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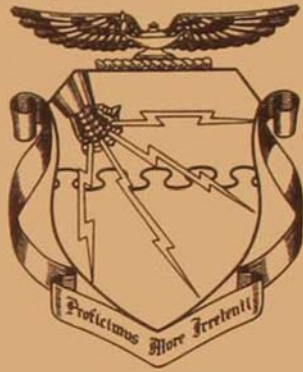
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ATTENTION

The next issue of The AIR UNIVERSITY QUARTERLY REVIEW, Fall 1948, Volume II, Number 2, will contain an alphabetical index of Volume I, Numbers 1, 2, 3, and 4.

DOUHET AND THE FUTURE

Lt. Col. Joseph L. Dickman

GENERAL Giulio Douhet published his master work *Il Dominio dell' Aria* in 1921.¹ This penetrating study of air warfare attracted lively international attention during the years preceding World War II and in its early stages. Douhet's writings were translated from the original Italian into French and English, and were read and discussed both in the United States and abroad. A condensation was prepared for the U.S. Army Air Corps in 1932, and another appeared in the service journal of the Royal Air Force in 1936. During the first two years of the past war frequent mention of the so-called Douhet Theory appeared in newspapers, magazines, and books, often by critics who saw in the events in Europe a disproval of Douhet's prophecies.

Most of the latest published commentaries on Douhet date between 1940 and 1944. Since then, however, interest has waned. But today there is a need for a re-evaluation of Douhet, for postwar events and trends have greatly altered the factors under which his concepts have been judged.

The consensus among wartime commentators was that most of his proposals were either overoptimistic or specifically erroneous, yet the very end of the war contains a lesson that might reverse any judgment made a year earlier. Further, the trend of research and development since indicates that the shape of the next war will be vastly different from the last one. Consequently, evaluations made during World War II apply only to the conditions of that time; any decision as to the future value of Douhet's concepts must take into consideration the effect of new developments, especially the atomic bomb and supersonic aircraft or missiles.

For the purpose of this appraisal, the Douhet Theory will be considered as being the sum of Douhet's opinions, proposals, and predictions concerning the proper use of Air

¹References to Douhet in this article are based on the English translation of Dino Ferrari, *The Command of the Air* (Coward-McCann, 1942).

Power. These beliefs are set forth in all of his writings, but chiefly in *The Command of the Air*.

In order to permit a progressive, detailed evaluation of Douhet's thought, the following nine statements are submitted, from their general significance and the emphasis given them in his writings, as representing Douhet's most important arguments. These statements comprise his fundamental concepts of Air Power and are presented as the principles of the Douhet Theory.

(1) Command of the air is a necessary and sufficient condition for victory.

(2) Aircraft are omnipotent weapons, capable of destroying any objective and invulnerable to any defense.

(3) The instrument for obtaining and exploiting command of the air should be an air force independent of the surface forces and composed of maximum bombing power and the requisite fighting power.

(4) The proper targets for the Independent Air Force are industrial objectives and centers of population.

(5) The proper weapon for the Independent Air Force is a combination of explosives, incendiaries, and poison gas.

(6) The Independent Air Force should always operate in mass.

(7) All efforts of an air force should be devoted solely to offense.

(8) No resources should be diverted to the support of auxiliary aviation.

(9) Surface forces should have a defensive function while the air force performs the major offensive action.

THE DOUHET THEORY not only embraces the entire subject of aerial warfare but also encroaches on that of war in general. It predicts that air action will have a decisive effect on the outcome of future wars, recommends that the three branches of the armed force of a nation be co-equal under a single directing head, and proposes that in the allotment of funds the air arm receive the preponderance of available means. In the field of aerial warfare in particular, it defines the mission of Air Power and describes

the organization and tactics required to accomplish that mission.

The Douhet Theory is predicated on what Sigaud called "the factor of maximum return. A nation has a definite sum total of material resources;" the portion allotted to military purposes "must be used to produce the greatest possible results."² Douhet, in his writings, had in mind Italy, a nation of very limited material resources. His pattern for war, expressed by the injunction to "resist on the ground, mass in the air," was designed to enable that nation to defeat a more richly endowed but less efficiently organized enemy.

The Douhet Theory did not receive a thorough test in World War II; moreover, the verdict that was passed will not be final. Less than three years after the end of that conflict, sides are already being drawn for a new one. The events of the last few months are signposts on the road that leads, unless there is an abrupt turning farther on, to World War III. And if there is another war, the Douhet Theory will get a second chance.

That the Douhet Theory was somewhat less than an unqualified success in World War II was due to the inability of the equipment of the times to fulfill Douhet's expectations. The deficiencies found in Douhet's principles do not in general concern his theories of employment, but derive from the technical limitations of aircraft and armament. Air Power, as typified by the B-17, Norden bombsight, and 1000 pound bomb, did not possess the capabilities that Douhet visualized.

Air Power in World War III, however, will be immeasurably better equipped for its job. In the few years that have elapsed since 1940, when the *Luftwaffe* failed in its attempt to win a war by Air Power, there have appeared new weapons, that, had the Germans possessed them then, would have quickly forced a decision. These are jet-propelled aircraft, V-weapons, and the atomic bomb.

The influence of these new developments, especially the atomic bomb, on the principles of aerial warfare is already attracting the attention of many writers. So much has been

²Louis A. Sigaud, *Douhet and Aerial Warfare* (G.P. Putnam, 1941), p. 39.

written on the atomic bomb alone that merely to add a little more of the same would be a waste of time. However, the effect on the Douhet Theory of these new implements, and their future improvements, is significant. When examined in the light of these weapons, certain of Douhet's concepts that were apparently disproved five years ago take on an entirely new aspect. For as Douhet said, "the form of any war...depends on the technical means of war available."

When speculating about the future it is necessary to indicate how near or remote a period of time is being considered. The period to be referred to here may be considered as a historical era which could be called the renaissance of the Douhet Theory. The beginning of this era will occur when there is produced a bomber with a maximum speed of around 600 miles per hour, capable of carrying an atomic bomb to a radius of action such that major ground combat will not be necessary to obtain suitable air bases from which to operate. Its zenith will be attained with the development of a pilotless aircraft or guided missile able to accurately deliver the atomic bomb at the same range and capable of supersonic speed. The end of this era will be reached when there is invented an anti-aircraft missile with 100 per cent effectiveness.

The development of these weapons is inevitable, and plans for their employment must be made. In such planning the principles of the Douhet Theory will figure, although probably without awareness by the planners.

THE EFFECT of the new means of warfare on Douhet's principles will now be examined. The individual principles will be discussed in a different sequence from that in which they were listed above. This variation is desirable because the influence of the new weapons alters the inter-relationships among the separate elements of the Douhet Theory.

The principle of the invincibility of aircraft is the one that undergoes the most significant change in the future. The atomic bomb and sonic speeds will give the airplane the qualities of invincibility and invulnerability with which Douhet believed it to be endowed.

It will be recalled that Douhet was extremely dogmatic in his calculation of the amount of damage that a "unit of bombardment" would inflict. According to his belief, twenty tons of explosives, delivered by ten aircraft, would invariably produce complete destruction within a 1500-foot circle. It has been shown that inaccuracy of bombing and resistance of modern buildings resulted in a substantially smaller effect in the past.

However, the atomic bomb reduces the importance of these factors and makes Douhet's principle applicable in the future. An atomic bomb dropped by one airplane will produce complete destruction within a 6000-foot circle, with heavy damage up to two miles beyond. Modern construction that could offer substantial resistance to conventional explosives and incendiaries is now vulnerable to atomic attack; the United States Strategic Bombing Survey estimates that "the overwhelming bulk of the buildings in American cities could not stand up against an atomic bomb bursting a mile or a mile and a half from them." Precise accuracy of bombing becomes unimportant when the damage is measured in square miles instead of square yards. The values that Douhet calculated are different today, but the principle of inevitable, predictable destruction is confirmed.

