for new bases were, in some instances, made contrary to the advice of Medical Corps officials. Shortly before unification, for example, an old permanent base was declared undesirable for training purposes because of health reasons and was reduced to practically a caretaker status. This station had one of the highest non-effective rates during the mobilization period and one of the highest rates of a certain crippling disease. The command of which the station was a member, was familiar with the health record and was glad to accept the surgeon's advice to discontinue it as a training base. The command, in advising officials of nearby communities, diplomatically refrained from mentioning the real reason. Their idea was to let demobilization take care of it. But the people of the nearby towns had derived indirect benefits from this station for years and did not wish to lose them. Its merits were told by the people to representatives of another command. The benefits included a considerable number of old and costly-to-operate permanent barracks and quarters for both officers

and non-commissioned officers. It was also suggested that it would be ideal for Arctic training of new troops. The surgeon of this second command advised strongly against taking over the station. He procured all of the figures regarding the health history of the post during the time it had been used as a training base, and informed his superiors that the first command was not utilizing the base because of their past experience and upon advice of their surgeon. The second command, nevertheless, requested the base on the grounds that the advantages outweighed the disadvantages and told the surgeon he must double his efforts to make it healthy. The base was transferred promptly and the new command began a new training program.

Shortly thereafter, however, a change in the training program was introduced and the base was no longer needed. Now there was the problem of how to give it up. The new command remembered it had been advised to stay out because of health reasons, so the surgeon was summoned and questioned about the health. The picture was beginning to run true to form, for the surgeon reported there had been nine cases of the same crippling disease during that week. Instead of drying up the station gradually on the basis of having no need for it, the command informed the townspeople that the area was unhealthy and the station must be given up immediately. This, of course, was poor public relations and alienated many people.

People native to an area are naturally biased in their opinions as to the healthfulness of the area. They believe that if it is satisfactory for them, it should be equally good for a large military training base. Unfortunately, that is not always the case.

If we examine the methods of waging war, the marked differences between conditions today and a century ago are brought clearly to a focus. For the mode of warfare reflects the general cultural pattern of a civilization.

--James B. Conant

Education in a Divided World (1948)

AIR-HEAD LOGISTICS

Colonel Jasper N. Bell

IT cannot be denied that airborne operations conducted during World War II were successful. Whether they were in all cases decisive or essential is a subject for further discussion. In any event, it can be said that these operations have had a far-reaching effect in modernizing tactical employment concepts of ground force commanders. The advocates of the airborne technique have been vociferous and energetic in their prediction of how future wars will be fought. They envision large-scale air movements of conventional ground units as well as highly specialized airborne units such as were employed during World War II. Many of these writers predict "air-head" operations of an entire army.

The general characteristics of such a future operation are described by General Jacob L. Devers in the April 1948 issue of *Pegasus*, as follows: "In a recent article for *Pegasus*, I envisioned the establishment of an air-head in any future war in the manner analogous to that in which beach-heads were established in World War II, on a scale calling for the employment of an entire corps, and including air transportable Infantry divisions as well as parachute and glider units."

A superficial analysis of the operation envisioned by General Devers might lead one to oversimplify the problem. Such a tendency is illustrated by the following statement made by Major General Archibald V. Arnold in an article entitled "Future Airborne Operations," also from the April 1948 issue of *Pegasus*: "The only limiting factor of an airborne operation is the number of aircraft which will be available for operation on D-Day."

The number of aircraft available for the operation is indeed important, but it is certainly not the only limiting factor. A thorough analysis of the complications that can be

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determined in advance will inevitably lead to the conclusion that an air transportable operation of corps size is loaded with limiting factors. Some of the most complex and baffling problems of such an operation involve logistics. The whole venture could well be termed a logistician's nightmare.

There is the problem of marshalling, in sufficient quantity and at the right time, the proper air transports and gliders. Equally baffling are the many problems connected with the location and construction of the airdromes from which to mount the operation, and the task of marshalling and equipping the required forces. The receiving end of the operation requires detailed and exact planning for the preparation and development of the air-head to the size required to support the operation. This aspect of the overall operation, which can be called "air-head logistics," may prove to be the major bottleneck. In the discussion which follows, an examination and analysis of the air-head phase of the operation will be made to determine the major problems involved. To provide a basis for discussion a hypothetical operation is assumed in order to carry out the air-head planning.

First, it will be assumed that the Air Force has obtained air supremacy over the enemy, at least in the local area, and that fighters can assure freedom of action to transports over the route and at the air-head. Next, it must be assumed that the number of transport aircraft required for the operation will be available. For the assault phase tactical type transports (C-82s and C-119s) and gliders will be used. During the build-up or air transportable phase the tactical transport force will be augmented with strategic type transports (C-54s, C-97s, etc.).

Now what are the requirements for the air-head? First, the capabilities of the corps must be appraised. Major General James M. Gavin, commander of the 82nd Airborne Division, discussed this phase of the problem in a recent article in *The Infantry Journal*. He said: "The corps, in my opinion, is the smallest unit that offers promising tactical prospects in the establishment of an independent air-head. It is large enough to contain several airlanding areas and it can provide protection to the airlanding of several divisions." General Gavin also expressed the opinion that

the corps would be adequate to seize and hold an area with a perimeter of forty-five miles, or a circle approximately fourteen miles in diameter. Further, an area this size would permit enough dispersion for defense, and would provide space for six or seven airdromes.

WITH this understanding of the capabilities of the corps, the selection of the objective may now be considered. It is reasonable to assume that any area fourteen miles in diameter, containing several prepared airdromes, would be so well defended as to be beyond the capabilities of our corps to seize and hold. An isolated airdrome surrounded by terrain suitable for the construction of additional landing strips would appear to be more suitable as the initial objective. Assuming that we select such an area, the prepared airdrome would serve as the focal point for the initial assault and would be the hub for further expansion. Engineer troops would be required from the beginning to inspect and repair the captured airdromes for air-landing operations and to build additional landing strips within the perimeter of the area.

The arrangement of the air-head, that is, the location of airstrips, supply dumps, and facilities, is the next important step in the pre-operational planning. The airstrip layout must permit the maximum degree of flexibility for handling air traffic and must insure minimum congestion on the ground. If the terrain is fairly flat, well drained, not heavily wooded, and otherwise suitable for the construction of additional landing strips, six additional strips can be constructed within the perimeter. Of the several possible methods of construction, the most practical would be to locate six two-way landing strips, equally spaced, on a perimeter circle of five miles radius from the center of the air-head. Each strip would be two miles inside the outer perimeter held by the corps. Assuming that each strip was approximately one mile in length, this arrangement would allow four miles clearance between each adjacent strip. Each landing strip would require a parallel parking ramp with taxi-ways connecting each end of the runway. Supplies and equipment landed on strips could be moved to a main supply

dump in the central part of the air-head or to auxiliary dumps on the outer perimeter, in direct support of elements of the corps.

This air-head layout provides a central airdrome and six landing strips. What will be the capacity of this system? Capacity in this instance is not measured in terms of physical capability to accommodate a given number of units. It is the ability to receive incoming personnel, supplies and equipment--it is the rate of input into the air-head. Here, two factors are involved. The first concerns air traffic or air operations. Assuming optimum conditions, how many airplanes can operate through the air-head on a sustained (24 hours per day) basis? The second factor has a direct bearing on the first: How fast can supplies be received or what will be the average unloading time for each aircraft? Discussion of this factor is best delayed until certain other elements that have a direct influence are analyzed.

In regard to air traffic, it must be remembered that the six landing strips are hastily prepared sod fields. They will handle tactical transports with track-type gear, but to accommodate strategic transports a surfacing of some sort will be required. Parking space for aircraft will be limited. Under these conditions the best that can be expected is twenty movements per hour (ten arrivals and ten departures) into each of the seven landing areas. This will permit three minutes between each movement at each field. Using this criteria as a maximum rate of flow for air-landing operations, and considering each transport sortie load to be five tons, our air-head has an operational capacity of seventy arrivals per hour, 1680 arrivals per day, or 8400 tons input per day.

The ability to maintain this rate will, of course, be greatly influenced by weather, field conditions, maintenance of aircraft, and turn-around time. It appears overly optimistic when it is considered that the maximum tonnage delivered over the hump to the Kunming area on a single day (1 August 1945) was 5327 net tons in 1118 trips. The highest monthly rate for that operation was 78,000 gross tons or an average of 2600 tons per day. Moreover, it took almost three years of hard work to build up the facilities for this peak rate.

UP to this point only the characteristics of the air-head have been discussed. The combat and service units required to make it operational must now be considered. First in importance is the corps, for which the following statistics are applicable:

One Airborne Division.....	4,400 tons
Two Standard Infantry Divisions.....	11,000 tons
Miscellaneous Combat Elements.....	8,000 tons
<i>(Anti-aircraft, Field Artillery, Tanks)</i>	
Initial Supply.....	<u>8,000 tons</u>
Total Weight of Corps.....	31,400 tons
Total Personnel.....	45,200
Daily Resupply Requirement.....	3,000 tons

It may be assumed that the airborne division will go in with the first wave to be dropped or assault landed in gliders. Published information indicates that approximately 820 C-82s and 450 gliders will be required to transport such a division. It is difficult to determine the proportion of standard infantry divisions that will take part in the assault phase (parachute or glider) of the operation. An estimate of the number of transport sorties required to move the remainder of the force (corps less airborne division) can be made by dividing the total weight by five tons. It must be remembered that most of the heavy equipment of the corps will have to be air landed. The air-head will be extremely unsuitable for this until the six landing strips are constructed.

The service units required to construct and operate the air-head must now be considered. Calculations here will be guesstimates, since no comparable operation has ever been accomplished. Most of the problems will be concerned with factors involved in landing strip construction and maintenance, airdrome operation and aircraft maintenance, and receipt and distribution of supplies.

How much of a force will be required for landing strip construction? Airborne engineers with light equipment can do some of the preliminary work, but for the construction of the six landing strips, aviation engineers with heavy-duty equipment will be required. Since time is vitally important and air transport space is severely limited, requirements must be kept to a minimum. It may be assumed that one airborne battalion and two aviation engineer battalions will

be capable of doing the job. The combined weight of the three engineer organizations to be moved into the air-head is approximately 5330 tons, including an estimated 2000 personnel. Daily resupply requirements will be 135 tons.

But the problem does not end here. It may be assumed that the engineers, within two or three days, can construct six very rough, soil-surface landing strips capable of handling, in dry weather, tactical transports with track gear. But the strips must be made serviceable for all-weather operations of both tactical and strategic aircraft. The transportation of surfacing material is no small item. Estimates for a single 6000-foot runway, with taxi-ways and unloading area suitable for transports, are as follows:

Steel pierced plank.....	5,500 tons
Aluminum pierced plank.....	2,700 tons
Prefabricated bituminous surfacing.....	800 tons

Multiplying these figures by six gives a requirement for steel plank, 33,000 tons; aluminum plank, 16,200 tons; bituminous surfacing, 4800 tons. In terms of weight the bituminous surfacing is by far the most desirable, but its suitability is questionable.

In regard to the second category, airdrome operation and aircraft maintenance, there is no standard Table of Organization unit exactly suited to the needs. The required personnel will probably be drawn from units of several types. However, calculations can be based on an airdrome squadron, weighing approximately 220 tons and containing about 300 persons. It will probably take three such organizations to operate one airdrome and six landing strips. This augments the initial movement by 660 tons and 900 personnel, and a resupply requirement of sixty tons.

IN computing the problems involved in the third and last category, receipt and distribution of supplies, the unknown is truly involved. How many men and how much of what kind of equipment will it take to unload supplies coming into the air-head at a maximum capacity of 350 tons per hour, twenty-four hours per day? It has been stated that it took about ten men to pass a ton of supplies through

the Normandy base section in a day. Our air-head, as planned, certainly resembles a base section. If this planning is used as a factor, it will require 80,400 personnel, far more than would be in the air-head already.

It has been stated that in general planning the need for ground service troops is computed at fifty per cent of the combat troops employed in an operation. For this air-head operation this appears reasonable, particularly if labor-saving equipment is used to a maximum. On this basis, the service force will number about 24,050 personnel. Engineers and airdrome personnel should be considered as combat troops in this instance. It is difficult to say what the total weight of such a force will be since it will be composed of many types of units. There will be considerable heavy equipment involved, including trucks, conveyors, fork-lifts, etc. Since the two infantry divisions are about equal in strength to this force, the initial weight might be assumed to be about the same--11,000 tons. Daily resupply requirements, using the same factor as employed above (.06637 tons per man per day) add up to 1596 tons.

In considering this phase of the operation, the absolute necessity for keeping the turn-around time of each aircraft at the air-head to a minimum must not be overlooked. Unloading *must* be accomplished in minutes. Much advance planning is required if this is to be done. The design and production of portable pre-loaded pods, overhead trams or conveyors in transport aircraft, or portable unloading docks, might be a possible solution.

The various phases of the operation have now been covered in sufficient detail to give a general idea of the immensity of the task. The following summary of the tonnages required for initial movement and resupply operation will give a fair basis for computing sortie requirements:

<i>Unit</i>	<i>Personnel</i>	<i>Initial Wt.</i>	<i>Resupply</i>
Corps (including Airborne Division) ..	45,200	31,400	3,000
Aviation Engineers.....	2,000	5,330	135
Airdrome Operation & Maintenance.....	900	660	60
Receipt and Distribution.....	24,050	11,000	1,596
Runway Surfacing.....		2,400	
Totals	72,150	50,790 tons	4,791 tons
(Total initial weight less Airborne Division--46,390 tons.)			

By using the figure of five tons per transport sortie, the approximate number of sorties required are:

Initial Movement (less Airborne Division)...	9,278 sorties
Resupply.....	938 sorties per day.

It should be noted that the sortie requirement for initial movement does not include the airborne division, because as previously stated, this unit would go in by parachute or glider. The time it will take to complete the initial movement is dependent upon the number of assault sorties (parachute or glider) versus the number of air-landing sorties. If the maximum air-landing capacity of the air-head (1680 sorties per twenty-four hour day) is considered, it will take 5.52 days to complete the initial movement. Resupply operations must start very soon after units are delivered. When a portion of this requirement is imposed on the initial movement, the time required becomes considerably longer.

AT this point planners are faced with the most difficult problem of all, the question of time versus timing. Everything is priority A-1. All elements of the corps must arrive at the air-head first to fight the enemy. The engineers must arrive first to construct the landing strips so that personnel and equipment can be air landed. Airdrome personnel must arrive first to handle traffic and keep the operation moving. Service personnel must arrive first to unload transports and distribute supplies. Resupply operations must commence very soon after the first assault. Everything cannot come at once, and the sky will not open up and dump everything on the ground at one time. There must be precision and orderliness if the operation is expected to have a bare chance of success. This can be accomplished only through a rigid system of priorities and expert timing.