Douhet's concept of an irresistible bomber force is less valid, but it may become true at some time in the future. The ultimate goal of development in aircraft is the long-range, supersonic guided missile. Defense against such weapons will be exceedingly difficult; human-piloted interceptors will be totally inadequate, and ground-to-air missiles will have to be relied on. These might also fail against V-2 type weapons. Douhet's arguments regarding the cost, ineffectiveness, and consequent futility of local defenses can be re-applied to the future. Edward Mead Earle predicts that "rockets, pilotless airplanes, guided missiles and other as yet undeveloped weapons of supersonic speed... will present problems of defense which remain unsolved and may well be impossible of solution."³ Here then in the

³Edward Mead Earle, "The Influence of Air Power Upon History," *The Yale Review*, XXXV (June 1946), p. 588.

long-range, supersonic guided missile may be at last the realization of Douhet's invulnerable air force.

The realization of such futuristic weapons is very distant, but a conditional state of invulnerability is closer at hand. As the speed of aircraft approaches the sonic, the advantages to the offense and the difficulties of the defense multiply enormously. The problem of interception and gunnery becomes acute at high speed and high altitude; it is further complicated by radar countermeasures and night operations, which would be logical for an atomic bomb attack, when precision accuracy of bombing is not necessary.

It is conceivable that a nation that had developed bombers with speeds near the sonic range could, by employing tactics designed to exploit the inherent advantages of that capability, possess an air force that was almost completely invulnerable to defensive efforts. Such invulnerability would exist only under the operating conditions for which the aircraft and tactics were designed. It might, of course, be only temporary; the situation could be reversed by a new design of the enemy. However, a very brief period of freedom of action in the enemy's sky will be sufficient to decide an atomic war.

It is unfortunate that Douhet could not have anticipated the atomic bomb, for he would certainly have seized upon it in his fifth principle, which concerns the proper weapons for his Independent Air Force. The atomic bomb, with its effects of blast, fire, and radio-activity, combines at once the qualities of the three means of attack that he recommended--explosives, incendiaries, and gas. The ability of an underwater explosion to contaminate an area for months would have particularly appealed to Douhet, who always showed a preference for "aero-chemical" methods. In describing how to best attack concentrations of population, he advised that "attacks must be so planned as to leave the target permeated with gas over a [long] period of time." In the future, the agent will be radioactive material, but the principle remains the same.

Although bacteriological warfare, another recommendation of Douhet's, has not been used in the past, it is still

possible in the future. The ability of a nation to use this weapon without fear of effective retaliation would make its employment more likely.

DOUHET'S FOURTH PRINCIPLE, that of targets, is another that receives added emphasis from new developments, particularly the atomic bomb again. It is obvious that this weapon is ideally suited for his concept of attacking a nation's will to resist through its centers of population. "The city is a made-to-order target," Bernard Brodie writes, "and the degree of urbanization of a country furnishes a rough index of its relative vulnerability to the atomic bomb."⁴

Whether the result of the application of this principle would follow precisely Douhet's prediction of the population demanding an end of the war, remains to be seen. The same factors that applied in World War II will be influential again, namely, the degree of defense that can be mustered, the amount of retaliation possible, and the discipline of the population. It is certain, as it was before, that ineffectual defenses and lack of retaliatory means will bring a speedy decision to an atomic war.

Concerning what would happen if both contestants possessed large numbers of atomic bombs and the means to deliver them, Mr. Brodie goes on to make some interesting speculations. He assumes that retaliation would be automatic after the initial blow and that destruction of each other's national economy could not be prevented by either side, in which case the ability to continue the fight would "depend on the degree to which the armed forces had made themselves independent of the urban communities and their industries for supply and support." Obviously, the comparative moral fiber of the two nations would receive a severe test in such a situation.

Douhet's doctrine of mass employment of aerial strength, expressed in the sixth principle, undergoes some change in the war of the future. Since any city in the world is likely to be destroyed by one to ten atomic bombs, it is improbable that hundreds of bombers will be dispatched against one

⁴Bernard Brodie, *The Absolute Weapon* (Harcourt, Brace, 1946), p. 99.

target as was done in the past, although substantial numbers over the minimum required may be employed to ensure that a sufficient number reaches the objective. It is possible that hundreds of bombers, however, will be launched against an entire nation, with the planes dispersing and striking individual targets. Such a method of attack would have the effect of saturating the enemy's defenses. It would best be made at night or in bad weather and should be accompanied by an elaborate radar countermeasure program. Its probability of success with light losses would vary directly with the speed of the bombers.

Douhet's concept of destroying the target completely in one attack also becomes practicable with atomic bombs. That the destruction accomplished by this weapon is truly complete is attested by the United States Strategic Bombing Survey's report on the effects of the bomb on Hiroshima.

THE FUTURE promises to have an interesting effect on Douhet's statements on the proper composition of the Independent Air Force, expressed in the third principle of the Douhet Theory. Douhet's development of the "battleplane" concept was proved to be unsound in World War II. Bomber aircraft were, generally speaking, dependent on fighter escort when strenuously opposed. However, in World War III it is possible that the high-speed, high-altitude, long-range bomber may be not only able to defend itself, but forced to. If escorting fighters cannot extend their range to match the bombers' without excessively sacrificing performance, they will have to be dispensed with.⁵

With the elimination of fighter escort, strategic bombers will operate mainly at night, relying on speed and electronics as their defensive weapons. Major de Seversky contends that escorts will always be necessary,⁶ but he fails to realize that the great destructiveness of the atomic bomb reduces the requirement for precision, daylight bombing and enables attacking at night, with the advantages to the

⁵Col. Bruce K. Holloway, "High Subsonic Speeds for Air Warfare," AIR UNIVERSITY QUARTERLY REVIEW (Fall 1947).

⁶Alexander P. de Seversky, "A Lecture on Air Power," AIR UNIVERSITY QUARTERLY REVIEW (Fall 1947).

offense that are inherent therein. It is possible that fighter planes will no longer be included in the strategic air force of the future, and Douhet's battleplane will have come into its own. It is paradoxical that speed, the characteristic that Douhet considered least necessary, will be the one that makes this concept possible.

In contrast with the principles previously discussed, Douhet's seventh, in which he advocated concentrating on the offense and ignoring the defense, will become increasingly invalid with the passage of time. The potentialities of the atomic bomb are too tremendous for a nation to afford not to take all possible precautions against such an attack. It may be at some time in the future that an attacked nation will find itself completely unable to defend against an enemy air force that has unveiled a secret new airplane of unmatched performance; but, nevertheless, in preparing against that eventuality, the defender-to-be must expend a large proportion of its resources in an effort to keep its defenses abreast of the expected offense. Should it ignore its own defenses and concern itself solely with bombing the enemy's industries and cities, even if it were successful in its mission, its own homeland would be devastated and it would have won a Pyrrhic victory.

The discouraging fact about defense in the future is that it must be much more efficient than it was in the past, and at a time when the odds against it are greater than they ever were before. For any country to be secure in the era of atomic warfare its defenses must be virtually perfect.

Command of the air, Douhet's first principle, assumes a unique importance in the future. As in World War II, it may never be attained; but in World War III, ability or failure to attain it will have an immeasurably greater immediate effect on the outcome of the war than mere air superiority ever had in the past.

Consider two nations, X and Y, both with atomic bombs and jet-propelled, high-speed bombers capable of attacking each other's vital industries. Assuming that neither side had perfected an air-to-air or ground-to-air guided missile, an effective defense against each air force may be impossible

once the aircraft are launched. If X were the aggressor in this case and in the initial blow destroyed all of Y's largest cities, the latter would still be able to retaliate unless X attacked Y's air force while it was on the ground, either by diverting part of the bombers or, if distance permitted, by using more economical, conventional means such as fighters. In either case, failure to obtain *almost perfect* results would leave Y with sufficient bombers to eliminate X's cities in one retaliatory attack. It is impossible to visualize how complete and instant destruction of an air force can be accomplished if it is of any size and at all prepared, yet command of the air must be attained by one opponent, in a war such as the one described, to prevent the economy of both nations from being destroyed.

THE FUTURE application of Douhet's eighth principle, concerning the elimination of auxiliary aviation, obviously depends on whether there will be a large-scale land campaign in the next war. If the army or navy are to perform important offensive functions, they will need tactical Air Power. Conversely, if the surface forces are relegated to a defensive role while the strategic air force conducts an atomic war on the enemy's cities and industries, the requirement for a tactical air force will diminish.

Douhet's picture of a conflict between strategic and tactical aviation will become clearer in the future for two reasons--increasing inability to directly assist each other; and, divergence in objectives and requirements, resulting in competition. Douhet partially predicted the first of these reasons when he stated that auxiliary aviation cannot contribute to obtaining command of the air. Although it has been shown by the operations of the Ninth Air Force in Europe that this concept was not necessarily true in World War II, it is plain that tactical aviation would have very little value in a long-range transpolar aerial war, as described above between nations X and Y. Similarly, if an amphibious operation were launched, the strategic air force would probably be unable to assist with any tactical support. Although strategic air forces have frequently been given

tactical assignments in the past, and their present equipment is still capable of this type of work, future aircraft with very high subsonic or supersonic speed will have design and performance characteristics that preclude such interchangeability of function.

Douhet predicted competition between strategic and tactical Air Power as inevitable. In World War II the United States was able to afford both, but the extravagance of the past may not be possible in the future. In an address to students of the Air Command and Staff School on 20 February 1948, Captain H. E. Eccles, USN, stated: "The United States fought World War II in an economy of plenty; the events of the last three years indicate that in any future war we will fight in an economy of scarcity."

This warning can be applied to the conflict between strategic and tactical Air Power. The development and production of the long-range, high-speed aircraft or missiles that will be needed to deliver the atomic bomb in World War III will be extremely costly, in resources as well as money. The requirements of tactical Air Power, of which troop carrier aviation, for example, is an ever-growing component, will be an additional drain on the nation's economy. If, at any time, it appears that expenditures for tactical aviation will jeopardize development in strategic, the former will have to be sacrificed.

As the gap increases between strategic and tactical aviation, in equipment, techniques, and doctrines, an attempt may be made to bring complete control of the tactical air force under the army. Such a move would corroborate Douhet's belief that auxiliary aviation which was indispensable to the surface forces should be under their command.

FINALLY, the ultimate test of Air Power, and of the Douhet Theory, will come with the application of Douhet's last principle, which asserts that in the war of the future the surface forces will have a supporting function while the air force executes the offensive action. The time for acceptance of this principle will arrive when the air force possesses the means to deliver large numbers of atomic bombs

reliably and accurately on remote targets. It must be obvious to anyone who understands the tremendous destructive capabilities of the bomb that here is the fastest and cheapest way to win a war. General Carl Spaatz, in an article in *Foreign Affairs* (April 1946), predicted that "another war, however distant in the future, would probably be decided by some form of air power before the surface forces were able to make contact with the enemy in major battles," and added, "that is the supreme military lesson of our period in history."

However, no one should be so rash as to say that ground combat will never again have to be resorted to. Air Power may win the next war, but it may not be able to end it. A nation with a well-disciplined population may refuse to surrender even after having been subjected to aerial atomic attacks; this possibility is especially likely if this nation has been able to inflict substantial damage with its own air force and atomic bombs before they were expended or destroyed. Other factors, such as a low degree of urbanization, well-dispersed industries, or the opportunity to occupy neutral neighboring countries and utilize their products and resources, would contribute to surviving an atomic "blitzkrieg." When dropping atomic bombs a nation can reach the point of diminishing returns, and when it has been reached without the enemy's capitulation a forcible occupation will be necessary to terminate the war. Such an operation, however, would probably not need to be on the massive scale seen in World War II.

How would a war end when both contestants were adequately and equally equipped for atomic action? Although one would eventually obtain some degree of superiority over the other, it is quite conceivable that both nations' economies would be so wrecked by atomic attacks that, if they were separated by a large body of water, neither could mount sufficient strength for an invasion.

In summary, it has been shown that the atomic bomb and future improvements in aircraft will have a tremendous influence on the Douhet Theory. Every one of Douhet's principles is strongly affected. Some receive more emphasis

in their present form; others will be modified somewhat by new equipment and tactics. However, the general evaluation is very favorable--his principles will become increasingly valid with every development in aviation, and will necessarily be applied, either consciously or unconsciously, in the war of the future.

It should be added that the Douhet Theory is not only a pattern for the conduct of war but also a guide for the preparation for one. It was designed to achieve the greatest results for the least expenditure of funds and resources, and in this way it offers an important lesson. Any nation that must be economical in its expenditures for defense, still providing adequate security for itself, would do well to heed Douhet's advice and concentrate on Air Power. A preponderance of means expended on aeronautical research in order to realize the potentialities of high-speed aircraft and atomic weapons, will permit the full application of the Douhet Theory and will contribute the most to obtaining security. Conversely, failure to keep ahead of possible enemies is an invitation to disaster.

Our regular forces in peacetime must be highly trained, instantly ready, long-term professional troops. Their morale and their philosophy must be that of the professional soldier, who does not serve for pay alone, but for the love of it, the glory of it, the service of it; they must be men who take pride in the uniform, a quality that lies at the very root of military efficiency and one that is too rare in the modern services. We must have our own Gurkhas, our own Tommy Atkinses, who can accustom themselves to severe duty, occasional skirmishing, and intermittent casualties in time of peace--in fact as part of the price of peace...and without arousing international crises or fear of war. Voluntary recruitment is the best basis for a long-term force of regulars; the finest troops in history have been volunteer, long-term professionals. Today's emphasis must be on quality, rather than upon Cannon-Fodder Man.

--Hanson W. Baldwin
The Price of Power (1948)

POTENTIALITIES OF AIRSHIPS

Paul W. Litchfield

WE SHOULD all be impressed with the necessity of conducting our air age planning on a global basis, and with the importance of keeping away from purely domestic or national thought patterns. Unfortunately, the human mind tends to grasp and deal with those concepts on which there has been prior activity and thought, rather than those on which there has been less background of personal experience.

Our concepts of air warfare and air transportation are still shackled to our recent experience, and while they do provide for some extension along the lines of potential development, they seldom depart from basic experience.

It follows as a logical step that our procurement programs, the selection of operational bases, and our whole system of logistics are based upon existing types of equipment. Perhaps this is as it should be, for the initial steps of a war must be fought with the tools at hand, and we must do the best we can with what we have. The main point to be made, however, is that we must not let our detailed planning for the use of what we have, keep us from studying, knowing about, and even developing alternative solutions to our basic problems. In the final analysis, what we have at the outbreak of hostilities will be no more than we have been able to plan for and create in time of peace.

In all forms of business, and probably also in warfare, there seems to be room for a number of possible solutions, in fact one might develop what would be known as a doctrine of alternate solution. Taking transportation as an example, and considering man's problem in moving from point to point, we see the many alternate solutions which are available and utilized. Depending upon his own muscular power for propulsion, man may crawl, walk, run, or swim to reach an objective. Mechanical aids (such as the bicycle) may assist him in attaining greater speed or lessening his exertion.

Harnessing natural forces like wind power, the force of gravity, or the utilization of animal power may help him reach his objective with little or no exertion on his own part.

Stepping into the field of mechanical contrivances, man may use the motorcycle, automobile, motor truck, highway bus, railroad train, or powered boats and vessels to speed him on his way. Surely there are many methods of getting from place to place on the earth's surface; all of these methods existing side by side and individual methods being selected in accordance with the weight the individual wishes to place upon the factors of speed, comfort, safety, reliability, and economy.

We all seem to recognize that many possible alternatives exist for transportation over the surface of the earth, but how many of us carry this broad concept into our thinking when we consider the possibilities of transportation through the air? Far too many of us have been guilty of feeling that the airplane is the only acceptable vehicle in the air age. One has only to look at the record to see that this is true. Aeronautical experts have opposed the carriage of parcel post by air because they felt the flood of business and the bulk of the packages would overtax the capacities of flight equipment. Millions have been spent for intermediate landing facilities because of the limited range of the aircraft the experts then had in mind, to say nothing of the funds spent on landing information and weather services necessary for only certain types of flight equipment and operations. Other solutions were entirely possible, and it all comes back to the existence of narrow concepts which did not encompass all possible solutions to a given problem.