Up to now only ideal conditions have been considered. What happens to the daily input if adverse conditions interfere with the operation? During bad weather, for example, heavy rain would slow down landing and unloading operations considerably. How many aircraft per hour can be landed under instrument conditions? An instrument approach system would be required. Under the Ground Controlled Approach system it

is doubtful if approaches into more than two fields would be feasible. What about enemy action? If our air-head is important to us in furthering our campaign against the enemy, it is certain that he will resist our efforts to the maximum degree possible. The enemy will likely have land lines of communications over which to bring in reinforcements. The location of any landing strip placed within the perimeter of the air-head is vulnerable to enemy artillery fire. The area could well become completely untenable.

In setting up the air-head operation described there must be a greater objective than merely capturing a piece of enemy real estate. The objective must have exploitation value. The big question is, what is left for exploitation? Minimum resupply requirements have been estimated at 938 sorties per day; the maximum rate of input is 1680 sorties. This leaves a balance of 742 sorties or 3710 tons per day cushion. Can this be considered available for exploitation? Shortages of supplies not delivered on days when adverse conditions prevail will have to be made up on favorable days. When these shortages are made up, an emergency reserve will be needed. It seems likely that the 3710 ton cushion expected for exploitation will be completely obligated to maintaining the units already delivered. It would appear that an impasse has been reached: exploitation is impossible unless the air-head can be expanded and expansion is impossible without exploitation.

In the final analysis, is the objective to be gained worth the effort expended? As long as there is a more effective way of neutralizing the enemy, or of inflicting the same amount of damage on him, the answer is no!

We must guard against obsolescence in both our thinking and our equipment. As fast as our weapons, our tactics or our methods become obsolete, we must scrap them ruthlessly. If we try to maintain an obsolete military establishment we won't have money enough left to develop, procure and maintain a modern force. No obsolete equipment or ideas will protect us from the devastation that a future war would bring forth.

--General George C. Kenney
Air Force Day Address (1948)

THE QUALITIES OF MILITARY LEADERSHIP

Colonel Edward Barber

SUCCESSFUL military leaders for centuries past, perhaps without realizing it, have had to apply correctly the principles of what today we call the science of psychology. They must be credited as being masters in the field of applied or practical psychology, otherwise they never would have attained success in persuading other men to subject themselves to the discomforts and dangers of the battlefield. This is particularly true of military leaders in the United States who must inspire within a matter of a few weeks a heterogeneous mass of citizen-soldiers to engage an enemy in battle. Indeed their task is rendered doubly difficult because in our nation the ideals of the soldier have been held up to scorn and ridicule to such an extent that the military leader must deal with a mass of contrary fixed ideas in the minds of the citizens that are presented to him to prepare for battle in a situation of extreme urgency. This problem can be understood best by those who have actually experienced it under the pressure of war. It matters little whether the conduct of war be considered as an art or a science. Military leadership as a profession is unique compared with any of the arts or sciences. General Sir Archibald Wavell has said, "I know of no branch of art or science, however, in which rivals are at liberty to throw stones at the artist or scientist, to steal his tools and to destroy his materials while he is working, always against time, on his picture or statue or experiment. Under such conditions, how many of the great masterpieces of art or discoveries of science would have been produced?"

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In 1934, Captain John H. Burns, United States Infantry, wrote--"the literature on military leadership is scanty and hardly could be called scientific. . . . In writings on leadership there is evidence of an uncritical acceptance of opinions of previous authors; which opinions, from frequent restatement, gain the dignity of dogma." In the same thesis, Captain Burns advanced the suggestion that "profitable fields for exploration and study" would lie in military history with concentration on the study of men and groups of men in battle, rather than on the geometrical formations and the evolution of weapons; concentration on the exact role played in battle by the factor of leadership rather than by the factor of generalship. This suggestion was echoed by General Sir Archibald Wavell in the Lees Knowles Lectures delivered at Trinity College, Cambridge University, in 1939, when he commented upon the study of military history by advising that the student "get at the flesh and blood of it, not the skeleton" in preference to a study of the outlines of strategy and the principles of war.

Secretary of War Robert H. Patterson has said of World War II that, "The prime purpose of the armed forces is to win a war without excessive loss of life. In that purpose the Army won a success without precedent in our history, and this is proof enough of the character of our military leadership. It could not have succeeded if there had been anything radically wrong with our leadership, and I mean the leadership supplied by those in uniform." This is high praise and in the broadest sense well merited, from the viewpoint that we did win a war and at relatively low cost in human life. However, it is a view of the end result and although we may take just pride in the accomplishment it would appear that a certain amount of retrospection and introspection is in order.

It has been said that the best place to begin the study of a war is during the period just prior to the actual formal declaration of war and the period just subsequent thereto, during the opening phases of hostilities and active combat. This is very fertile ground for the student of United States history because of the inadequacies in our military structure that can be revealed through such a study of the periods

prior to each war we have engaged in, and the opportunities afforded for constructive thought and effort to minimize similar inadequacies in the future. It is within the personal experience of the writer that one of the most serious and perplexing problems that confronted the Chief of Staff, and indeed the Commander-in-Chief, was the problem of the proper selection of military leaders, which was presented to them particularly in the early stages of the war. Generally speaking, the criteria for appraising military leadership were inadequate and in many respects completely lacking.

THERE can be little if any doubt that here is a problem that is purely military in nature, and one that remains unsolved at the present time. During the opening phases of World War II, there were some criteria available, of course, in the form of efficiency reports, biographical data, reports of annual physical examinations, that were reasonably complete in the case of Regular Army officers, but only fragmentary in the cases of National Guard and Reserve officers. Under the stress of war, these criteria were found to be inadequate and indeed so unwieldy administratively when dealing with large numbers, that we were quickly forced to place our chief reliance upon the recommendations of senior officers, for the selection and assignment of junior officers, rather than upon scientifically assembled and correlated data upon which the potentialities for leadership in an individual could be judged with any real assurance of success. The basic difficulty lay in the very simple fact that in order to measure anything, one must know what it is that needs to be measured. The plain truth is that there was much talk about "leadership" without any clear-cut and readily understood definitions of just *what* it was. There was so much ambiguity in describing the qualities of leadership as to completely baffle the students who endeavored to isolate them and devise a means of measurement. The qualities ascribed to successful leaders were of such an intangible nature that many people concluded that "leaders are born, not made." An attitude of resignation toward this theorem may account for the fact that literature on the subject was "scanty." Throughout World War II, the training

programs in the Officer Candidate Schools emphasized instruction in the techniques of the arm or service, with little or no attention given to the techniques of leadership. One either had the attributes for leadership, or one did not, and that is all there was to it. Looking back through twenty-seven years of service as a commissioned officer, one can find little formalized instruction in leadership offered in the various service schools, and yet emphasis was placed continually upon the necessity for good leadership without defining just what attributes marked the successful military leader.

It may be that an explanation for this lies in the fact that much of the military history of the world has been written by non-military men, and that on the few occasions military men have taken to the pen they have been pre-occupied with strategy, tactics, principles of war, evolution of weapons, and the geometrical interpretations of battle. Hence, it seems clear that whatever success in handling men our leaders may have enjoyed during World War II it was derived not from knowledge gained through formalized instruction in leadership, but from knowledge gained through the hard school of experience in which success is measured largely through the manner in which one profits by his own mistakes. This is a rather costly method of acquiring knowledge when young men have to be sent into battle led by other young men whose qualities of military leadership are restricted in scope and development to their own experience. Men seldom live long enough to profit by their own experience.

Brigadier General W. D. Palmer has commented that the war effort of the United States during World War II was the most effective in our history, but that this effectiveness was estimated to be about sixty per cent efficient. It is not unlikely that this figure could be applied as a general factor to our overall military leadership, not because of any lack of inherent aptitude or capability on the part of our individual leaders, but more because of our inability to fortify their experience with a knowledge of the attributes of a good military leader, and more serious, because of our inability to appraise such attributes in a definitive manner in making selections and assignments to positions of responsibility. In brief, our military leadership during World War

It was very good, indeed outstanding in a few instances, but there is very definite evidence that it could have been made better.

IN 1945, Dr. William O. Jenkins, Indiana University, who was then associated with the Psychological Branch, Office of the Air Surgeon, Hqs., AAF, wrote, "No single trait or group of characteristics has been isolated which sets off the leader from the members of his group. . . . Progress has not been made in the development of criteria of leadership behavior, nor in the setting up of an adequate working definition of the concept to guide research in the isolating of leadership traits." There is much to be said in agreement with this view, even though it tends to admit failure and a complete stalemate since Captain Burns studied the problem in 1934. Dr. Jenkins' statement may not be completely warranted, because some progress has been made as pointed out by Dr. Donald E. Baier, Personnel Research Section, AGO, in the September 1947 issue of the *Psychological Bulletin*. However, it is clear that a solution to the problem of selection of military leaders has not been reached and that much painstaking research remains to be done. In this article, an effort is made to isolate and define a group of leadership qualities which writers in the field appear to agree upon as essential to success.

The isolation of a single trait or group of characteristics which sets off the leader from the members of his group is an intriguing problem. When Captain Burns suggested, in his thesis in 1934, a study of successful military leaders of the past, he was well aware of the magnitude of the task, saying, "It is a large order and can only be filled by conscientious, detailed, and scientific study, which will range far outside the strictly military field and into sociology, psychology, national mores, social history, national customs, ideals and traditions, and perhaps racial origins." Within the knowledge of the writer, the only work worthy of mention that has been done in this field is Dr. Douglas Southall Freeman's masterpiece in three volumes, *Lee's Lieutenants*, in which the qualities of high commanders appear to be effectively isolated. It is significant that

General Wavell, in the Lees Knowles Lectures, mentions the qualities of a good general which closely parallel the qualities synthesized by Dr. Freeman. It is also significant that General Wavell awards to Socrates the full credit for the statement of these qualities. In comparing these two lists of qualities one may note minor differences, and it is here that efforts to isolate groups of characteristics for military leaders encounter an obstacle which has appeared insurmountable. Psychologists who worked on this problem during World War II, and those who are still engaged, have stated that no progress can be made until there is substantial agreement upon not only a statement of qualities, but also a clear-cut definition of the qualities involved. There is no question but that the authors in this field have described military leaders in terms that make the task of isolating qualities shared in common a rather difficult one.

During World War II, two approaches were followed to solving the problem of leadership appraisal. One approach endeavored to establish criteria for leadership behavior; i.e., what did a leader do, how did he act, what was it in his outward and observable conduct, his mechanical motions, his speech, his appearance, that influenced men to follow him and do his bidding? This approach did not develop any consistent conclusions but to confirm what military men have observed repeatedly in their own experience. Military leaders come in all shapes and sizes and seldom do they act in an identical manner even in situations that appear to be identical. An individual leader frequently will change and vary his methods and actions in dealing with situations that appear to be similar. It appears doubtful that criteria for leadership behavior will ever be established upon an acceptable basis. The principal benefit will be found in the educational value which will accrue to the tyro from a study of how successful leaders behaved in various circumstances.

THE other approach endeavored to isolate the attributes or virtues of leadership, but this approach always seemed to founder upon what was considered to be conflicting opinions. A comparative review of all the literature available to the writer is rather revealing in that it tends to demon-

LEADERSHIP QUALITIES GIVEN BY REFERENCES CONSULTED

LEADERSHIP QUALITIES ¹	REFERENCES CONSULTED ²																			
	Military										Civilian									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Proficiency	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
Vitality	X	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X
Decision	X	X	X	X	X		X	X	X	X	X	X		X		X		X	X	X
Humanity	X	X	X	X	X	X	X	X		X		X	X	X		X		X	X	X
Character	X	X	X	X		X	X	X	X	X		X	X	X		X	X		X	
Duty		X	X	X	X	X	X	X	X		X			X	X	X	X			X
Equity	X	X		X	X	X	X	X		X			X	X	X	X			X	
Courage	X			X	X	X	X	X		X				X	X	X		X		
Initiative	X			X	X		X	X	X	X			X			X	X		X	
Judgment		X	X	X	X		X	X	X	X		X		X			X			
Integrity			X	X	X	X	X	X				X			X	X		X		
Bearing		X		X			X	X	X			X			X		X	X		
Tact				X	X		X			X	X				X		X	X		
Loyalty				X			X					X	X		X		X	X		
Militance				X			X		X	X				X				X	X	
Dignity	X			X			X	X							X					X
Imagination				X	X					X				X						
Piety				X									X				X			X
Prudence				X						X				X	X					

¹The leadership qualities listed in this column are defined in detail on pp. 55-63.

²The references consulted are identified in the chart by the numbers that precede them in the bibliography on page 65.

strate that the conflict in opinion over qualities of leadership is not as wide as might be thought. On page 54 is given a tabulation of qualities and authors to show how close the agreement is on many of the qualities listed. There follows below an analysis of each of the qualities, which is a composite one representing as far as practicable the collective views of the authorities consulted, with the comparative and definitive meanings based on *Webster's Dictionary of Synonyms*, 1st ed. (1942):

Proficiency: Degree of advancement in knowledge necessary to success; competency beyond that of the average as a result of training and practice.

Analogous Words: Efficiency, effectiveness, capability, ability, competence, qualification, skill, expertness.

G. I. Expression: "He sure knows his stuff!" or "The guy is really smart!"

Discussion:

(A) Knowledge of Profession:

This is referred to frequently in other terms, such as intellectual capacity, or technical mastery. The important factor in this attribute of proficiency lies in the definition, which is one of "degree." The potential leader needs to ask himself, "Do I know enough of the technique of this enterprise to gain the confidence of my followers and to realize our common purpose?" The corporal or the captain needs to know enough to discharge his assigned duties, but the general needs to know more than this, enough to meet the requirements of his position. Proficiency, in the military field particularly, must include the ability to instruct others, a facility in imparting knowledge and in addressing groups of people that can be acquired through training and education and experience. There are several important by-products of this quality of proficiency. The leader who "knows his stuff" inevitably gains the respect and confidence of his men, and gains confidence in himself. As proficiency is the product of training and education and experience, it can be appraised by an examination of an individual's educational background, both civilian and military, and by observing the variety of assignments held and the manner of performance of duty therein.

(B) Knowledge of Men:

A military leader must have a knowledge of the aptitudes, capabilities, and limitations of men if he is to employ them effectively. This includes a knowledge of individual human beings, both men and women, how they differ each from the other, and how they react and behave in groups under various stimuli. This is the kind of knowledge concerning such commonplace things as, "What are the primary and secondary needs of men that a leader must cater to in order to maintain their effectiveness under widely varying conditions? How long can man function effectively (a) without water (b) without food (c) without sleep (d) under extremes of temperature (e) at high altitudes (f) under emotional stress of 'bad news' from home? How can highly developed senses of seeing, hearing, etc., possessed by certain individuals, be capitalized upon for special military tasks? What physical reserves does man have that can be called upon for extra effort?" A leader who has this knowledge will use his men to the limit of their capabilities but will never ask "the impossible." This quality in a leader can be appraised in part by an examination of educational background, but principally by observation of his experience. In a formalized educational system, knowledge of men is equal in importance to knowledge of profession, and needs more emphasis than has been accorded it in the past.

Antithesis: Proficiency by accepted definition does not imply that a leader must know "all the answers." An attitude of intellectual snobbishness must be guarded against. This attitude manifests itself in underestimation of the capacities of the followers, development of an overpowering desire to tell subordinates "how" to do everything, tendency to assume a superior and condescending manner, and an unwillingness to admit mistakes or a lack of knowledge. From the viewpoint of leadership, application of the knowledge of men cannot be based upon the coldly scientific methods of the psychologist, but needs to be tempered by an attitude of humanity.

Vitality: The power to arouse to activity something that is inert or latent.

Analogous Words: Animation, stimulation, vigor, enthusiasm, excitation, energy, intensity, zeal, zest, life,

aliveness.

G. I. Expression: "The guy sure is on the ball."

Discussion: Vitality in a leader is a dynamic emotion that is not only self-sustaining but is contagious, an emotion that infects his followers with a "will to win" and a robust sense of joy in the job to be done. It is an element in the leader's personal power of persuasiveness, which can become a compelling force, an infectious enthusiasm for the task. It accounts largely for the ability in a leader to get results. Vitality is manifested in enthusiasm, cheerfulness, hard work, industriousness, and personal interest in the tasks assigned. It is an intangible quality but its genuineness is quickly sensed. It can be appraised only through association and observation.

Antithesis: A condition of good health is an aid but not an end in itself. Many people in poor health have great vitality. A lethargic manner, a dull and apathetic indifference, a bored look, a gloomy attitude, will seldom lead to success as a military leader.

Decision: The power or habit of promptly and definitely making up one's mind, *when circumstances demand it.*

Analogous Words: Assurance, certainty, aplomb, confidence, masterfulness.

G. I. Expression: "The guy sure knows what he wants."

Discussion: Success in military leadership demands the ability to make a decision whenever it is necessary to the attaining of the objective. This implies the ability to apply inductive reasoning and logical thought processes to the solution of a problem. However, inseparable from this thinking power or habit is the ability to impress one's followers with the fact that a decision has been made and that the time for hesitation, vacillation, and questioning, is over. The leader must look decided, must act in a decided way, and must speak decisively but calmly and in such a way as to be clearly understood by his followers. The giving of commands in a proper tone of voice is indicative of an appreciation of the value of the decisive manner. Decisiveness, in contrast to arbitrariness, implies that decisions can be changed when necessary, provided the manner in which the new decision is conveyed to one's followers is carefully thought through. The ability to reach a decision can be developed and tested

through training and education. The decisive manner can be acquired under coaching, but it is largely the result of individual effort and can be appraised only through association and observation.

Antithesis: Vacillation and hesitation cannot be tolerated in a military leader. Success in leadership seldom comes to those who falter and waver when circumstances demand a decision.

Humanity: An attitude of proper feeling toward man.

Analogous Words: Kindliness, compassion, benevolence, forbearance, tolerance, mercy, altruism or self-sacrifice, self-denial.

G. I. Expression: "He sure looks after his men" and "That guy understands our problems."

Discussion: Enlisted men place the quality of *humanity* or human understanding at the top of the list of qualities they admire most in a military leader. It is manifested by the active interest a leader takes in the welfare of his men; in seeing that their physical needs are cared for reasonably, their food, equipment, clothing, shelter, and health; by the sympathetic assistance and understanding he lends to their individual problems; and by a clear recognition of the contribution of the follower, as well as the leader, toward the attainment of the common objective. A leader "serves" both his subordinates and his superior. Appraisal of this quality must be based upon association and observation.

Antithesis: Inexperienced leaders frequently interpret this quality to mean that a close association between leaders and followers on a social basis is necessary, that a "buddy-buddy" relationship must be developed. Enlisted men are quick to decry and resent a military leader who attempts to curry their favor, to be a "good fella" and to intrude into their off-duty life. Familiarity in this respect breeds contempt and will nullify other good qualities of leadership. Antonyms are: Inhumanity, mercilessness, intolerance, selfishness.

Character: Moral excellence, the quality of excelling in the practice of the duties of life.

Analogous Words: Goodness, virtue, morality, honor, moral ascendancy, nobility, dignity of attitude and private life, sense of what is right, conscience.

G. I. Expression: "The skipper knows what's right," or "He sure sets us a good example."

Discussion: The attribute of character as defined herein deals entirely with conforming to a standard of what is right and good. It implies a relationship to either character or conduct which can be viewed as right or wrong, or as good or bad. It refers to a determination of, or the teaching of, principles of right conduct and good living. The definition does not establish a standard but implies a higher standard for the leader. The leader who excels in the practice of the duties of life will have a commanding influence upon his men. When a leader has resolved his inner conflict over what is right or wrong, or good or bad, and his concept of right is on a higher than average plane, he will have moral excellence. It then must follow necessarily that he will have other secondary attributes such as self-control, emotional stability, calmness under stress, self-possession, or those qualities of spirit which make simple the matter of "setting the example." The quality of character is an intangible one. It will develop principally through teaching and force of example, and will be in part one of the products of environment. Appraisal will have to depend upon the judgment and opinion of men through association and observation, rather than upon any artificial or arbitrary yardstick.

Antithesis: A leader who sets a "poor example" for his men is a man who either has no standard or at best a very low one for what is right and good. Publicly disgraceful conduct, open drunkenness, conduct which casts reflection upon the uniform and the armed services, open consorting with persons of ill repute, dishonesty, and intemperateness in actions of any sort, are convincing manifestations of a person of low character and one not fitted to be an officer and a gentleman. Similarly, clandestine relationships of a like nature prevent the attainment of a dignity of attitude and private life that is essential to the successful leader.

Duty: Moral perception of obligation.

Analogous Words: Obligation, responsibility, answerability, liability, constraint, compulsion.

G. I. Expression: "The guy seen his duty, and he done it."

Discussion: An obligation is the binding power of a vow. Moral perception implies the possession of character. A sense of duty enables a leader to discern correctly or to be keenly aware of just what he ought to do, or just what the nature of his vow is. Further, it provides a moral constraint or impelling force which translates a clear discernment of what should be done into actually doing it. A highly developed sense of duty assumes the aspects of a devotion, a religious fervor, a consecration that is essential to success in leadership. A sense of duty is assumed to give a guarantee of performance of unpleasant and unrecognized deeds and of unassigned tasks. Correctly developed, it guarantees that self-interest will never interfere with a performance of duty. From a sense of duty there arise the attributes of steadfastness and dependability, and a willingness to assume responsibility. The sense of duty can be appraised by association and observation but must depend upon the judgment of men.

Antithesis: A military leader who does not clearly understand his oath of office cannot develop a sense of duty. A leader who is not acutely dissatisfied, because of failure to do what he feels he is morally bound to do, has not developed a sense of duty. A leader who permits self-interest to force him into doing that which he is morally bound not to do, has no sense of duty.

Equity: The quality of being equitable, of being able to administer according to what is reasonable rather than what is merely legal.

Analogous Words: Justice, impartiality, fairness.

G. I. Expression: "The guy's a square shooter" or "He don't play favorites."

Discussion: A military leader finds it necessary to be fair, impartial, and just in dealing with his men, but there is a very finely drawn distinction in the quality of *equity* which sets it apart as a fundamental attribute. Equity implies a justice based upon a strictly impartial meting out of rewards and punishments, of praise and blame, with all conditions of fair play being respected. It implies a justice that transcends the strict letter of the law and is in keeping with what is reasonable rather than what is merely legal.

Antithesis: The military leader must guard against a blind administration of justice according to "the book." Favoritism must not enter into rewards and praise of subordinates. Enlisted men quickly lose respect for a leader who inspires a sense of injustice or partiality through either deliberate or unwitting failure to give them their just due according to the dictates of reason and fair play.

THE foregoing seven qualities of military leadership represent a clear-cut majority of opinion of a representative sample of authorities in the field, as interpreted by the writer. Considerable reflection leads to the conclusion that these seven attributes can be considered as fundamental, the ones that are shared in common by all successful military leaders, and ones that possibly we should insist that our military leaders possess.

There are twelve other qualities listed in the chart which are mentioned by the authorities consulted. Four of these stand close to the seven that have been analyzed in the preceding text. All twelve are to be discussed herewith in a descending order of importance according to their frequency on the chart. These twelve attributes are highly desirable ones in a leader, but no special effort is made herein to develop special composite definitions for them, for several reasons. First, the various definitions furnished by the authors, either directly or by implication, are by no means clear and do not seem to offer the possibility for an acceptable interpretation; second, there does not appear to be a majority agreement as to the essentiality of the attributes for success; third, because of vagueness of definition the development of a method of appraisal would be almost impossible; and finally, it appears that all of them may be related closely to or be a direct outgrowth from the seven attributes listed as fundamental. For the present, it would seem better to list these "secondary" qualities with standard definitions, agree that they are highly desirable and include them as a part of leadership education, and leave to the individual the manner in which he can best emulate them or fit them into his leadership personality. The twelve additional qualities follow:

Courage: In the physical sense, a quality of mind or temperament which forces one to resist the temptation to give way in the face of opposition, danger, or handicap. In the moral sense, a resolution of character which implies the ability to stand up in the face of opposition to one's principles and to bear the consequences of such a stand.

Initiative: The aptitude to develop and undertake new enterprises. Militarily, the trait of taking appropriate action when necessary, in the absence of specific orders or instructions from one's superior.

Judgment and Common Sense: The mental faculty of deciding correctly by the comparison of facts and ideas, coupled with a grasp of practicalities and a sense of realities. There is implied a "native" capacity for seeing things as they are without illusion or emotional bias, for making choices or decisions that are sane, fair, and reasonable.

Integrity: Uprightness of character and soundness of moral principle; freedom from moral delinquencies. (Note: Authors are inclined to use this term rather too loosely and apply meanings that are much too all-inclusive to be able to interpret in a definitive manner. It is too broad a term to be used in a specific manner.)

Bearing: The manner in which a person outwardly manifests his personality and breeding. It may imply reference to his mental attitude toward others, his conduct in society, or his characteristic posture or way of holding himself.

Tact: The skill and grace with which a well-bred person conducts himself in his relations with others, whether one's social equals or not. It implies delicate and sympathetic perception, especially of what is fit, graceful, or considerate, under given circumstances.

Loyalty: Faithful in allegiance to one's country. Patriotism is implied in loyalty. In the leader-follower relationship, loyalty is a two-way attribute, faithfulness to the follower and to the next superior leader.

Militance: The fighting disposition, without the suggestion of self-seeking. It implies a devotion to a cause and energetic, self-sacrificing prosecution of its ends. Sometimes erroneously referred to as force and aggressiveness, which frequently combine with self-seeking.

Dignity: A quality which inspires respect and reverence. It implies a certain reserve, a nobleness, or augustness that sets the leader apart.

Imagination: An ability of the mind by which mental images can be formed. It is both reproductive and productive, or creative. Foresight in a military leader enables planning and conception of future operations.

Piety: The quality of a religious man, one who professes and practices a belief and form of worship in the Christian religion.

Prudence: A quality that enables a leader to choose a wise and sensible course of action, implying that such a course will not be followed rashly or inadvisedly.

IT is not too difficult to conclude that the foregoing list of twelve attributes be considered as "secondary," as resulting from or growing out of the seven listed previously as fundamental. Consider for example, *courage*. Cannot this be considered as growing out of the qualities of *character* and *duty*? How can one have courage without a sense of what is right or wrong, or good or bad, and a clear discernment of what should be done coupled with a moral compulsion to do it? Certainly a leader will experience fear at times, but if he has that innate quality of character he can recognize at once that to give way to his fear is wrong and in effect an abdication of leadership. Consider as another example the quality of *judgment and common sense*. Does this not grow out of the quality of *proficiency*? Is it not a product of training and education and experience? It is believed so. The remaining secondary qualities also can be related to the fundamental attributes in a similar manner.

Summarizing, the seven attributes that may be considered as fundamental qualities of a successful military leader are: (1) Proficiency (a) Professional knowledge (b) Knowledge of men (2) Vitality (3) Decision (4) Humanity (5) Character (6) Duty (7) Equity. These qualities and the definitions as given herein represent a composite of the views of 140 officers and enlisted men of the Armed Forces who served in World War II, six distinguished military authors, nine standard words and references representing the research and

analysis of a large number of the nation's best psychologists, and the views of three outstanding civilians who have studied leadership--a clergyman, a business man, and an educator. Effort has been made to limit the writer's contribution to the preparation of this composite view in a manner as objective as is humanly possible. The fact that twenty-seven years of experience as a military officer supports this composite view may contribute in some small degree to the validity of the view.

Only one comment might be added, somewhat in the nature of a lament. The qualities of *loyalty* and *piety* appear to stand rather low on the list of attributes as viewed by such a large number of observers. It may be that the writers were endeavoring to broaden their conception of leadership beyond national boundaries, or it may be that their views reflect a trend of the times. Regardless of how far one might go in speculating on reasons, the writer must admit that, during World War II, personal observation of large numbers of officers and enlisted men gave some cause for concern over the lack of any outward manifestation of a truly patriotic fervor. We did have patriotism in large measure, but there were many individuals, both leaders and followers, more than generally to be expected, who gave convincing evidence of placing self-interest above the welfare of the nation and their fellow-men. As for *piety*, there are many instances that stand out in retrospect where a God-fearing posture on the part of a leader has played a decisive part in solving particularly vexing problems in leader-follower relationships. Indeed history records that it was the God-fearing quality of General Robert E. Lee that inspired the Army of Virginia to heights of glory even in the face of inevitable defeat.

It is possible that these qualities may flow naturally from the seven fundamental qualities developed and defined herein, and to that extent are not fundamental within themselves. In any event, the writer's experience leads to a strong conviction that the two qualities of *loyalty* and *piety* should stand high on any list of attributes to be emulated by leaders who aspire to success, for it has been said that true leadership involves all that is finest in man

and involves all that is best in human nature. This article cannot catalog all the desirable qualities, but has been limited to certain fundamental qualities and definitions to aid in devising means and methods for appraising and selecting leaders for our Armed Forces.

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A nation is subordinated not so much by the pulverization of its armed forces, as by the destruction of the state; that is, the organized will and integrating leadership of the community.

-Herman Finer
America's Destiny (1947)

THE TIME FACTOR IN WAR

Colonel Charles H. Anderson

THE well-worn phrase, "Time is the essence of war," is often heard, but few people have analyzed it in the light of modern warfare. It is believed that the nature of modern warfare demands a reevaluation of the importance of the time factor in war. It is suggested that the time factor be considered as a separate factor to be analyzed, weighed, and thoroughly explored in all its implications.