We have not only been narrow in our consideration of types of aircraft, but we have also been opinionated as to how individual aircraft should be propelled. To be sure, the attainment of practical forms of jet propulsion has been demonstrated to the general public within rather recent years, and no doubt jet and rocket propulsion are receiving consideration in our projections of future weapons. However, while jet and rocket propulsion principles are very old, it is only within recent years that we have allowed them to

enter into our thinking and planning in the military and transportational fields.

In the field of air transportation, and of air warfare, jet propulsion has not been the only stepchild. Unfortunately, there are a number of other projects, the fundamentals of which are rather clearly understood, but the practical application of which is being delayed in acceptance through the lack of enough vision to orient them in their true place in the air transportation problem. To be sure, they will all be developed in due course, and sooner or later, perhaps as is often the case under the stimulation of activity by some foreign power, we at long last may see that it is in our interest to deal with other than the accepted solutions to a given problem.

THE LARGE family of aeronautical stepchildren, which in past years has included such promising infants as the helicopter, jet propelled plane, and guided missile, also includes a long neglected member, the airship. The airship or dirigible balloon was one of the earliest forms by which man found it possible to control his navigation of the air. But with increases in the reliability of gasoline engines man has tended to depend more and more upon the existence of power to hold his aircraft aloft, and the mania for speed, and often for speed alone, has narrowed our vision so much as to preclude consideration of another form of transportation, which while perhaps less startling in the category of air speed, has many other attributes which make it useful and even desirable for certain missions.

Some of these attributes of the airship have been too long forgotten, and should be reviewed at this point.

The large rigid airship is a displacement vessel representing the next logical step in improving the performance of surface vessels by lifting them into a medium only 1/800th as dense as water. Starting with the steamship *Savannah*, which had a speed of something like six knots and used 90 h.p., the 130 years of steamship development has brought us to cruising speeds of the order of 30 knots, attained at the expenditure of as much as 215,000 h.p. Speeds in excess of 28 knots were available before World War I, so that the

past 35 years of pressure and design incentive have yielded only a slight additional amount of speed. That speed which has been obtained has come at very great expense, and it is rather generally accepted that transoceanic traffic must take to the air if appreciably greater speed is desired. Large rigid airships are capable of sustained cruising speeds of 65 knots over long transoceanic routes, and they are therefore twice as fast as the fastest of the superliners, and nearly three times as fast as the more economical smaller ships used on other than the blue ribbon transatlantic route.

In cargo carrying capacity, the large rigid airship (because of its reduced displacement) is not able to lift as large a cargo as a steamship, but it can still carry a cargo of say 90 tons on a trip from California to Hawaii, and 70 tons on a nonstop trip from the United States to Europe, or from Hawaii to Tokyo. Such cargoes are considerably larger than any other form of aircraft can offer over similar routes, and they open an intriguing possibility for the handling of types and items of cargo not heretofore considered as possible of air transportation. The large size and lifting capacity of rigid airships permits the installation of spacious and luxurious passenger accommodations. Projects have been laid down incorporating accommodations for as many as 300 passengers in a single airship, the large displacement and absence of vibration and motion making the airship one of the smoothest forms of transportation known. The great distance between the power plants and the passenger quarters, together with the many features of good living which can be built into accommodations where space and weight are not too important, add immeasurably to the comfort and attractiveness of airship transportation.

From the standpoint of economy, the rigid airship offers mass transportation at a very low cost. Freight rates would need to be higher than those charged for surface transportation, but need not be as high as those required for airplane traffic.

One of the fundamental reasons why airship transportation is relatively inexpensive is that no power need be expended to support the airship in the air, the lift being generated by the inherent buoyancy of the noninflammable helium gas

contained within its gas bags or compartments. The power which is required is needed only for overcoming the resistance to driving the streamlined airship body through the air. The fuel consumption is very low, particularly so because of the rather moderate cruising speed employed (65 knots or 75 miles per hour).

While steamships also secure buoyancy without power expenditure, they are being driven through a medium many times as dense as air, and the power and fuel consumption are very high. In the case of airplanes, fuel is required not only to overcome the resistance to forward motion, but also to maintain that flow of air about the wings which is necessary for the generation of lift. A substantial portion of an airplane's engine power is used to provide the lift, this portion of the resistance being identified as the induced drag of the airplane in contrast to the form drag and skin friction drag which represent resistance to motion as such. For any form of immersed equipment, resistance to motion increases markedly with speed, and the airplane which flies very rapidly in order to generate sufficient lift and in order to sell the commodity of speed to the public, experiences a substantial penalty in this regard.

Because of the large sizes in which rigid airships may be built, the possibility of large fuel and cargo loads, and the very low fuel consumption at cruising speeds, the rigid airship is admirably suited for long-range operations with large pay loads. Due to problems associated with the expansion of its lifting gas at higher altitudes, the airship is not particularly suited for operation in mountainous terrain, and this fact coupled with the comparatively small speed margin as between the airship and forms of land transportation, would suggest that the logical sphere for rigid airship operation is on long nonstop transoceanic routes. On such routes it can serve as an intermediate vehicle carrying rather large accumulated pay loads at speeds intermediate between those of steamships and airplanes, with sailing frequencies faster than those of steamships, but less frequent than airplanes, and with comfort and economy very much in its favor.

REDUCED to fundamentals, that portion of warfare which necessitates bringing persons or articles into physical contact with enemy objectives is nothing but transportation. The transportation may be direct in those cases where explosives or other materials are launched at the enemy, or the transportation may be only that means which advances the fighting unit to within its striking range. Harking back to our doctrine of alternate solution, each military problem raises the question as to which form of transportation is best suited for the mission at hand.

While those who understand the airship and its potentialities do not advocate it as a primary or attack weapon, they do class it as an outstanding form of transportation and feel accordingly that it has distinct use as an auxiliary to the armed forces.

One of the major differences between commercial transportation and transportation purely for military account in wartime may arise through the risks associated with enemy action. In drawing comparisons in such cases, the question must naturally be raised as to the relative vulnerability of various forms of transportation to enemy attack. If the means of transportation is not capable of defending itself against the forms of enemy attack which will be experienced in a given theater, then it can only be used in that theater on a basis of a calculated risk. If the risk is too great, there is no other solution but to either provide the transportation with still greater protection or to withdraw it to some area where it is not so susceptible to attack and carry out the operation by using some other form of transportation.

Those who disfavor combat use of airships point to their large size and to the inability to take evasive action because of relatively low air speeds. It should be recalled, however, that while perhaps more vulnerable to certain types of attack, the airship is less vulnerable on certain other scores. For instance, ordinary gunfire or torpedoes from other surface ships and anchored or floating mines constitute certain hazards to surface vessels, which hazards need not exist at all for airships.

It might be noted that the rigid airship is visualized as an auxiliary to the armed forces, and that in this concept

it fills a role very similar to that of the Merchant Marine, which backs up the armed forces in time of war. The degree of vulnerability may well be comparable in the two instances.

While airplane attack admittedly could put an unprotected rigid airship out of commission, it has been conclusively shown that attacks of this type can also dispose of auxiliary surface craft, while even highly armed and armored war vessels cannot always survive such attacks.

But here again, and merely in passing, it does not follow that the rigid airship must be unprotected. It is not unreasonable to visualize airships which could give a good account of themselves using their own fire power, missiles, and supporting aircraft. There may even be types of supporting or offensive equipment which are only possible for equipment as large and stable as the airship.

Even if airship proponents do not contend that the rigid airship should be assigned to active or every day use in advanced combat theaters, this does not necessarily mean that there is no place for the airship in sectors where we hold a reasonable control of the air, or on other specialized missions. As cases in point, rigid airships, which are just another means of transportation, should be able to serve as hospital ships, speeding the evacuation of wounded from hospital relay stations not directly in the zones of combat. In the same way they may be used for the carriage of personnel or cargo in protected theaters. In this regard, while economy of operation is seldom emphasized for military operations, it should be recalled that the unwarranted consumption of personnel, fuel, or of other critical materials to obtain a given objective represents a diminution of the overall war effort and the denial of these items to other tasks which also may be important.