As late as July 1945, for example, "our overall objective, our overall strategic concept, and the basic undertakings were modified to point directly at the *earliest possible* defeat of Japan!" There seemed to be little or no thought given as to the most efficient way of accomplishing the ultimate objective. Japan at this time was a thoroughly beaten nation, and although she still had large ground forces in the field, allied Air Power and submarines had left them with practically no logistical support. In other words we were in the exploitation phase of the war. The war ended shortly after the date the above decisions were made. Although many feel that the dropping of the atomic bomb was the final blow which caused the Japanese to give up, it is likely that early capitulation would have been achieved with conventional air weapons and the submarine. This method of strangulation might have prolonged the war, but surely it would have been more economical in terms of personnel and materiel than the planned amphibious invasion of the Japanese homeland.

In order to understand the importance of the time factor in war, let us briefly review the part it played in certain selected decisions and campaigns of World War II, and then consider it in terms of the foreseeable future.

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

With the fall of France and the Low Countries in the summer of 1940, Great Britain was left to face Germany alone. Britain had lost most of her ground force equipment and a large number of her first line aircraft and pilots in the battle on the Continent. She needed time to rebuild and reequip her forces. Unwittingly, Germany provided her with this time. The Germans believed that if they won the land battle on the Continent they had won the war; this faulty belief precluded their making any plans for an invasion of the British Isles. But when Britain refused to capitulate, Germany had to plan for an invasion at a later date. This gave Britain time to prepare for the great air battle which followed and which was lost by the Germans because of their inability to properly employ their Air Power. Again badly needed time was gained, time which the British used to great advantage. From a nation defeated in all save spirit, she recovered and went on to contribute her share to the defeat of the greatest military machine ever designed for conquest.

IN June 1941 Hitler attacked Russia without warning. Russia had attempted to buy time by making a non-aggression pact with Germany, but this ruse failed to give her sufficient time to prepare for the conflict she knew could not be avoided. Lacking trained troops and equipment in adequate quantities to carry on a successful campaign in the western areas of her territory, Russia elected to fall back before the hard-hitting German forces. In adopting a scorched-earth policy, Russia destroyed a large part of her most productive territory. She threw large forces into the fray and sacrificed millions of men. What did she hope to gain? In a word--time. Obviously, it was a gamble; but Russia wanted time in which to rebuild and reequip her own forces, and time for her new allies to build and to send her urgently needed equipment. The early onset of winter in 1941 also aided Russia by halting the German advance, thus adding to the time she bought with manpower and land. This time, so dearly purchased, proved to be adequate. The spring thaws brought the anticipated renewal of the Nazi drive, but Russian resistance, stiffened by materiel produced and personnel trained during the respite, proved too great to

be overcome. Hitler lost forever his chance to conquer the U.S.S.R.

When the United States entered the war, the time element was an important, if not the most important, factor which affected the decision to knock Germany out of the war first. Germany was apparently the master of western Europe. She was able to utilize the resources available in the conquered countries. Furthermore, German scientists had the ability to develop new and improved weapons; the more time they possessed the greater would be their chances of developing "secret" weapons.

On the other hand, Japan needed considerably more time to consolidate her newly conquered but widespread lands. Her subjugated territories for the most part contained large natural resources but little industrial potential. Japan's ability to improve old weapons or design new ones was limited. Obviously, there were other considerations affecting the decision to eliminate Germany from the war first, but the time element alone would have dictated this course of action.

That time was of paramount importance in our fight against Germany can be seen when the status of the new weapons she introduced shortly before the war ended is examined. Her jet fighters, for example, were far superior to any the Allies had, but came too late to materially influence the war's outcome. In the hands of inexperienced pilots they were not too effective. The V-1 and V-2, which were not launched against England until after the invasion of *Festung Europa* had begun, were other weapons which conceivably could have changed the complexion of the war had they come earlier. However, the Anglo-American bombing offensive against production facilities greatly delayed their construction. Certainly the snorkle-equipped German submarine would have added materially to our shipping difficulties had it been developed sooner.

Shortly after the war ended, General George C. Marshall said: "Goering stated after his capture that it was a certainty the Eastern American cities would have been under rocket bombardment had Germany remained undefeated for two more years. The first attack would have started sooner." In

Scientists Against Time, James Phinney Baxter warns that, "Given time and sufficient scientific manpower adequately organized to meet service needs, any major industrial power can produce new weapons that will help to tip the scales in its favor." Such quotations as these support the decision to defeat Germany first. Had Japan been the first target, the war in Europe would have been prolonged and Germany could have had the benefit of new weapons which might conceivably have swung the balance in her favor.

TIME not only affected decisions and the strategy and tactics of the war, but also affected mobilization of industry and manpower. American industry had started to convert to war production before Pearl Harbor, although peak production was not reached until the summer of 1944. The aircraft industry is a case in point.

In 1937 the aircraft industry was the forty-fourth largest in this country, employing only 33,000 persons. In 1944 it was the largest industry in the world and employed over 2,000,000 persons in this country alone. This was a phenomenal increase, but it was not accomplished overnight. The first impetus for expansion of the aircraft industry came in 1939 from Britain and France. As a result of contracts with those two nations, some American companies expanded their floor space and facilities. Thus, the aircraft industry began expansion before America entered the war and reached peak production much sooner than would have been possible had it been compelled to rely on domestic orders. Other industries also required a great deal of time to reach their ultimate high production figures.

In the field of research and development American scientists and technologists raced against time. Yet, with few exceptions, the weapons used in World War II were conceived prior to the beginning of hostilities. Once again the aircraft industry provides a good example of the long time required to complete research and development of modern weapons. It has been stated that it generally took four years to develop a new weapon from its inception through the various stages of research, development, testing, and production. However, it took eight years to develop and put

into combat the B-29, and approximately twelve years were required to bring the B-17 from the drawing board to an efficient combat machine. Lieutenant General B. W. Chidlaw, at present, Deputy Commanding General, Air Materiel Command, recently pointed out that there were no American combat aircraft used in World War II which did not have their beginnings in the period prior to the war. The importance of the time element in the development of our weapons and industrial potential could be illustrated by numerous other examples, for time is as important a factor in the production of guns, tanks, and ships as it is in the production of airplanes.

In the training of personnel, time is also important. With sufficient time training can be thorough and complete. During World War II American air crews were not trained to the optimum standards because of the hurry to get large forces in the field. There was quantity at the expense of quality. American concepts of training have been affected by the old "minute-man" heritage, and many are still of the opinion that America can spring to arms overnight. This concept had some basis in the frontier days when every man had a squirrel gun and knew how to shoot it, but technology has changed the picture. Today wars are fought with highly technical equipment which personnel learn to operate efficiently only after months and years of specialized training. In World War II it took approximately three years to expand the Army Air Force training establishment to the point where it could produce the required numbers of trained personnel.

THE impact of the time factor is crucial upon all elements involved in a nation's war-making capacity. In order to clearly demonstrate the full importance of the time factor, the following equation has been developed:

$$C = M + PT$$

"M" represents the *mobilized* war materiel and manpower available for immediate use;

"P" represents the *potential* war materiel and manpower which may eventually become available;

"T" represents the *time* factor;

"C" represents a nation's total war *capacity* or potential.

This is not an exact mathematical formula, for each of the above factors contains innumerable elements, most of which are variables. However, the formula does depict a relationship which exists and is accurate enough for purposes of illustration.

After Pearl Harbor it took this country approximately three years to reach the rate of production and achieve the flow of trained personnel required to successfully prosecute the war. In this instance "T" equalled three years. The comparatively isolated position of the United States, separated from its enemies by large oceans, coupled with the staunch-hearted action of its allies, provided the necessary years needed to convert potential into mobilized strength. But what of the future?

Today, technology has changed the complexion of war. Our ocean barriers and distance are no longer adequate protection against attack. Long-range aircraft carrying mass destruction weapons can attack any point in the world within a few hours of the decision to take such action. Allies, although helpful, cannot hold off such attacks while war preparations are made. Thus the "T" in the equation takes on added significance. If a nation is attacked today without warning and "T" should become or approach zero, it is obvious that the decisive phase of the war would have to be fought with "M"--the forces in being. In other words, total capacity to wage war would approach the means available at the beginning of hostilities. This is an alarming situation. It poses the question, "How can time be bought in a future war?"

At first glance it appears necessary to maintain forces in being and a sufficient stockpile of supplies, equipment, and weapons with which to win the war, at least the decisive phase of the war, without recourse to a potential which cannot be utilized. But the adoption of this line of action is not as simple as it may appear. A potential enemy such as Hitler's Germany could force a nation to continually increase the size of its military structure until it became an unbearable burden. Under such pressure the United States might easily become a veritable armed camp in a state of psychological siege. In short, America would lose the very thing it was trying to protect--its democratic way of life.

Furthermore, all resources would be rapidly depleted in an attempt to maintain such a fortress. A potential enemy nation employing police state methods could build and maintain a large force in being without great difficulty. In a totalitarian state the whole economy can be devoted to the construction and maintenance of armed forces, while individual freedoms and decent living standards are disregarded.

IF it is not acceptable to build and maintain huge military forces capable of defeating any nation or group of nations which might become an enemy, what is the alternative? Certainly the situation cannot be ignored. The maintenance of small, ineffectual military forces would only invite trouble and assure failure in the attainment of national aims. It would seem that the analysis is caught on the horns of a dilemma. But let us take a further look at the situation. Why is this country--potentially the strongest nation on earth--in a worse position today than a possible enemy? Does not the formula apply equally well to all nations? The answer seems to lie in the fact that thinking has not kept pace with technical advancement. Technology has changed practically all aspects of war; now ideas concerning war must also change if we are to remove ourselves from the dilemma upon which we are impaled. It can only be concluded that the formula does apply to all nations alike but that a potential aggressor nation has the advantage of an additional factor--*initiative*.

It follows that the factor of initiative must be added to the formula. To do this national objectives must be definitely and precisely determined. Having decided upon national aims, they must be announced unequivocally to the world, then pursued vigorously and with determination. All means available must be used to achieve the desired ends. This requires taking the political, psychological, and economic initiative. The justification for this action must be clearly explained to the peoples of the world, including the American. America's great economic power should be used to assist friendly nations in every way possible. Conversely, we should actively oppose, by economic and political means, those nations hostile to our national security.

Finally, there must be maintained an air force capable of dealing a decisive blow against any nation or group of nations which might forcefully threaten the national security. To enable the Air Force to take action *in time* requires knowledge of an enemy's intent. This is far from being impossible of attainment; and anything short of complete Intelligence might invite a "Pearl Harbor" many times as disastrous as the 1941 version.

Some may argue that such a policy would lead to war. On the contrary, it is believed that such a course would avert war. Certainly, an open, clearly spelled-out policy, vigorously pursued and backed by appropriate force, stands a better chance of ultimate success than one of vacillation backed by unrealistic and wishful thinking. Times have changed, and our thinking must likewise change.

General Eisenhower has said that a future war may be won or lost in the first sixty days of hostilities. Others have estimated that the decisive phase may be over in as little as twelve hours. Whatever the length, it is unlikely that any nation will ever again be given much time to prepare for a total war once it has started.

It is the battle of material which calls for really total mobilization and for general conscription of all men and their possessions; its importance is such that military operations depend on the rhythm and fluctuations of industrial production. Its influence is felt not only during the conflict, when success often hangs on the speedy completion of designs and manufacture, but also before the start of hostilities: long before the fighting begins a silent battle is raging in the laboratories and factories of each side in an effort to outstrip the enemy in armaments; and if they gain a big enough start, as did the Axis powers in 1939, the first phases of the war are marked by a long series of spectacular successes. On the other hand, if the other side has neither the space nor the industrial means of gaining time for recovery, its technical backwardness may prove fatal.

--F. O. Miksche & E. Combaux
War Between Continents (1948)

EDITORIAL

MAJ. GEN. ROBERT W. HARPER

THE FUTURE will be severe in the demands it will make on Air Force leaders and planners. The problems which will confront them will encompass nearly the sum total of human knowledge and experience. These problems will involve every aspect of our national structure--public health, education, research, trade, industry, transportation --as well as that of the enemy. Thus, they will touch upon many fields of activity far removed from what once was considered the limited province of the military.

It is essential, therefore, that to plan and direct total war, or even a kind of total mobilization for preserving peace, our leaders and planners possess a clear understanding of society in its totality--an understanding of the problems of labor and management, of the effects of economics upon war and of war upon economies, of political systems and philosophies, of national culture and psychology, of the role of science in peace and war, and of the ever-increasing relationship between military and civilian institutions.

In addition to an understanding of these factors, Air Force leaders and planners will require a thorough and intimate knowledge of the concepts and doctrines of Air Power, the strategy and tactics of aerial warfare, and the weapons of their profession. They will also require the ability to form opinions that have breadth as well as vigor; to solve problems through clear, original, and resourceful thought; and to plan boldly, realistically, objectively, without regard for vested interests of any kind, including their own. They will need courage to make decisions, and fortitude to endure the criticism which so often is aimed at those who do make decisions. They will need a fine sense of justice, a skill for organization, a facility for self-expression, and many other attributes.

But, because of what happened in Japan three years ago last August, their most vital need will be for vision that cannot be clouded by doubt, faith that cannot be shaken by fear, and voice that cannot be stilled by duress. For a fuller appreciation of the implications of that event,

however, it would be well to recall what happened in Europe six years ago last August.

On the afternoon of 17 August 1942 eighteen Flying Fortresses of the 97th Group took off from Grafton Underwood. Twelve were to attack the marshalling yard at Rouen, while the remainder flew a diversionary sweep along the coast. General Eaker, the commander of VIII Bomber Command, rode in the lead plane of the second flight of six. It was a small mission, and a year later no one would have paid any attention to it. But this day it commanded the attention of both American and British airmen. General Spaatz was there to watch the bombers take off, and with him were many high-ranking officers of the USAAF and RAF. Everyone shared in the excitement and tension of the moment, for it was indeed a great moment in the history of American Air Power. The USAAF was making its first bombing offensive over Europe.

On this small and highly successful mission the Fortresses of VIII Bomber Command carried much more than a bomb load of trouble for the enemy. They carried a long heritage of debate over the merits of strategic bombardment, and a controversy of many years over the development of long-range heavy bombers. With General Eaker that afternoon rode the spirit of Mitchell. With General Spaatz, in spirit, stood all the great builders of American military Air Power from Greely to General Arnold.

For this small force of B-17s was not only beginning an experiment in strategic bombardment that was destined to affect vitally the entire course of the war; it was vindicating the vision, faith, and voice of Mitchell and his handful of disciples who for twenty years had propounded their strategic and tactical doctrines and defended them against the fiercest opposition and ridicule. The experiment begun on 17 August 1942 became an article of faith as far as doctrine was concerned, and it culminated during the following year in the combined bombing offensives. These involved thousands of planes and tens of thousands of bombs, and eventually caused the complete collapse of Germany and the partial collapse of Japan.

Then, on 6 August 1945, the *Enola Gay* dropped a single bomb on Hiroshima. The appalling power of that bomb destroyed three-fifths of a modern city, precipitated the ending of a

terrible war, and violently disrupted the entire life of a nation. In the smoke and shambles of the stricken city, thousands of people perished. So did many of the doctrines on which the raid over Rouen, three years before, had focused so brilliant a light.

Much of the work of Mitchell and other visionaries and missionaries--for that is what they were considered--will therefore have to be done over again. For atomic warfare new concepts of Air Power will have to be formulated, new tactics evolved, new equipment designed, and new methods developed. Many of these burdens have fallen upon Air Force leaders and planners.

This is a good assignment but not an easy one. From time immemorial the lot of visionaries and missionaries--for our leaders and planners too will be regarded as such--has been difficult. They too will encounter opposition and ridicule, subtler perhaps but no less fierce. They too will be sorely tempted at times to abandon the fight and recede into the shadows. But men endowed with vision and gifted with voice may not do this. They have a sacred obligation to fulfill, a tremendous responsibility to discharge, and a prodigious task to accomplish.

This obligation, responsibility, and task might well be expressed in words from the *Book of Habakkuk*. In it the Lord bade the prophet to "write the vision, and make it plain upon tables, that he may run that readeth it. For the vision is yet for an appointed time, but at the end it shall speak."

Our leaders and planners must write *their* vision. They must write it so plainly that "he may run that readeth it," yet clearly understand it. And they must not be discouraged if the vision to which they give voice one day is not accepted the next. For their vision, like Mitchell's, may be "for an appointed time, but at the end it shall speak."

When the time does come for it to speak, though, their vision must be right, whereas Mitchell's could have been wrong with far less disastrous results. Had his vision been proved wrong on 17 August 1942 the worst that might have happened would have been the creation of a stalemate. But should the vision of our leaders and planners be proved wrong on some future August 17th, the result might well be the sudden and utter destruction of our country and way of life.

AIR ANTHOLOGY

BOMBING BERLIN

By a Squadron Bombing Leader

September 1940

This officer joined the R.A.F.V.R. on May 2nd, 1939, being called up on September 1st, 1939. He took a navigation course until Christmas, 1939, up to that time being a Leading Aircraftman. He then went for a bombing and gunnery course. Commissioned on the completion of this course, he was given intensive training in navigation and bombing. He was posted to his squadron in the middle of June this year. He has made six operational trips as navigator and bomb aimer. His official title is squadron bombing leader, and his duties include that of maintaining the bomb aimers in efficiency and knowledge of all new ideas and improvements.

I MADE my first trip to Berlin the other night. Before that I had been over France a few times, when the Jerries were walking through, and I had made the trip to the Ruhr and to Milan. Berlin was a job I really wanted. Of course, I had no real say in the matter at all: it was just luck. The choice lies with the commanding officer. Anyway, I struck lucky. Lucky, because I am not a regular member of any particular crew. So far I haven't flown in the same crew twice. That happens, as I am the squadron bombing leader, and change about a great deal.

That afternoon, we were given our targets and general instructions, and between the briefing and the time of take-off we worked out the details. Soon after dinner we took off, just as day was giving way to night. The light was failing fast as we started on our six hundred and fifty mile outward journey, and by the time we had crossed the odd two hundred miles of sea and reached the enemy coast it was dark.

We had a favourable wind and saw nothing for the hour and three-quarters that we spent crossing the sea. There was a lot of cloud below us, which began to clear as we approached

the Dutch coast. There we ran into intense anti-aircraft fire. Heavy bursts in the distance at about twelve thousand feet, with continual flashes, which looked like lightning. It wasn't reaching us and we wondered who was getting the benefit of it. Other aircraft were ahead and it looked as though the gunners were concentrating on them.

From then on, there was nothing at all, until we were over Emden, when searchlights began to show, and to hunt about in the sky. They failed to locate us, and we went round them, dodging trouble.

The captain took over from the second pilot. It is not a difficult operation, changing over, although some people seem to believe that it is like rocking a canoe. All that happens is that the second pilot gets the aircraft dead straight, flying level, slips out of his seat, and the captain moves in.

The rest of the run to Berlin was uneventful. We were there about twenty minutes before midnight.

Searchlights came on, quite a lot of them, and flak. There seemed to be a solid rectangle of brilliant light in the sky. It wasn't coming our way--then, but was making things as difficult as possible for the others who had left a quarter of an hour earlier and were already over the target.

When our estimated time of arrival suggested that we should have arrived, we headed for the searchlights and dropped a flare to see what was below us. We spotted a river, and I had a look at the map to see if it was the one we wanted: there are several stretches of water there. While we were trying to identify it, we were picked up by searchlights at seven thousand feet. They held us, and we moved pretty rapidly, taking very violent avoiding action to get away. We got away, and again dropped flares to pin-point our position. In fact we repeated that operation several times and were again caught by searchlights and heavy anti-aircraft fire. Some of the bursts came too close to us to be comfortable, but we thought we had escaped. I know that we flew through big black balls of smoke that looked like balloons. They were only smoke.

Cloud made it hard to identify the target, and gave us a jolt once. We thought a squadron of aircraft was flying over

us. There were silhouettes in the light, very clear and very sharp. They were our own shadows thrown on to the clouds by the searchlights. A very strange sight, and a very strange feeling, that.

For an hour and a half we flew around trying to make sure. Of course we could have unloaded on Berlin at any time we liked: but--as you know we don't do indiscriminate bombings.

The exact spot still eluded us and the captain decided to come round the searchlights and make a low level attack. So we descended to one thousand feet--over London that would be a few hundred feet above St. Paul's.

We saw fires to the east, caused by other aircraft, and followed the river towards them to come over the target area again, and into a curtain of flak of all colours and descriptions.

We reached the fire, which was now blazing well, and easily recognised the Siemens-Schuckert Works, with railway sidings alongside. We dropped a long stick of high explosives and incendiaries at a little over one thousand feet.

The searchlights were nearly horizontal by now, and the anti-aircraft fire really hot. We could imagine the gunners frantically turning the handles, trying to get their guns to bear on us. Streams of green tracer shells were hosepiping over us as we took evasive action to get away from the target. The captain put the nose down, and we came well below that one thousand feet.

The rear gunner had meanwhile reported the bursts of our bombs, with fires and explosions in the works as a result. There was a good fire going in the centre, and we had bombed alongside it. Some of our heavy stuff must have landed on the railway. We couldn't miss from that height.

All we could do was done, so we climbed through the clouds to 12,000 feet, and turned for home with the engines running smoothly.

Coming home, there was not much opposition, and the crew had time for a little relaxation--with hot coffee and biscuits--and perhaps forty winks for some.

The wireless operator was exploring the fuselage and came forward again with a wide grin and his hands full of pieces of aluminium to tell us tales of a large series of holes we had collected over Berlin.

Against the wind we made the North Sea, and flew into the dawn. The wireless operator grew excited again, pointing out quite a large hole in the wing.

Reaching home, the captain spoke to the ground and wished them good morning. We touched down after ten and a quarter hours in the air, had a look at the machine, and found enough holes to give the riggers a spot of work for a while. Nothing had struck a vital part: but another six inches and they would have got the petrol tanks, and then we might have come down somewhere else.

That was that. Then we had our interrogation on the trip; after which we were ready for breakfast and bed. It was a good twenty-four hours since we had been there, but we had had an enjoyable trip between times.

--The Airmen Speak, Edited by
Wing Commander Bentley Beaman.
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Before the age of Air Power the defense of a strategic area was usually a matter of placing heavy guns to command its approaches and then confronting the attacker with superior fire power from protected positions. The Maginot line was constructed on this theory. The areas strategically important to the exercise of Air Power, however, can be defended only to a limited degree by placing superior fire power in the form of interceptor aircraft and antiaircraft artillery to command the approaches to the strategic area. In World War II it was clearly shown that a determined attacking force cannot be stopped short of its target. On many occasions losses were inflicted that could have been prohibitive if they had been suffered over a sustained period, but Air Power showed itself always to be capable of reaching its objective and attacking it. While defensive Air Power can do much to minimize the effectiveness of an aerial attack, the present capabilities of air weapons do not alter this World War II lesson. The defense of the Arctic approaches to the United States, therefore, cannot rest solely upon fast interceptor fighters and the artillery that would help to defend their bases. The ultimate defenses available to the United States for protection from aerial attack from over the top of the world lies in the maintenance of a striking-force-in-being that could answer aerial aggression with a smashing retaliatory attack.

--Gen. Carl Spaatz, Chief of Staff, USAF
Report to the Secretary of the Air Force (30 June 1948)

FOREIGN HORIZONS

AIR MAGAZINES OF THE WORLD

Translated from an Editorial in *Aeronautica* (Venezuela) January 1948.

AS we begin this new year of 1948--our fifth in existence as a magazine exclusively dedicated to the interests of American aviation and the interests of friendly nations beyond the Western Hemisphere--our first wish is to offer a particularly hearty and cordial greeting to all the aeronautical magazines of the world that regularly arrive at our exchange department. For this reason, we have dedicated our honorary front cover to the following colleagues:

Argentina: *Aero-Mundial*; *Mundo Aeronautico*; *Avia*; *Aeronautica*; *Amsa*.--Belgium: *Sabena-Revue*.--Brazil: *Esquadilha*; *Aviacao*; *Guia Aeronautico*; *Panair em Revista*; *Aerosul*.--Canada: *Aircraft and Airport*; *Canadian Car Journal*; *Boletin de la I.A.T.A.*; *Boletin de la O.A.C.I.*; *Phil Glanzer News Service*.--Colombia: *Aero-Vias*.--Cuba: *Revista Aerea Cubana*.--Chile: *Aeronautica*; *Revista de la Fuerza Aerea*.--Spain: *Aeronautica*.--United States: *Air Transport Association of America*; *American Aviation*; *Flying*; *Martin Gram*; *Military Review*; *Aviation Week*; *C.A.A. Journal*; *Douglas Airview*; *Western Flying*; *Skyways*; *U. S. Air Services*; *Revista Aerea Latinoamericana*; *Air-Sea Rescue*; *Aviation News*; *Aero Digest*; *Air Pilot and Technician*; *Air Transport*; *Boeing Magazine*; *Ryan Aeronautical Company*; *The Martin Star*; *Aviation*; *Service Bulletin*, *Pratt & Whitney Aircraft*; *The Pegasus*; *Air Transportation*; *Aviation Maintenance & Operations*; *Air Force*; *Aero Products*; *Air World*; *United Airgram*; *U. S. Department of Commerce Civil Aeronautics Administration*; *Curtis Flying*; *Aviation News and Views*; *El Ingeniero de Aeropuertos*; *Inter-American Escadrille*; *National Aeronautic Association*; *Trade Winds*; *Fairchild*; *American Aviation Traffic Guide*; *The Bee-Hive*; *Beechcraft News*; *Pilots & Mechanics Association*.--France: *L'Air*.--Great Britain: *Flight*; *The Aeroplane*; *Aero-*

nautics; *De Havilland Gazette*; *The Society of British Aircraft Constructors Ltd.*; *The Light Plane*; *Handley Page Bulletin*; *Hunting Aviation Review*; *News Review Vickers-Armstrong's Ltd.*; *Shell Aviation News*; *Bristol Press Bulletin*; *Central Office of Information*.--Italy: *Revista Aeronautica*; *Alata*.--Mexico: *Caminos del Aire*; *Anahuac*; *Publicacion del Departamento de Aeronautica Civil*; *New Horizons*.--Peru: *Boletin del Primer Agrupamiento Aereo*.--Switzerland: *Inter-Avia*.

The above mentioned publications, which come to us from throughout the world, have only one shortcoming: There is a need to coordinate the efforts of each to secure the greatest benefits for all. With their periodic publication as specialized magazines, they are of great value to all phases of the aviation field. They serve as a means of information exchange between nations linked by common interests and cultural traditions.

Thus, in the magazines on our exchange list, airmen in the different branches of aerial activity of all nationalities give complete information on everything that is being done in the aeronautical field. Now that hostilities are over, these publications are on the job applying to the arts of peace the lessons learned during the war. The contribution of these publications is most significant, for wherever they circulate they help improve the airman's knowledge and efficiency. Also, as a result of their vital information, they contribute to the birth of a fraternal understanding among the men dedicated to aeronautical science.

It is not enough for one to merely understand the simple mechanical functions of landing on a runway geographically far removed from the take-off point. Before this is achieved, one must have an ample background of aeronautical knowledge. A simple mechanical invention may, because of lack of general interest, go unnoticed by the public. But this will not happen as long as there exists an intellectual interchange of aeronautical information. The publications, toward which we render today a deserved homage of recognition, ably fulfill that function.

They are the best messengers of the true meaning of the conquest of the air by man. This exchange makes for a better

and more sympathetic appreciation of our problems. It is the human approach by which are being erased the conventional phantoms that kindle in the world the fires of destruction.

These publications, with their periodic arrival at numerous and distant editorial offices, where at the same time other magazines start backwards on the route traveled by their colleagues, carry their message of faith and solidarity, and bring readers closer together in interests and hopes more quickly than does the fastest plane that man has ever created.

With these firm beliefs, derived from our experience of the past five years, and in an effort to maintain and intensify this work, we now make a sincere appeal to both our old and new colleagues: Let us initiate a systematic campaign to support this educational exchange; let us establish a competition of enthusiasm so as to insure the greatest circulation of our publications with a view to enhancing the mutual understanding so necessary during this present era.

There should be maintained a thorough and complete file regarding the aeronautical development of each country. Each publication should be a true and exact reflection of both its own and other countries' aerial activities.

To this end we wish to form a World Association of Aeronautical Writers. Each country containing publications of the kind mentioned would be represented. This shall be a purely cultural and non-political body whose goal shall be the coordination of all aeronautical information in the world.

Now, then, our editorial offices await the response from all the world's aeronautical writers to this first appeal. In succeeding editions of *Aeronautica* we will publish all correspondence relative to this subject and additional information regarding the planning and progress of the proposed organization.

In closing, we must not forget the fallen heroes of world aviation, for by their sacrifices the most outstanding scientific progress has been made. We have always felt that these fallen heroes act as a beacon in a stormy sea, guiding the pilot and his ship laden with hopes to a safe port.

THE BATTLE OF BRITAIN THROUGH GERMAN EYES

Reprinted from *The Aeroplane* (London), 1 October 1948.