THE UNIQUE long-range characteristics of the rigid airship are of unusual interest for the handling of missions at distances beyond the radius of action of other types of aircraft. An airship which has been fueled and provisioned for a range of say 8000 miles is able to operate in a service carrying substantial cargo, to a point 4000 miles away from its starting point, and is still able to

return to its home base without taking on fuel or supplies during the entire journey.

The ease of such an operation is contrasted with the very difficult problems associated when the same mission is attempted with a shorter range aircraft, which while perhaps able to travel the 4000 mile distance, must be refueled and serviced at the advanced locality. The problems of preparing advanced landing areas and stocking them with the necessary fuel and supplies were found to be large indeed during the recent war.

In the long-range flight category fall a number of specialized missions which could be of a military nature and call for unusual trips. An example of this type of activity carried out in peacetime, but which might be visualized in a more military setting, was the rendezvous between the airship *Graf Zeppelin* and Russian ice breakers within the Arctic Circle. The *Graf Zeppelin* actually landed unaided amidst the ice floes of the Arctic Ocean for the purpose of transferring meteorologists, mail, etc. Methods of transferring personnel and cargo to and from airships without landing have also been demonstrated.

The phenomenal endurance of rigid airships would appear to offer intriguing possibilities for their use as sentinel ships, whether for the detection of enemy activity or as relay stations in the chain of information or command. During a recent endurance test, the Navy's small non-rigid airship, the MX, stayed aloft for over a week, while endurances of rigid airships maintaining observation or sentinel stations of the order of two weeks are quite possible. Such sentinel ships may be supplemented by airplanes or helicopters carried aboard the airship, which in this sense becomes an aircraft carrier. The aircraft carrier principle was successfully demonstrated by the U.S. Navy, and the use of airships for this purpose is not entirely out of the question for special missions involving the use of the rigid airship as a floating base for other aircraft and for the extension of the range of their striking or observational value. In this case it should be noted that the large size and lift of the rigid airship provide ample space and capacity for the largest types of radio and electronic equipment now visualized. Here

again there is the opening of a new concept for this type of equipment, untrammelled and unfettered from the weight and size restrictions which circumscribe ordinary thinking about airborne equipment of this type.

The foregoing discussion of the auxiliary use of airships in time of war has been confined to the use of the large airships of the rigid type. For completeness one should include the accepted use of the smaller non-rigid airships for coast and harbor patrol, convoy work, and anti-submarine activity. It might be noted here that the small airship, with its peculiar ability to hover and operate at reduced air speeds, together with its capacity for lifting and towing specialized detection equipment, offers an unusual weapon for combating the submarine menace, a menace which grows in importance with the technological improvement of weapons of this class.

IT SEEMS to be generally recognized that this country's transportation system is a vital element in our planning for war. Extensive appropriations or subsidies have been made to the aeronautic and shipping industries in order that they may be ready and prepared to assist the military when the need for such help arises. Since these government expenditures on behalf of the development of air and sea transportation are in reality brought about to meet future military needs, it behooves the military to be sure that the expenditures are channeled along lines which will give the type of support which will be needed in time of crisis. The military's interest should not be limited merely to the availability of a certain number of accepted types of units maintained in active or inactive storage, but it should extend beyond that simple concept to an insistence that the pattern and type of development shall be such that new and promising types also come into being as rapidly as possible.

One traditional method for developing commercial airplanes has been to pattern them after bombers or other military types which were originally purchased for the military. Such a procedure resulted in the government absorbing the original design, development, and tooling costs, and allowed the commercial users to benefit in the form of

reduced prices for subsequent units purchased at a later date in a slightly modified form for commercial use. Now that the size and complexity of airplanes has so radically increased, there is a great reluctance on the part of private capital to undertake the design and development of aircraft intended for commercial use alone. This reluctance of private capital to participate in expensive developments destined for a rather limited commercial market has long been noted by airship proponents, who by force of circumstances have faced this particular problem for a number of years. Now that the airplane also faces a similar problem, some solution may be forthcoming in the form of military or other governmental sponsorship of large-scale development projects.

In the establishment of such a program, the interest of the military should be a broad one, not necessarily tied to specific types or models, but patterned to encourage a whole broad development in all of the fields where promise is shown. Under this concept of military and government support for aircraft development, the military would be faced with a dual responsibility; first, for the development of types of distinct utility to the armed forces, and secondly, towards a shaping and steering of the limited commercial developments into economic and efficient channels for future activity.

This concept of a duty, broader than that of pure military requirements, emphasizes the position of trust held by our military leaders and their parallel responsibility, however indirect it may seem to be, for the nurture and development of commercial activities as well.

*A*n enemy has to have air superiority, a great industrial production and a very large fleet of aircraft if it is to overwhelm a country by using conventional weapons only. But an enemy can inflict enormous damage with the mass-destruction weapons even if he does not have air superiority. The possession by an enemy of these weapons, in quantity, changes all the rules and requires a different strategy by a nation which may be attacked.

CONTROL OF COMBAT FATIGUE

Lt. Col. Herman A. Laubrich

IN THE STRESS of aerial combat with its terrifying experiences and physical strain, individuals react in as many different ways as there are types of human personalities. Under sufficient stress of war, an individual may reach the point of psychological failure, may develop severe emotional disorders resulting from fear and the reaction to fear which render him worse than useless as a combat airman. Psychiatrists know such illnesses by the titles of neurosis, psychoneurosis, and operational fatigue.

Neurosis and psychoneurosis have the somewhat more awe-inspiring titles and, indeed, are the more malignant emotional disturbances, having their roots deep-seated and sometimes meshed in the soul since infancy. They are the so-called "true" emotional sicknesses, usually antedating military service, which existed in the individual long before the terrifying experience of combat.¹

Operational fatigue, on the other hand, is the term used to describe a disorder occurring in the basically stable, normal individual who, through the continual stress of combat with its unusual emotional strain and sustained physical fatigue, has developed a sickness which is roughly half fatigue and half emotional illness.

Combat fatigue is a distinctly real disorder and is of the greatest practical concern to a combat unit commander. Any of his men are susceptible to it. The airman suffering from its effects may be of such reduced efficiency and so emotionally disturbed as to constitute a hazard to himself and his fellow fliers and, in some instances, may require permanent grounding.

If subjected to sufficiently severe stress and if the exposure to it is sufficiently prolonged, psychological

¹D. W. Hastings, *Psychiatric Experiences of the Eighth Air Force* (Josiah Macy Jr. Foundation, 1944), p. 32.

symptoms may develop in anyone.² Once symptoms have appeared, it becomes a question of good medical and military judgment as to how much longer the individual should be exposed to the combat situation and what can be done to help him. *Before* the symptoms appear, however, there is the question of what measures can be taken by the military leader, consistent with accomplishment of the mission, to prevent the combat flier from reaching the point of breakdown.

Since future aerial warfare will surely subject the combat airman to more severe and more trying experiences than have ever been undergone in the past, and since it will be more necessary than ever before to secure the maximum effectiveness from available personnel, the following vital questions regarding control of operational fatigue will surely be raised in the mind of the combat commander: *What are the causes of operational fatigue? What are its symptoms and effects? What is its treatment? What can be done to control and prevent its onset?*

THE REACTION to war stress begins early in the overseas career of the combat flier. The strain of aerial warfare is severe and the chances of survival are always uncertain. These facts are known by flying personnel and they are quickly learned by replacements coming into a depleted unit. At this stage the men feel the first real pressure of war. Their friends and loved ones have been left behind, the environment is strange, and actual combat is drawing very near. In a small percentage of individuals, psychological failure will occur here, expressed either by unmitigated fear, with a request for relief from flying duties, or by physical illness. Such failure is primarily motivated by fear.

There are obviously all sorts of combat fears--fear of personal injury or death; fear for the safety and well-being of someone who is dearly loved; fear of loss of honor and prestige; fear of economic loss. One thing, however, is common to all fears: what is feared is the loss of something that is held very dear, whether it be a man's own life, the well-being of another, an inanimate object or an abstract

²R.R. Grinker and J. P. Spiegel, *Men Under Stress* (Blakiston, 1945), p. 53.

idea. John Dallard writes in *Fear in Battle* that: "The feeling of fear is a normal reaction and is felt by literally all men in the face of danger."