AFTER eight years, it has become possible to assemble a considerable amount of data on the Battle of Britain from the German point of view. It is most unlikely that the full story will ever be published--the intrigues and political follies which did so much to assist us in the fateful battle--but we can at least reconstruct much of the progress, or lack of it, in the Luftwaffe's operations against this country. This account has been composed from all the information from German sources so far obtainable.

In order to obtain a complete picture of the state of the Luftwaffe at the beginning of the Battle, it is necessary to look back to 1937, when the first elements of Germany's Air Force were given operational experience in Spain. The Kondor Legion, which was assisting Franco against the Republicans, was composed at that time of about 120 aircraft and was in effect a self-contained Air Force, with fighters, bombers, ground attack and reconnaissance aircraft, and flak and communications units. Later, the organization became more complex, and by 1939, most instructors at Luftwaffe training schools in Germany had had operational experience.

Such older aircraft as the Heinkel 51 and 59, the Henschel 123 and the Junkers 52 and 86 were later supplemented by the newer breed of cantilever monoplanes, including the Heinkel 111, the Dornier 17, the Junkers 87 and the Me 109. These latter aircraft were, of course, infinitely superior to the motley collection of Republican aircraft, and the organization and efficiency of the Kondor Legion also led to the virtual control of the allied Spanish and Italian units. The German General Staff in Spain thus gained valuable experience in operational policy, to the detriment of German/Spanish relations.

Used at first for bomber escort duties, the Heinkel 51 was soon found to be too slow for air combat, and was relegated to ground attack, carrying 10-kg. bombs below the wings. The Messerschmitt 109A, B and C single-seat fighters proved quite satisfactory in operation, although it was not until the later stages of the Civil War that R/T control

between ground and air units came into service. One of the most immediate lessons was that the original armament of two 7.9-mm. machine-guns of the Me 109 was inadequate, and this was later rectified, first by the installation of a 20-mm. cannon, and then its replacement by two wing-mounted cannon or machine-guns.

Tactical experience also showed that the conventional tight Vic formation of fighter units was impracticable with highspeed aircraft, and loose formations were soon adopted. The organization of fighter units was then established as four "Staffeln," each of twelve aircraft, comprising a "Gruppe." Operational formations were then based on a "Schwarm" (four aircraft), comprised of two "Rotten" of two aircraft each. These principles, which were evolved from the experience of Galland and Moelders, were adapted with typical Teutonic thoroughness, and when used by well-trained and disciplined pilots were quite successful.

So far as the bombers were concerned, the Junkers 52/3m was replaced in 1938 by the Dornier 17 and the Heinkel 111, though it remained in service as a transport. The Junkers 86 was used in small numbers for a short time, but, like all other bombers, only for daylight operation. With occasional exceptions, all night bombing was done by the Heinkel 59s of the Sea Reconnaissance Unit. These obsolete biplanes were later used by the Germans in the Channel as Air-Sea rescue aircraft, and for rather more nefarious purposes for which the Red Cross markings stood them in good stead.

The general successes of the Heinkel 111 and Dornier 17 in bombing operations convinced the Germans that because they were sufficiently fast to outstrip most Republican fighters, heavy armament and armour could be dispensed with, and it was this mistake perhaps more than any other that cost them the Battle of Britain. The operational personnel had become aware of this fallacy by bitter experience when attempting unescorted bombing operations, but, as happens so often, the Staff were blissfully unaware of reality.

Supplementing the Henschel 123, the Junkers 87 first went into service in Spain in 1937, where as a strategic weapon it achieved a fair amount of success, against limited opposition. Under similar conditions, although operating

tactically, the notorious "Stuka" became a household word in the Battles of Poland and France--so much so that it impressed not only the Mother of Parliaments, but also the German General Staff.

There, then, is the setting for the first air battle of real consequence. From 1937 until the Summer of 1940, the Luftwaffe had been lulled into a false security by a string of successes with a weapon which had not encountered any formidable opposition. Working on the precepts evolved from the experience of the Kondor Legion, the Luftwaffe had comfortable clashes with the French in their tight formations, and, to a lesser extent, with the British during the Winter of 1939. Dunkirk led to some fierce air fighting and heavy losses to German bombers, but if anything it was a sideline for the Luftwaffe, which was largely engaged elsewhere.

DURING the lull before the storm almost all of the fighter, and two main bomber forces of the Luftwaffe were deployed in Luftflotte 2, under Generalfeldmarschall Kesselring, and Luftflotte 3, commanded by Generalfeldmarschall Sperrle, in the North of France. There were about 1000 fighters, and roughly half that number of bombers. Their task was to gain the air superiority necessary for the invasion of England, and to eliminate British sea power by the destruction of ports and shipping. Previous accounts of the Battle have accentuated the part of the bombers from the very beginning, but it is fairly evident that the Luftwaffe realized the strength of Fighter Command, and therefore in order to conserve its bomber strength, the first formations of aircraft to appear over Britain on July 10, were German fighters. Flying up to about 25,000 ft., these formations were intended to draw British fighters into combat under adverse conditions and at first met with some success. The German Air Staff were quick to notice how soon the R.A.F. changed from tight formations to a more tactically manageable development.

Fighter Command, however, soon refused to be baited, and it was then, on August 8, that small forces of German bombers, usually comprising individual Gruppen with large fighter escorts, began decoy raids on shipping and coastal targets.

The first large air battles ensued in consequence, and because of skillful ground control, the Hurricanes and Spitfires were often able to evade the high-flying escort and inflict heavy losses on the German bombers, which in theory were to have made their way quietly home with a nominal escort, having lured the R.A.F. to battle.

To a certain extent, this was countered by the provision of close escort fighters but the Luftwaffe, or rather Goering, made its own tactics negative by prohibiting these fighters from leaving the bomber formations to give combat. The "early warning screen" around Britain also allowed Fighter Command to obtain the maximum endurance from its aircraft which were able to pursue the German formations back across the Channel. A proportion of the Luftwaffe fighter strength thus had to be diverted to meeting returning bombers.

In addition to active defence, radio counter measures against the German "X" and "Y" beams, and the "Knickebein" system, which were used for navigation, caused a certain amount of confusion, while R.A.F. fighters were also vectored onto formations by the beams.

After the unsuccessful attempt to destroy Fighter Command in the air which had frittered away much of the Luftwaffe's strength, the attack was changed to fighter aerodromes and production centres on August 24 by Goering, who consistently interfered with Staff policy. During this third phase, German bomber formations were composed of about 80 aircraft with about three times that number of escort fighters. With the continued frustration of attacks, the centralized Command, which had never laid down a clear overall plan for the operation, steadily deteriorated; for instance, complete bomber formations were often left without escort. This is where the Hurricane really came into its own, for although its effectiveness against the Me 109E was limited through a maximum speed of only slightly more than 300 m.p.h. the shattering fire-power of eight 0.303-in. machine-guns, which it shared with the Spitfire, literally tore the unarmoured bombers to shreds.

Both the Hurricane and Spitfire were more manoeuvrable than any German aircraft used in the Battle, but above

20,000 ft. there was little to choose between the Spitfire and the Me 109E, which was usually armed with two 7.9-mm. machine-guns firing through the airscrew disc, with 1,000 r.p.g., and a 20-mm. cannon in each wing with 600 r.p.g. The Me 109F came into service during the later stages of the Battle, with extended wing tips and a high-altitude engine, but some trouble was experienced with the cantilever tail-plane and several cases of structural failure occurred.

Perhaps the biggest failure was the vaunted Me 110, which had first featured in Zerstoerer units during the Battle of France. There they had a little success, but as soon as they encountered R.A.F. fighters during the opening stages of the German fighter sweeps, their losses mounted. Although fast and fairly well armed, their lack of manoeuvrability made them extremely vulnerable to the nimble Hurricane and Spitfire Squadrons, and the Me 110s were usually reduced to flying in small circles for mutual protection from the rear. Eventually, the Germans were even forced to use Me 109s to protect formations of Me 110s!

Among the bombers were the Ju 87B, the Do 17P and 17Z, the Do 215, the He 111H and 111P and the Ju 88A. Of these, the Ju 87B was the most useless, having bus-like flying characteristics and a feeble armament, and it was duly shot down in scores by the Hurricanes and by light A.A. fire. The Dornier 17 and 215 breed were very similar, having neither the speed, armament nor load to be really efficient. The Heinkel 111 was comparable with the Blenheim of that period, but again suffered from lack of armour and armament. By far the best aircraft was the Junkers 88, which remained one of the finest German aircraft of the War. There is no evidence to show that the so-called Heinkel 113 was ever used by the Germans in the Battle of Britain or in any other operation.

It was apparent to the Luftwaffe during this third phase that their attacks on R.A.F. aerodromes were effective, although heavy losses were encountered. Goering chose to assume that complete air superiority was his, and that the time was ripe for the great attack on London and other strategic targets, despite the fact that fighter resistance was actually increasing.

On September 7, the daylight bombing offensive was launched by massed formations of bombers, with close escort and high fighter cover. The difficulties of making a successful rendezvous over the French coast for the bomber and fighter formations were accentuated by poor ground control, with the result that precise co-ordination became almost impossible. Because of the limited endurance (about 1 1/2 hours) of the escort fighters, which by then were almost equalled in numbers by the bombers they were supposed to protect, the formations could not afford to make diversionary approaches to the English coast, and their interception was that much simplified. The escort fighters were still bound to stick very closely to the huge bomber formations by Goering's orders, which destroyed the initiative of action so essential to fighter combat. The bomber pilots were most insistent that the fighters should keep as close as possible to them, but above 20,000 ft., at which the straggling bomber formations flew to reduce the risk of flak, they were so slow and cumbersome that the fighters found it most difficult to maintain position. Thus the whole unwieldy mass of German aircraft, often 10 miles long, had to await the pleasure of the Hurricanes and Spitfires, with disastrous results.

Occasionally, through sheer weight of numbers, the attacking aircraft broke through, and created a fair amount of damage. The ethics of their bombing came under great criticism at the time, but we ourselves attacked precisely similar objectives later in the War, although perhaps with slightly different motives. German losses during this period, from September 7 to 30, reached the peak of 435 aircraft, which from the point of view of a prolonged attack were absolutely prohibitive. These losses were increasingly due to the weather, which disrupted the organization of formations in the air, and generally reduced effectiveness of the striking forces. Operational fatigue was rife among the remaining crews who had been flying since the end of July often on more than one operation per day without adequate rest. It had been found absolutely necessary to allow one day's rest in five to operational crews. As there seemed no hope of overwhelming Fighter Command, daylight bombing was called off. Hence by September 30 the Battle had been won.--J.E.F.

Airman's Reading

The German Generals Talk, by B. H. Liddell Hart (Wm. Morrow, \$4).

Reviewed by

Major Max Van Rossum Daum

THE well known British military commentator, B.H. Liddell Hart, gives herein a vivid first-hand picture of Hitler's military attainment as seen by his senior generals. Two-thirds of this compact volume are devoted to the opinions and criticism of many top German generals on the events of World War II.

Beginning with a concise description of the resurrection and training of the German Army during the years before Hitler, the author traces the influence of Hitler and the Nazi Party on the subsequent development of the Army and its General Staff. Since these accounts are based on long talks with captured German generals, they represent recent history from a German point of view. As such they have historic value even after official documents are published.

Perhaps the most interesting parts of the book are the characterizations of Hitler as a general by his military leaders. Outstanding among these is the one by Kurt von Manteuffel, one of the best young generals, who commanded the Fifth Panzer Army during the Ardennes offensive. Manteuffel is reported to have said of his Fuhrer: "Hitler had read a lot of military literature and was also fond of listening to military lectures. In this way, coupled with his personal experience of the last war as an ordinary soldier, he had gained a very good knowledge of the lower level of warfare--the properties of the different weapons; the effect of ground and weather; the mentality and morale of troops...on the other hand he had no idea of the higher strategical and tactical combinations...."

"Moreover, he had a tendency to intoxicate himself with figures and quantities. When one was discussing a problem

with him, he would repeatedly pick up the telephone, ask to be put through to some departmental chief and ask him: 'How many so and so have we got?' Then he would turn to the man who was arguing with him, quote the number, and say: 'There you are'--as if that settled the problem...."

Hart's own conclusion is that Hitler was far from being a stupid strategist. According to Hart, "he had a deeply subtle sense of surprise, and was a master of the psychological side of strategy....He recognized the potentialities of mobile armoured forces sooner than the General Staff did, and the way he backed Guderian, Germany's leading exponent of this new instrument, proved the most decisive factor in the opening victories."

A highlight of this work is the description of a Russian advance and the German evaluation of the abilities of the Russian soldier and his weapons. General Dittmar, High Command radio commentator, told Hart that the Russian's chief asset was "what might be called the soulless indifference of the troops--it was something more than fatalism...."

There are startling explanations for the "miracle" of Dunkerque and Hitler's apparent indifference to "Operation Sea Lion," as the operation for the invasion of Britain was termed; also, a significant paragraph on the effect of the "unconditional surrender" policy in prolonging the war.

It seems a pity that this analysis of the problems of German generals omits the generals of the *Ober Kommando der Luftwaffe* (O.K.L.). General Koller, its last Chief of Staff could have supplied the author with some very illuminating observations on the manner in which German Air Force strategy was restricted, and on the thrice cancelled attempts to start a strategic air offensive on Soviet target systems. Or, General Galland could have given some insight on Hitler's personal interference in the development and operational employment of the deadly jet fighter, the ME-262.

Hitler's flagrant misuse of his air weapon would refute Hart's conclusion as to Hitler's ability to be "quick to spot the value of new ideas, new weapons...." The opinions of top German Air Force generals, many of whom were available at the war's end, could have helped to round out this appraisal of Hitler's attainments as a military strategist.

In spite of these shortcomings this volume represents an excellent source of material for the military student. It is easy to read and contains many lessons, not least of which are the limitations imposed by a police-state dictatorship on the military conduct of a major war.

In common with many recent studies on the aspects of World War II, Liddell Hart's book strengthens the conviction that modern warfare, in spite of its high degree of technological development, depends on human evaluation and human decision for its successful employment.



Road to Survival, by William Vogt (William Sloane Associates, \$4).

Reviewed by
Woodford Agee Heflin

THE steady destruction of the earth's food-producing soils, upon which an overpopulated world depends for life, is the subject of this book. William Vogt, its author, is obviously an authority upon his subject, which he establishes by the breadth of his own observations, by the knowledge he displays of complicated and difficult facts, and by the soundness of his judgments.

The method of approach is, for lack of a better word, scientific. That is, examination of the earth's soils, of the various crops raised from one land to another, of the capacity of grasslands, of the trends in the water tables, of the ebb and flow, and death of wildlife, of the decline and extermination of our forests--this examination is direct and factual, and made in detail sufficient to establish, beyond reasonable doubt, that man through ignorance, avarice, and indifference is rapidly destroying the only means by which he supports his own life.

In Peru, for instance, a corn crop not contoured to the hillside on which it is planted, starts erosion that carries rich soil into the sea; in Guatemala the progressive, or milpa, system of agriculture continues to reduce the forests to firewood and bring erosive destruction to the land; in the southern states of our own country, cotton and tobacco

planters once mined their lands in three or four years, leaving to their descendants a worn-out economy and poverty; in the state of Oaxaca, Mexico, the relentless felling of forest trees dessicates wells and springs, certain to make the entire state a desert in fifty years; in Australia the over-grazing of grasslands begets the dust storms that carry precious soils a thousand miles into the Tasman Sea; in the Halls of Congress the Soil Conservation Service receives a healthy cut in appropriations, and the western cattleman is thus given the green light to take over the highland grasslands; in the *Washington Post* a headline dramatizes the Marshall Plan, "Iowa Paying in Soil for Nourishing World."

Thus through a long, but dramatically interesting, catalog of facts and events, the author details the forces at work upon the land. Out of these facts comes the inescapable conclusion that the present standards of human life, whether high or low, within the United States or elsewhere, are, in fact, sustained by the expenditure of resource capital. Should this process of expenditure not be halted, the destiny of man is starvation.

Fundamentally the last two wars in Europe were caused by overpopulation, in terms of the carrying capacity of the land supporting the people who live there. And in 1946, Count Carlo Sforza of Italy cried, "We are overpopulated. We cannot possibly feed so many mouths!" In India, China, Java, San Salvador, and Haiti, the depths of human misery resulting from overpopulation are already demonstrated; and in the United States we too will suffer the pangs of overpopulation, a fact not so generally seen as in India and China, because of the existence of our resource capital, upon which we freely and recklessly draw, not to feed ourselves alone but a large portion of the outside world!

The reader of this book cannot fail to be impressed and sobered. Vogt believes that disaster can yet be avoided, but only by the most resolute action based upon reason and understanding. "The first step...is a clear statement of the problems." Then research, education, and action must follow. Conservation must be observed by every human being, and failure to observe it must be treated as a crime. Aid to overpopulated and war-torn areas must be accompanied by an

attempt to check breeding, and populations of every nation must be reduced--reduced to the carrying capacity of the land.

Because of this book the reader may come to reappraise his values and revolutionize his thinking. To the four freedoms, he may add a fifth: "Freedom from excessive children." To those already admitted to the Hall of Fame, he may add Charles Goodyear and Margaret Sanger. To the billions now spent for defense, he may add other billions, first, for conservation and second, for the systematic, humane reduction of the world's population. Unless he does these things, it would seem that he cannot hope for the continuance of civilized life.



Of Flight and Life, by Charles A. Lindbergh (Scribner's, \$1.50).

Reviewed by

Major John J. Driscoll

MOST who experienced certain psychological changes induced by World War II combat will recognize and understand the evolution of Lindbergh's sense of values. Often after a combat operation involving a "close call," or the loss of a fellow airman, one experiences a complete metamorphosis in his outlook on life. There arises a new appraisal of values characterized by an almost utter disregard for material interests. Similar moral awakenings have undoubtedly occurred during crises throughout history. In the present age, however, our moral status tends to become subordinate to technological efficiency. Nevertheless, the need for ethical reevaluation reaches its peak of importance in this atomic era--for we now face the potential devastation of all civilization.

Lindbergh underwent a series of evolutionary changes in his personal outlook during the experiences he describes in the first half of this book. In this section he shows that modern man needs not only science but also religion in order to survive. He describes a marked personal metamorphosis after a "close call" during a high altitude P-47 research flight in 1943. The following year, while piloting a P-38 on

a combat mission in the South Pacific, he underwent a further assessment of his spiritual values when he again narrowly escaped death. His recognition of the problems inherent in scientific materialism reached its peak of clarity when in 1945 he surveyed the destruction of Germany's civilization.

From the abundance of postwar discussions and writings it is evident that many people have recognized, at least faintly, the need for a reappraisal of our ethical standards. Lindbergh, however, has done much more than just recognize the problem; he has analyzed it *and has pointed toward a solution*--"that modern man must direct the material power of his science by the spiritual truths of his God."

In the second half of the treatise Lindbergh discusses possible solutions to our dilemma and includes an excellent analysis of the problems of world government. However, he sharply emphasizes that there is no materialistic solution, no political formula which alone can save us, for "our salvation. . . lies in the balanced qualities of spirit, mind, and body of our people."

Ever since his memorable 1927 flight, Lindbergh has proved to be a keen analyst. But somehow his advice has generally gone unheeded by the public. His unbiased appraisal of the strength and technical superiority of the prewar *Luftwaffe* was spurned by many egotistical Americans. He has never been publicly credited for the use of his evaluations by our military intelligence, even though later studies proved them highly accurate. Lindbergh clearly realized and early defined the urgency for careful consideration of the potential postwar situation, a factor almost utterly neglected by our political and military planners. His prewar recommendations to allow Hitler and Stalin to pursue their intentions of exterminating each other, and his wartime pleas for a negotiated peace rather than a victory based on unconditional surrender, have proved valid in the light of recent events.

Once again Lindbergh sets forth a thesis on a problem of inestimable importance. The idea is difficult of communication, but he has recognized, defined, and analyzed in a courageous manner the vital question of what lies ahead. In a concise and well written account of only fifty-six pages,

he advocates a moral and spiritual insight if we are to save Western civilization. "It is this spark a man or a woman can contribute--must contribute if our civilization goes on--the embryonic power, the intelligence, the unity with God for which there is no other source." Charles A. Lindbergh, instead of being just a voice crying in the technological wilderness, should be heard.



Latin America: Continent in Crisis, by Ray Josephs (Random House, \$4.50).

Reviewed by
Raymond Estep

IN diary form the author reports the story of his six-months' (June 8, 1947 to January 14, 1948) tour of eleven Latin American nations. Among the countries visited were nine republics of South America, and Cuba and the Dominican Republic in the West Indies. The author's sojourn in the various countries varied from nine days in Ecuador to thirty in Argentina and thirty-four in Brazil. He visited several cities in each nation and consulted with leaders of many groups and political parties. In general, he gives a hasty review of the various political alignments in each country, describes the national leaders, estimates the strength and organization of the local Communist parties, attempts an evaluation of the influence of the Roman Catholic Church, discusses economic problems, reports on the Latin American attitude toward the United States, and sketches progress in the fine arts. The concluding chapter, dated Washington, June 4, 1948, recapitulates the revolutionary disturbances accompanying the Bogota Conference of March and April 1948.

The title of this work is erroneous in statement and implication. Latin America is not a continent. If the author had meant "South America," with which most of his work is concerned, he should have so indicated in his title. From the original misstatement, the author moves to the "Prologue," where he announces that his prospective journey will be "the first, so far as I know, to chart the postwar picture in every major country in Latin America." He then proceeds to

omit Mexico, Paraguay, all of the Central American nations, and Haiti. The omission of Mexico from the list of major countries of Latin America is not explained, and no mention is made of Paraguay, although the author visited all of her neighbors. One of the serious inadequacies of the volume is the almost complete absence of information on the historical background of the countries discussed.

The volume contains 492 pages packed with information, but it is sometimes difficult to separate fact from fiction. In spite of the statement by the author that "casual glances, particularly in Latin America, are deceiving," much of his diary falls into the category of a "casual glance." Among the more obvious factual errors are the following: the author states (page 6) that he could see the Caribbean from his room in Hotel Nacional in Havana--he probably meant the Gulf of Mexico; that Pizarro founded Lima in 1585 (page 154)--the date was 1535; that the United States recognized Brazilian independence in 1822 (page 455)--actually it was May 26, 1824.

The diary does not contain footnotes or bibliography, and in only a limited number of instances is a quotation or statement attributed to any specific individual or source. The frequent resort to such authorities as a "highly-placed source," "a reliable informant," "a person close to the government," or similar generalization may be acceptable in newspaper writing, but is poor practice in a book of the type that the author has attempted.

The volume is an example of poor writing. The sentence structure is complicated and involved. Punctuation, especially in the use of the comma, semicolon, and dashes, leaves much to be desired. Diacritical marks are frequently omitted. Considerable misspelling and misuse of terms are evident. In the constant use of contractions the author violates accepted rules for formal writing. The prime example of this is the misuse of the contractions *he's*, *she's*, *its's*, *Argentina's*, etc. for *he has*, *she has*, or *Argentina has*.

The reader will find much in this work that is interesting and informative. He should constantly keep in mind, however, that it is a piece of journalism in diary form.

The Rising Sun in the Pacific, by Samuel Eliot Morison
(Atlantic--Little, Brown, \$6).

Reviewed by
Arthur Thomas Kittle

THIS is the third of author Morison's thirteen projected volumes on the history of U.S. Naval Operations in World War II, and the first to deal with operations in the Pacific. The first two volumes cover events in the Atlantic up to the Sicilian campaign in July 1943.

In his foreword to this series of naval history, Secretary of Defense Forrestal states, "This work is in no sense an official history. The form, style, and character of the narrative are the author's own." At the same time, the Navy Department has assisted Captain Morison in the accumulation of first-hand impressions and in the exhaustive research of materials at hand. In all sincerity the author states that the early dark months of war in the Pacific up to April 1942, showing one Japanese success after another, were neither pleasant nor inspiring to record. Culled from official United States as well as Japanese sources, this presentation is to date by far the best account of the period when adversity and defeat pursued our Navy across the Pacific.

Morison divides his account into four sections which fall quite naturally in respective order. In Part I he investigates the incidents and conditions from the end of World War I as related to the final outbreak in 1941. Throughout this outline of relations between Japan and the Allies during two turbulent decades finally culminating in war, detailed consideration is given to diplomatic history which led directly from the early 1930s onward to the attack on Pearl Harbor and the involvement of the United States in the global struggle. "For an historian of the United States Navy," says Morison, "a brief inquiry into the causes of the war in the Pacific is peculiarly appropriate; since an officer of that Navy first cracked the shell around Japan, upon that Navy fell the first fury of the enemy attack, and by that Navy--alone or as a spearhead for other armed forces--Japan was utterly defeated."

Written for the general reader rather than the professional sailor, this history deals not only with battles

and operations, but also with strategy and policy behind such operations with numerous explanations indicating why they took place.

Following his account of the attack on Pearl Harbor in Part I, where much material from Japanese sources is used in developing a mosaic so long hidden from an avid public by censorship, rumor, and speculation, the full and hideous story of early Pacific naval warfare unfolds--invasion of the Philippines, the fall of Guam, surrender of Wake, initial strikes by United States carriers, and finally the tragic attempt to defend Malaysia.

Contained in this narrative is a complete summary of Japan's war plans and objectives with vivid descriptions of our own misconceptions, weaknesses, and lack of imagination, all of which contributed to continuing Japanese successes. The story of our ineffectual resistance in the Philippines, for example, is by no means pleasant reading. The author's willingness to follow to the end the implications of fact and findings, however, enhances the value of his book and its interest to the reader. It provides a lesson not soon to be forgotten.

As yet, no good, complete history of the Allied defeat in the Pacific from December 7 to the Coral Sea has been written. Captain Morison's book would have covered this period effectively and completely had it told the story of Army ground and aerial operations as well as those of the Navy. As it is, his book covers the period of naval operations admirably, displaying with superior merit the firm hand of the historian as well as the energy and heroism of the seaman and warrior.



Educational Lessons from Wartime Training, by Alonzo G. Grace and Others (American Council on Education, \$3).

Reviewed by
Henry E. Patrick

SHORTLY before the end of the war in 1945 the American Council on Education created the Commission on Implications of Armed Services Educational Programs to investigate the wartime experiences of the services in training several

million men and women. Although the survey was intended to point out worth-while features of military programs which might be adopted with profit by civilian educational institutions, the reports which it produced also have many implications for the armed services themselves. This volume, which is the general report of the Commission, is a summary of the nine published monographs¹ and the eight special reports which resulted from this ambitious and valuable project.

The principal activity of an efficient peacetime military establishment is to prepare for a possible war by instructing its personnel in how to wage war effectively. The suggestions in this monograph are therefore of considerable importance to the armed services in conducting training educational programs. Since they can spare neither men nor money to investigate the vast store of records of their wartime experiences, those in charge of service schools and training will find that the authors of this series have done a useful job for them.

Administrators and instructors in service schools will want to examine their programs critically in the light of the findings of these studies. Then they can see whether they are taking full advantage of educational advances. In the field of evaluation, for example, aptitude tests have been constructed that can predict fairly accurately what students will accomplish in a school. Tests of this type would be of real value to those who select personnel for assignment to schools. In the area of instructional materials, too, progress was made in capitalizing on the benefits of audio-visual aids to learning, as well as on the increased effectiveness of published texts, manuals, and other well written and skillfully illustrated materials. Schools preparing instructors in subject matter and training them in teaching methods in most cases borrowed the best from educational advances in these fields. Wartime curriculum planners learned to keep in view the real objectives of their programs and did their best to fulfill them in many excellent courses of training.

¹See "The Armed Services and Adult Education," a book review, by H. E. Patrick, of another monograph in this series, AIR UNIVERSITY QUARTERLY REVIEW (Spring 1948) pp. 82-3. *Editor.*

BRIEFER COMMENT

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The Control of Atomic Energy, by James R. Newman and Byron S. Miller.

"The Atomic Energy Act of 1946 is a radical piece of legislation--in some respects as radical and unprecedented as the scientific discovery that occasioned it." The authors substantiate this assertion by showing how the Atomic Energy Commission, which the legislation established, influences this country's military security, its foreign policy, its economic structure--in short, the very framework of our entire society. This book discusses the underlying philosophy behind the Act and asks and attempts to answer such vital questions as--How can we best control atomic energy? The full text of the Act is included.

Whittlesey House: McGraw-Hill \$5

Eastern Asia, by Thomas E. Ennis.

BEGINNING with recorded Chinese history, this timely new text surveys the history of all Eastern Asia, not merely of China and Japan. Professor Ennis is exceptionally qualified for the work, with a varied background of study in the area. Although not intended for the expert, the book will provide an excellent refresher for all those interested in the Far East. This is a history of peoples rather than of regions or governments. Customs and cultures and art forms and beliefs as well as political and economic conditions are presented. The cultural history of the particular peoples is broadly covered for each major time period to the present.

Lippincott \$5

La Prochaine Guerre, by Camille Rougeron.

THIS volume covers a broader field than the author's two previous works, both of which deal primarily with military aviation. Here he discusses land and sea, as well as air, warfare, and investigates the political, technical, industrial, and agricultural factors that are involved in modern war. He recognizes, as a result of the revolution in weapons, the magnitude that future war is likely to assume. Strategy and tactics and the latest aircraft developments are surveyed in the chapters on air warfare.