The harrowing experiences which are the normal events in modern air warfare subject the airman to emotional stress far beyond any that he would encounter during a normal lifetime. The ordeal of frequent enemy fighter attack, the penetration of seemingly insuperable walls of flak, the shock of seeing a comrade's ship explode in mid-air, and of returning from a mission with dead and wounded aboard one's own ship...to tolerate such psychological stress demands a high degree of emotional stamina, a force that is not possessed equally by all persons. Most individuals do not reach the point of emotional breakdown, but in most cases anxiety is felt in varying degrees of severity dependent upon the emotional stability of the individual. The anxiety or tension, though widely different in various personalities, does seem to follow a general pattern.

Some airmen experience the greatest tension the night before a mission. They visualize and feel all the terrifying possibilities of disaster. They see their ship crashing in flames, their blood spattered over the cockpit, or their comrades machine-gunned in their parachutes. This results in worry, insomnia, irritability, and an almost constant nervous strain on the individual, with an ensuing marked loss of efficiency.

In the majority of individuals, the feeling of greatest tension occurs during the period of relative inactivity between briefing and take-off, and then perhaps again on entering enemy territory, in immediate anticipation of the coming danger. This tension is relieved by combat, when the enemy is actually encountered and the task at hand becomes paramount.

Some men experience the greatest nervous anxiety after the mission is completed, when they have begun to talk over and think over the events that occurred and relive the experiences with an obsessive repetition, realizing how close they may have come to disaster.

A small number of fliers seem to feel virtually no tension as a result of combat. It is the opinion of psychiatrists

that these men separate their fear of death and disaster from its proper cause and dispose it to other matters of a varying nature, such as the fear of contracting venereal disease, the fear of or dislike for authority, the welfare of loved ones at home, or any other matter worthy of some small degree of apprehension or anxiety.

An interesting aspect of the reactions to the stress of combat flying is revealed in the attitudes and personalities that develop as the men progress through the tour, going from defensive insecurity, manifested by cocky, false bravado, to an attitude of conscious anxiety with a somewhat hopeless feeling about their chances of survival; then changing to effective, cautious fighting men, quiet and cool on the ground and in the air; and finally, as the end of the tour draws near, developing restlessness, fatigue, and sometimes a fairly marked depression with loss of interest and efficiency. Thus, the long strain of continued combat begins to have its telling effect.

Although the onset of operational fatigue is basically a matter of personality and tolerance of the individual to emotional stress, there does appear to be a relation between the position in the combat crew and the frequency rate of the illness.

Among enlisted and officer flying personnel, those who have the least amount of continuous work to do throughout the mission and hence less opportunity to release tension, are the most susceptible to accumulations of anxiety. Fighter pilots are least frequently affected. The frequency with which 'operational fatigue' occurs is, according to occupation in the combat crew, in the following order: (1) radio gunner; (2) gunner; (3) engineer gunner; (4) bombardier navigator; (5) bombardier; (6) navigator; (7) pilot (bomber); (8) pilot (fighter).³

AMONG COMBAT AIRMEN in the recent war by far the greatest number of psychiatric cases were anxiety states in one form or another; i.e., emotional disorder precipitated by the continual stress of combat with its harrowing experiences, physical strain, and almost constant threat of disaster to the individual. True psychoses (actual mental

³Grinker and Spiegel, *Men Under Stress*, p. 213.

instability) were very infrequent and almost all cases, therefore, fall under one of the following headings: *fear reaction, bodily or functional symptoms owing to combat flying, psychoneurosis, or operational fatigue.*

Fear reaction is the term used to describe the emotional upset of the individual who is so overcome by his fear that he is unfit or unsafe for further combat flying. His disorder is transient, in direct response to the fear of combat, and disappears abruptly when he is relieved from combat. This individual usually realizes his shortcoming, but is unwilling or unable to control it.

The term *functional symptoms owing to combat flying* is generally used to describe the bodily symptoms that occur in some individuals as the result of fear of combat flying. These individuals usually appear average or "normal" until they begin combat, when the fear reaction manifests itself in such forms as nausea, dizziness, weakness in the knees, and innumerable other bodily symptoms that can be associated with a state of anxiety.

Psychoneurosis generally applies to the individual whose condition existed before any combat experience, and often before military service, a person who has somehow managed to survive the selection process and the hazards of a flying career until entering combat duty.

Operational fatigue has already been defined. However, it is further clarified in the following statement:

For our purposes, then, we have established four arbitrary criteria for the diagnosis of 'war neurosis' or 'combat fatigue:' (1) A stable personality prior to appearance of the traumatically determined emotional disturbance. There should be no objective evidence of maladjustment in childhood or adolescence. (2) A combat experience of sufficient intensity to render it feasible as a precipitating agent. The mere threat of combat is not enough to produce neurotic symptoms in men other than those specifically predisposed, i.e., the psychoneurotics. (3) Objective evidence of subjective anxiety. The patient suffering with war neurosis does not discuss his combat experience with equanimity. (4) Recoverability. It is our belief that all true 'war neuroses' will recover in a comparatively short period of time with even relatively superficial therapy. When symptoms persist in disabling degree beyond two months under treatment, either the treatment is not adequate, or the psychoneurosis is not simply 'combat fatigue' and has its roots in a deep-seated

emotional conflict which long antedated the traumatic experience.⁴

J. M. Murray, writing in *Psychosomatic Medicine* in 1944, differentiates operational fatigue from psychoneurosis on the basis that the latter denotes symptoms which are derived from unconscious conflicts arising in early childhood. On the other hand, he believes that operational fatigue, at least in the early stages, is basically dependent on recent situations and has not yet become irreversibly bound to earlier unresolved conflicts. Just as physical and emotional factors contribute to the production of fatigue states, so the resultant symptoms include both physical and emotional disturbances.

Although the vast majority of combat airmen never reach the point of psychological failure, operational fatigue is nevertheless a condition to which any so-called "normal" individual can be brought, provided he is subjected to sufficiently prolonged emotional stress and physical fatigue. The degree of stress that can be tolerated before a psychological breakdown will occur is primarily a matter of individual emotional stability.

BECAUSE of the myriad variables involved, ranging from the ability of the psychiatrist to accurately diagnose emotional disturbances to the characteristics of the type aircraft being flown, it would be difficult to estimate a percentage of individuals who might be expected to incur operational fatigue before completing a combat tour. One fact, however, became evident during the recent war, and will probably hold true in any future conflict: The incidence of psychiatric disorder among enlisted men was far greater than that among officers. There are numerous reasons for this, some of which are within the control of the unit commander. For one thing, Flight Surgeons and commanders, in many cases, paid more attention to officers. They were quicker to sense a disturbance in them and take preventive action. Too, officers often had easier access to the Flight Surgeon and were more inclined to consult him when they felt unfit. Officers had better facilities for recreation

⁴G. N. Raines and L. C. Kolb, "Combat Fatigue and War Neuroses," *U. S. Navy Medical Bulletin*, XLI, 1943, p. 923.

and diversion; they generally had more motivation for flying duty; they held positions of greater responsibility and were more occupied when on a mission. In general, the officers had a greater concept of the part their efforts played in the overall picture of the war than did enlisted crew members.

When an airman flies mission after mission, day after day, experiencing the continual emotional stress, as well as the physical strain incumbent with combat flying, and without having adequate intervals during which to rest and "forget" the experiences of combat, he may well reach the point of emotional saturation leading to operational fatigue.

The basic trouble arises, of course, from the ever present conflict between the instinct of self-preservation and the various motivating quantities which drive the individual to continue in combat. However, numerous other factors contribute in whole or in part to the onset of the disorder. Examples of these contributing factors are: (1) Worry, apprehension for the well-being of loved ones at home; (2) lack of motivation, feeling that war is unnecessary; (3) insufficient leave and pass-time; (4) missions too close together over an extended period of time; (5) lack of confidence in the type of aircraft being flown; (6) lack of sleep; (7) poor facilities for recreation and diversion; (8) poor physical condition; (9) poor food; (10) low unit morale; (11) poor leadership, both on the ground and in the air; (12) terrifying experiences; (13) frequent scrubbing of missions after briefing; (14) knowledge of missions too far in advance; (15) insufficient knowledge of results of missions; (16) poor personal equipment; (17) slow delivery of mail; (18) little or no provision for nourishment on prolonged missions.

Some of these factors are routine matters to be considered in maintaining good morale among any group of military men, but in the stress of war they attain new significance and are worthy of close consideration by a combat commander.

THE INDIVIDUAL suffering from operational fatigue displays some or all of the symptoms characteristic of the

general psychiatric disorders. His face becomes pale and drawn. He becomes restless and nervous, often experiencing a tremor of the fingers ranging from moderate to so pronounced that he has difficulty in eating and drinking. He often experiences vivid dreams and nightmares, usually centered around the combat situation, which are so severe as to cause awakening. He is tense and irritable and becomes belligerent on little provocation, often quarreling with his fellows and even with close friends. This adds to his tension and anxiety and he frequently begins to avoid his friends in an effort to avoid the quarrels. There is often a straining of the mental processes to the point where the individual sometimes wonders if he is approaching insanity. In a highly trained group of combat fliers, whose survival often depends upon instantaneous decisions and quick action, such depression and retardation of the faculties are serious symptoms, contributing materially to the anxiety of the individual, as well as causing him to be a hazard to his fellow airmen.

Although "symptoms" are generally considered the concern of the Flight Surgeon, many of the "danger flags" of psychiatric disturbances are easily discernible to a commander and can be of considerable value in helping him recognize and prevent the onset of operational fatigue among his combat crews.

The treatment of operational fatigue combines medical therapy with physical rest, inasmuch as the disorder is partly emotional and partly bodily fatigue. Adequate psychiatric therapy in combination with a well-regulated program of physical reconditioning and rest and rehabilitation have produced gratifying results in returning operational fatigue cases to combat duty. A large majority of both officers and enlisted men treated during the war were returned to full flying duty. The factors which contribute to the onset of operational fatigue among combat airmen are those which fall within the scope of morale, a command responsibility. The obvious conclusion is that the combat commander, concerned with the welfare of his men and the efficiency of his unit, can to an important degree control and prevent the onset of operational fatigue among his airmen.

IN VIEW of the foregoing discussion and in consideration of the probability that any air war of the near future will be waged much as in the past--with essentially conventional aircraft manned by human crews--and that the problem of emotional illnesses will therefore almost certainly continue to exist, any commander who is to achieve maximum effectiveness from his combat airmen must understand the problems of emotional stress which they encounter and must do something about them.

It is of extreme importance that combat flying personnel have sufficient time away from the flying field for rest and recreation. Generous leave schedules are recommended. An individual who is on leave or pass should not be recalled to fly a combat mission unless it is of absolute necessity. If possible, an arrangement to send the crews to an established Rest Camp approximately midway through the tour may prove to be of considerable value.

The importance of sleep is obvious and should require no elucidation. However, at the average operational station the facilities for obtaining proper rest are often inadequate. The night before a mission, when sleep is most needed, is usually when it is most difficult to obtain. Both officers and enlisted men are often quartered in rooms with twenty or more other persons. Due to the restlessness and inability of many of the individuals to sleep, it is impossible for the others to get the vitally needed rest. Room partitions and a "lights out" curfew are possible solutions. When, during the night, a mission is scrubbed, or a crew is removed from flying the mission, all individuals concerned should be informed promptly, even if they must be awakened to be told. This will help them to relax into a restful sleep, and is far better than letting them doze fitfully, getting no worthwhile rest.

Although the number of missions is usually not within the control of the unit commander it is a subject of great importance to the combat crews. It is believed extremely important to give the airmen *some* goal at which to aim as regards relief from combat, even if it is only a temporary relief for the purpose of rest and recuperation.

Combat crews seldom have an opportunity to see the results

of their bombing, except from their own strike photos which are usually just columns of smoke and dust. It is believed that some sort of regular briefing to keep the crews informed of the part they are playing in the overall picture is of value.

Often there will be seen pronounced emotional reactions among fliers after a crash or some other harrowing episode in the air. Experience has shown that the onset of a fear reaction or of a neurotic state often dates from one such terrifying experience. One psychiatric study makes the following observation on this point:

When a flier returns from such a mission, in which he has had a severe shock and exhibits uncontrolled behavior, excessive tremulousness or mental confusion, he can be greatly benefited by moderate sedation.... The aim is merely to relieve the [mind] from the acute anxiety produced by the recent [shock] until it becomes strong enough to digest the experience.⁵

Such treatment, of course, rests with the Flight Surgeon.

There are numerous other elements which enter into the prophylaxis of operational fatigue. They, as well as those already discussed, simply fall under the heading of good leadership. In the final analysis, superior leadership is the solution to successful combat operations.

⁵Grinker and Spiegel, *Men Under Stress*, p. 156.

In the second World War the airplane and the tank, working for the first time as a co-ordinated team, all but decided the contest against the side which was slower to develop these arms and the proper strategy for their use. In the next war, it will be the airplane and the various applications of rocket power which will decide the struggle. If the blitz of 1940 and 1944 was terrific, it was nevertheless mild by comparison with what will be possible through long-range rocket attack, followed up by rocket-strafting aircraft, bazooka-armed paratroops, rocket-driven demolition bombs and various types of guided missiles.

--G. Edward Pendray

The Coming Age of Rocket Power (1948)

A QUALITY AIR FORCE

Colonel John W. Carpenter, III

DURING WORLD WAR II this country was inadvertently plunged into a not too subtle "numbers racket" masquerading under the name of the Expansion Program necessary to build our peacetime fighting forces to war strength. Against the results of this insidious lottery was balanced the fate of the nation.

Since our Air Force was young and far behind those of other leading nations of the world, the then U.S. Army Air Force found itself more deeply submerged in this "numbers racket" than any of the other branches of the Armed Forces. To see the truth of this statement we have only to look at some "before and after" figures. As of 30 June 1939, the AAF consisted of 23,455 military personnel; by 30 June 1943, a total of 2,197,114 was listed. Obviously, an increase of this magnitude, with the urgency of war as a catalyst, dictated some sort of mass production training and conditioning.

Our national policy as regards a fighting force propounds the concept of a "Civilian Army," brought forth when the exigencies of war dictate and trained by a nucleus of professional fighting men who make up our small, regular establishment. Under such a concept a certain amount of the "numbers racket" is a necessary evil. But how far can we go? How many men, combat crews, and units can we put in the field? And how swiftly can they be trained?

Since the only means available for speeding up this process beyond a certain point is by shortening the training period, it becomes apparent that there is a point of diminishing returns beyond which it would be foolhardy to venture. If carried to an absurdity, a training system operating under these conditions could continue to speed up delivery of combat units by creating air crews manned by pilots incapable of getting the aircraft off the ground. The

same applies to the ground crew members and to supply and administrative personnel.

It is mandatory, therefore, that we reach a balance which will provide the greatest numbers of individuals and units possible and still insure that those individuals and units will be able to perform satisfactorily their primary mission, be it firing guns, dropping bombs, or unloading freight cars.

LOOKING at this problem objectively, it seems apparent that the AAF went overboard on the "numbers racket" in certain instances during the past war. This conclusion was forcibly stated by one of our eminent operations analysts, Dr. Thomas I. Edwards of Headquarters, USAF, in a lecture at the Air Command and Staff School, 12 November 1947. Dr. Edwards pointed out a strange paradox in bombing accuracy unearthed in analyzing certain bombing results of the Eighth Air Force. It was discovered that bombing formations using independent range sightings on bombing runs had the smallest percentage of bombs within 1000 feet of the aiming point; formations in which each squadron leader sighted for range and deflection for his squadron had the next greatest percentage of bombs within 1000 feet of the aiming point; formations in which the group leader alone sighted for range and deflection (with all members of his unit dropping when he dropped) had the greatest percentage of bombs within 1000 feet of the aiming point. Since this conclusion was reached through univariate analysis, Dr. Edwards pointed out that it might be well to seek confirmation of the results by reference to another system of proof. However, he further indicated that results of univariate analysis are adequate for: (1) exploratory purposes; (2) quickly identifying tactics which have high military worth; (3) identifying major sources of error. Apparently, this information was used by the Eighth Air Force in determining the type of formation which was most advantageous in attacking objectives against which they were deployed. Likewise, we may use this information for identifying a major source of error.