Berger-Levrault, Paris 300 fr.

John J. Pershing, by Frederick Palmer.

WRITTEN with the stipulation that it should not be published until after his death, this biography of General of the Armies Pershing now reaches the public. Colonel Palmer, one of Pershing's long-time associates, was chosen by the general's intimates as the man most competent to write this book. The complete span of Pershing's life is covered, with a major portion devoted to his career after 1917. Many sidelights are thrown on the war and behind-the-scene reasons are given for several hotly debated decisions. The book clarifies the record and presents a warm and human man in contrast to the cold, impersonal, hard-driving general known to history.

Military Service \$4.50

Stalingrad, by Theodor Plievier.

HERE is the story of Stalingrad told from the point of view of

the German soldier who suffered and died on the frozen steppes and in the demolished city. The book has been a prodigious seller in a postwar Europe that can buy few novels. In no other battle of the war did catastrophe strike the common soldier of the line with such epic proportions. The German Sixth Army, ordered by Hitler to hold to the last man, died from enemy fire, cold, disease, starvation, and suicide. Even the few survivors were referred to as the living dead. No better World War II novel has yet come out of Europe.

Appleton-Century-Crofts \$3

The Language of World War II,
by A. Marjorie Taylor.

ORIGINALLY published in 1944, this book is now up-to-date for the entire war with a revised edition. Subtitled *Abbreviations, Captions, Quotations, Slogans, Titles and Other Terms and Phrases*, it is an alphabetically arranged dictionary of the terminology of the war. The material is primarily based on quotations, slogans, poster captions, song titles, and initialed government and other agencies created in connection with the war effort. It will have some value as a reference book. Sample entry: "*Strafe*: A German term which came into use in World War I, in the phrase 'Gott strafe England,' meaning 'God punish England.'"

H. W. Wilson \$3

Atomic Energy, by Karl K. Darrow.

BASED on a series of lectures the author delivered at Northwestern University last year, this small book reviews the scientific development and potentialities of atomic energy in an attempt to clarify the true significance of this powerful discovery. Such subjects as the atom,

nuclear theory, isotopes, chain reaction, and radioactivity are thoroughly discussed, and confusing terms such as "free neutron" and "sinister nuclei" are simplified. The author is painstaking in his efforts to insure that the reader will emerge with a better understanding of this important subject.

John Wiley \$2

War, Politics, and Insanity,
by C. S. Bluemel, M.D.

IN this book a psychiatrist looks at the politician with the intention of analyzing the psychological qualities of leadership. An attempt is made to show that politicians possess distinguishing traits of personality that form a recognizable pattern. It is maintained that men are urged into the political field by the desire to dominate the lives of others. Evidence for these conclusions rests largely on the case histories of a few well known personalities: Stalin, Mussolini, Goering, Hitler, Cromwell, Joan of Arc, Napoleon, and George III. With such insufficient supporting data the book adds little to the science of leadership.

World Press \$2

Government in the United States,
by W. Leon Godshall, editor.

IN this new principles of government text the editor and co-authors cover all three levels of government; national, state, and local. While doing this, the conventional pattern of a survey text is followed. Particular emphasis is given to the foundations of the American system. The forty-five chapters have been written by a variety of contributors, each a specialist in his particular subject matter. Liberal bibliographies follow each chapter and

the appendix contains four of our most useful constitutional documents.

D. Van Nostrand \$5

Russia Astride the Balkans, by Robert Bishop and E. S. Crayfield.

THIS book is primarily a behind-the-scenes account of the Russian occupation of Rumania following the plot of August 1944 that unseated the Nazis and their Rumanian collaborators. The authors, both allied intelligence agents stationed in the Balkans for several years, describe acts of chicanery and sabotage and other strong-arm methods employed by the Soviets to subdue the people. They accuse the Russians of deporting whole populations to Siberia for slave labor, of wrecking the country's economy, of abolishing all civil rights--in short, of turning the small nation into a terrorist slave state.

McBride \$3.50

Education in a Divided World, by James Bryant Conant.

THE basic concern of this book is the American system of elementary and secondary schools. President Conant of Harvard believes that whether these schools are good or bad is fundamental to the future destiny of the nation. If they are bad, our social structure will rest on an insecure foundation and be much less capable of meeting its supreme test, the world challenge of communism. In discussing this challenge Conant predicts that the Cold War will continue for ten or more years as the conflicting ideologies fight a political battle rather than a shooting war. Many sound recommendations for improving American education are detailed.

Harvard Univ. \$3

State Government Today, by Roy Victor Peel.

THIS book attempts an appraisal of the current American system of state governments. It is concerned with whether these governments are performing well the functions entrusted to them. Whether they are living up to the expectations of the people who established them. Whether they are too completely overshadowed by the federal government or are diffused into areas where it was never intended that they should go. The arguments of the proponents of more state government, and of less, are covered. The evidence on both sides is summarized, with final conclusions left largely to the reader.

Univ. of New Mexico \$3

Readings in the History of Psychology, by Wayne Dennis.

NOT since Rand's *The Classical Psychologists*, published in 1912, has a set of readings in the history of psychology appeared. Since great progress has been made in the subject during the past thirty-six years, this collection is particularly welcome. The volume will permit convenient reading of the classic psychologists by many who would otherwise have no access to the original works. Sixty-one selections are included, ranging from Aristotle to Clark Leonard Hull. They are arranged chronologically by date of publication. Among those used are: "Psychological Examining in the United States Army," by Robert M. Yerkes and "The Measurement of Intelligence," by Lewis M. Terman.

Appleton-Century-Crofts \$4.75

An Affair of State, by Pat Frank.

IN this novel Pat Frank applies to international politics the same talent for projectional

reporting which made his *Mr. Adam* so widely read. Taking the temperature of the Cold War in 1949, the plot revolves around a young war veteran who becomes a Foreign Service Officer and is assigned to Budapest. Here against a background of international intrigue and espionage the Eastern and Western blocs play their deadly game of position. Much of the writing reveals more of the truths of power politics and bureaucracy than the dry analyses of the professional commentators. The book offers an opportunity for getting acquainted with some of the political facts of life while being highly entertained.

Lippincott \$2.75

The Liberal Spirit, by Horace M. Kallen.

THE nine essays which compose this book deal with the problems of freedom in the modern world. The author's basic concern is with the free conscience of the individual man, beset today, the world over, with the encroachment of institutions and ideologies of power. Several of the essays deal with interactions between the liberal spirit and such institutions as the state, the church, industry, science, and art. Others discuss the interplay of these factors and their affects upon freedom. This is a difficult book and will likely be read least by those most in need of it.

*New School for Social Research:
Cornell Univ. \$3*

American Political and Social History, by Harold U. Faulkner.

THIS is the fifth edition of this classic American history text, and is the first to be entirely reset since the original was published in 1937. Throughout, the material has been rearranged and consolidated and the account

brought up to early 1948. The book is designed as a basic survey for college students and as such provides an excellent single volume history for the adult reader. Around the basic core of factual detail is woven a solid fabric of background material. Extensive bibliographical references are provided for each chapter.

Appleton-Century-Crofts \$5

The Fourth Arm, by James W. Kenyon.

THIS unusual book surveys the fire-fighting methods employed by the British during the war years of 1939-1945. The author's account of the vital role British fire-fighters played in the Battle of Britain, and the chapters dealing with the British Army Fire Services, fires on ships, salvage, arson, and fire prevention are enlightening. In discussing aircraft fires, the author lists the major causes of engine fires, the methods of rescue from crashed aircraft and ways of reducing the fire risk, and describes the organization of the RAF Fire Service. This is an adequate study of an often neglected subject.

George G. Harrap, London 12/6

The United States and China, by John King Fairbank.

CHINA, dynamic and torn by civil war, places before the United States a controversial problem in foreign relations whose solution is rapidly becoming imperative. This book should help effect that solution, for it is full of information that Americans must have to form a realistic judgment as to what our China policy should be. Backgrounded in history, the political, social, economic, and cultural factors of the Chinese nation are explored.

This is the latest book in the projected twenty-five volume series of the American Foreign Policy Library under the editorship of Sumner Welles.

Harvard Univ. \$3.75

Mister Roberts, by Thomas Heggen and Joshua Logan.

THIS drama of life on a wartime Naval supply ship in non-combatant waters became a success on the Broadway stage. Mister Roberts is a cargo officer who works with the crew and shares their frustrations and boredom in the fulfillment of their unspectacular but necessary job. Although their interests receive his constant attention, Roberts' primary aim is transfer to a combat vessel so that he can personally come to grips with the enemy. This latter objective is eventually achieved but with tragic consequences. Comedy, pathos, and understanding are the principal ingredients of this story of life in the wartime Navy.

Random House \$2.50

The Fall of the Spanish American Empire, by Salvador de Madariaga.

TO the author's brilliant *The Rise of the Spanish American Empire*, this book adds the required sequel. Together, they cover 300 years of Latin-American history. *The Fall* begins with an analysis of the peoples which comprise the empire—White, Indian, Negro. Next foreign influences, such as the French philosophers, are discussed. Then an evaluation is made of the effects of the American and French Revolutions and the Negro rising in Haiti. The final chapter brings the reader to Simon Bolivar, with the stage set for revolution and the empire's break-up. This is a

scholarly presentation of one of the great cycles of history.

Macmillan \$5

War Between Continents, by F. O. Miksche and E. Combaux.

FROM an analysis of the implications of the rivalry between Russia and the West, this book develops its theme—World War III. The probable strategies of both sides and the theatres of operation (Western Europe and the Near and Far East) are discussed. A survey is made of modern weapons and their expected influence on tactics, with the general conclusion that they will not result in short wars. Special emphasis is given to the potentialities of guerillas. As an alternative to World War III the authors advocate a European federation to restore the balance of power. A significant recommendation for this book is its detached point of view.

Faber and Faber, London 15/-

The Struggle Behind the Iron Curtain, by Ferenc Nagy.

THIS is the former Prime Minister's account of how the Communists took from him control of the government of Hungary. Nagy rose to power, after the Germans were driven out, in the country's last unfettered election. Believing in a democratic government, he tried to govern with the inclusion of Communists in his cabinet. This attempt led to the rapid undermining of his office. While he was in Switzerland for a short vacation, a Communist coup extorted his resignation in return for the life of his young son who had remained behind in Hungary. Nagy is now a refugee in the United States from where he is trying to carry his message to the world through this book.

Macmillan \$6



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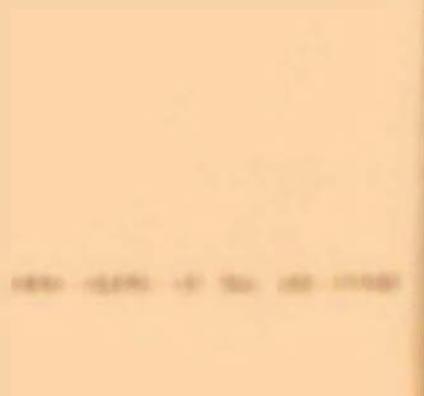
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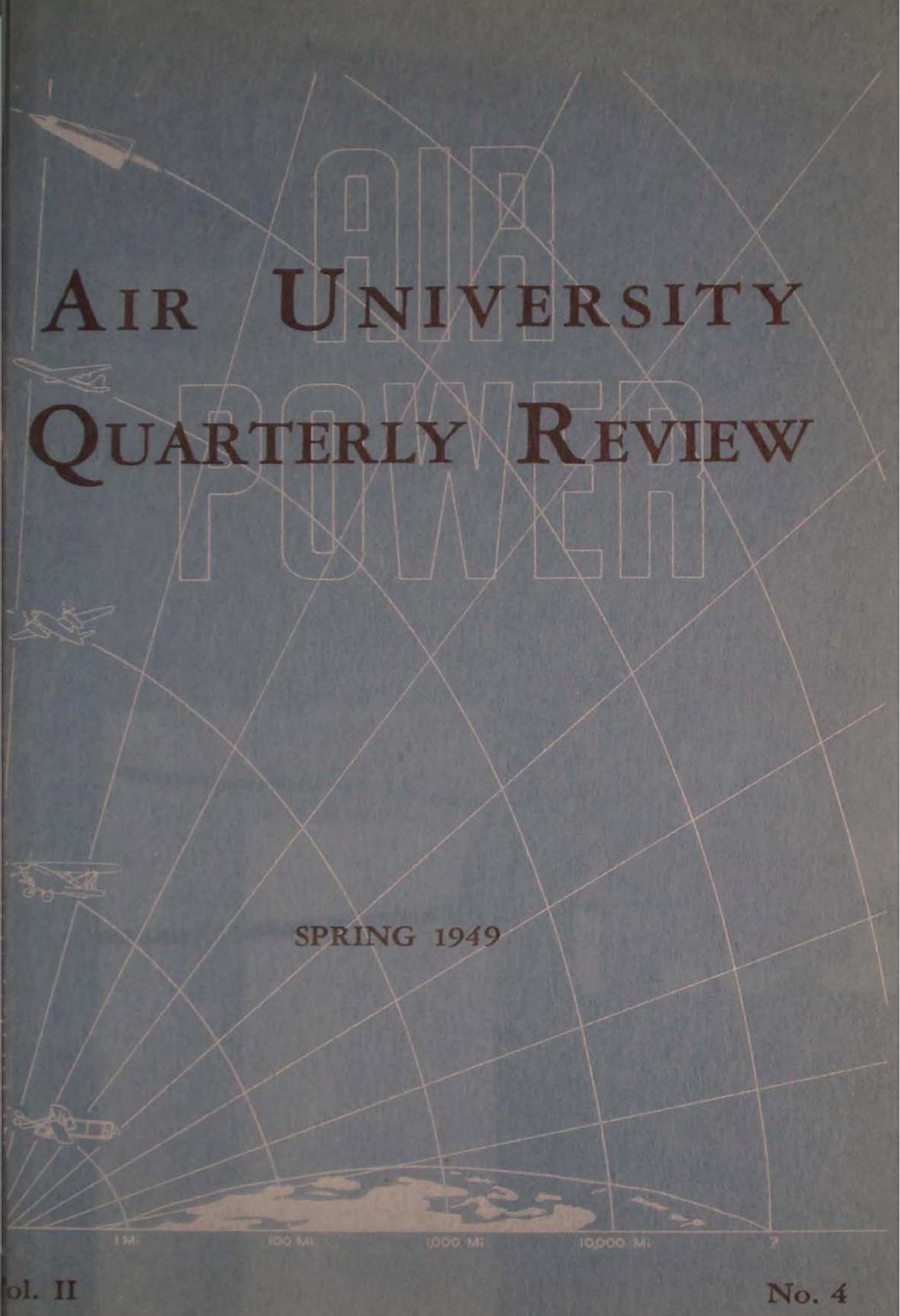
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