According to the theory of bombing and the laws of probability, the more individually aimed releases obtained, the

greater should be the accuracy of the bombing. From the information presented in the analysis mentioned above, it is plain to see that, all other things being equal, the degree of accuracy obtained was in inverse order from that which might have been expected. In other words, instead of the individually aimed releases being the most accurate, they proved to be the least accurate. Such results forced the AAF to adopt the lead-crew principle in its bombing formations. Simply stated, this principle involved the use of specially selected and trained crews to lead an organization in combat. The lead crew did the navigating and the bombing, and made all the decisions for the entire unit. Adoption of this principle allowed the AAF to put greater numbers of aircraft over a given target with the accuracy of all bombs more closely approximating those of the lead crew. All other crews were less highly trained and merely released their bombs when the leader dropped his. Thus, considering their poor state of training, the crews on the wings of the leader actually achieved better results than had they employed individual sightings. This, of course, poses the immediate question: "Wouldn't we have been better off with only half as many crews, trained twice as well?"

Another example of lack of training in AAF bomber crews was the difficulty experienced by our units in destroying the German rocket-launching sites. Very few of the small sites were ever actually destroyed. After each bombing they were quickly moved by the Germans, and England was never relieved of the menace of the V-weapons until the sites were moved far to the rear or, as a result of the advances by our ground troops after the Normandy landings, abandoned completely. A considerable portion of the total effort of our bombardment aviation was expended on the rocket installations, although few actual hits were scored. It must be remembered that these targets were comparatively small. Further, many of our Air Force leaders contended that they were not suitable targets, particularly for our horizontal bombers. The fact remains, however, that for the effort expended, the results were poor. Here again, our crews were not trained to a high enough degree of proficiency to permit them to exploit the full capabilities of the equipment with

which they were provided. There simply was not enough time available to teach all there was to learn, much less, time enough to gain a high degree of proficiency through practice and repetition. Such was the effect of the urgency of war upon the product of the Air Force training system.

EXAMINATION of the "numbers racket" side of the training system reveals some interesting statistics which in turn lend an insight into the reason for some of these training deficiencies. Consider for a moment the heavy bombardment crew. It is a team composed of the most varied assortment of specialists, one which requires the highest degree of training before it can perform its primary mission--accurately bombing the target and returning to friendly territory in the face of enemy opposition.

In August of 1943 the AAF's zone of interior training system was producing some 500 heavy bombardment crews per month, and straining every fiber to meet this commitment. Suddenly, and with very little warning, these demands were increased to more than twice that figure. The training system responded by producing over 1100 crews during October and more than 1000 in November 1943. After this achievement, crew production slumped and did not reach the 1000 mark again until March 1944.

In the meantime, an all-out effort was ordered in preparation for the Normandy landings in the summer. The straining zone of interior establishment again increased its production of heavy bombardment crews to over 1800 in April 1944, to more than 1500 in May and June, and to more than 1400 in July. After this exertion, production dropped off and never recovered. Attempts were still being made to reach these maximum figures again when the cut-back began in February 1945. However, because the end in Europe appeared inevitable and the build-up of very heavy bombardment in the Pacific was assuming a new importance, the goals were not attained.

How did the training system meet these ever increasing inroads upon its productive capacity? The training cycle for heavy bombardment crews, after completion of individual training by its component members, was three months in

length. Individual training periods ranged from a few weeks for gunners, to nine months for pilots, to over two years for radar operators. Obviously, individual training had to be completed before there were any crews to train. And since the increased commitments were poured on at such a rapid rate, the only possible means of providing the number of crews demanded was to cut the training cycle.

Over the protests of the training people, this cycle was cut to twelve weeks--then eleven weeks--then ten weeks--and in some cases even to eight weeks, in order to fill the skies with airplanes. As each cut was made, the various theater commanders were informed of the increased deficiencies which could be expected from these ill-trained crews; however, they still called for more. Again and again the answer came back: "Send the numbers anyway!"

It is not our purpose to impugn the decisions made by our top commanders during World War II, since the final, victorious results of the conflict are evidence enough of the overall soundness of those decisions. Apparently, the "numbers racket" never cracked the training system since the crews produced under these unfavorable conditions were the crews which won the war in the skies over the world. Nevertheless, adherence to this "numbers racket" pattern which was imposed upon the AAF training system produced the crews mentioned above. These were the crews who had so much difficulty in hitting the German rocket-launching sites and who compiled the overall visual, average circular error of 1200 feet with a bombsight supposedly capable of "pickle-barrel" bombing.

World War II has been won, and all that happened is past. For future survival we must look forward. Those concepts employed in connection with the winning of the recent struggle are history, and must be considered as such. If we are to progress, we must not allow our thinking to stagnate by dwelling on irrevocable events. We can, however, study past operations and draw lessons from mistakes made, considering them as signposts pointing the way in which answers to future problems may be found.

THE PRIMARY purpose of this discussion is to examine the present position of the United States Air Force, and to project our thinking into the future to determine how far we can go in the direction of the "numbers racket" in the prospective preparation of the Air Force for combat.

First of all, we have a fabulously expensive tool to deal with. It is interesting and alarming to note that the USAF official estimate for the maintenance of the basic 70 Group Program (considered the minimum necessary for insuring our Nation's security) is \$8.1 billion per year as compared with the \$3.3 billion allocated in the 1948 budget. In this connection, Mr. W. Stuart Symington in his *Statement of the Secretary of the Air Force in a Public Hearing before the President's Air Policy Commission 26 November 1947* illustrates the position of the Air Force as to the adequacy of the 70 Group Program:

Finally, there is a minimum in forces in being, below which both our capacity to protect our sources of strength and our capacity to retaliate--upon which, I repeat, especially in this day of atomic weapons, depends our major hope for peace in the world--would be seriously jeopardized. The 70 group program was conceived over a year ago as an expression of this minimum. We have not achieved it and are now shooting at 55 groups by 1 January 1948. The continuing appraisal which this subject has received has tended more and more as time goes on to confirm the validity of the original concept of 70 groups as a minimum below which we cannot go without unacceptable risk. Mind you, this risk is not expressed in terms of this month or this year, but in terms of an imbalance in an over-all program which must provide for our security not only this month and this year, but next year and the years to come. It is a program which encompasses military air in all its phases, civil air, and the air industry of this country--all interrelated and interdependent.

Mr. Symington goes on to show what it takes in addition to size to make an air force strong:

It must be pointed out, however, that the strength required is not to be measured solely in terms of aircraft. In the last war it was not true, and in any future war it will certainly not be true that quantity is an acceptable substitute for quality. Quality is dependent primarily upon two factors: One, the quality of the equipment--something that can only be insured by an

adequate, i. e., the best--program for research and development in the world; second, the quality of the people--something that must be measured again in such un-mathematical terms as morale and efficiency.

What the Air Force must strive for is a system which will provide an answer to the first factor of Mr. Symington's breakdown of "quality"--quality of equipment. The end product of this system, in terms of offense, is a prodigiously expensive machine consisting of enormous destructive power and the vehicular means of transporting that destructive power to the target; this coupled with a costly and complicated means of assuring that upon arrival the target is hit.

SO MUCH FOR the equipment, as such, of the Air Force. Next, let us consider the other factor of Mr. Symington's breakdown of "quality"--the quality of the people. In investigating this from the Air Force point of view, we are primarily concerned with the people who operate and maintain the "quality" equipment discussed above. With the high cost of the equipment in question, we, as a nation, cannot tolerate inexperience in our operating personnel--the people of the Air Force.

The delivery of the atomic bomb is a case in point. Here is a weapon so expensive and so important that we dare not use crews who might miss their objective. Furthermore, inexperience among the people who maintain the equipment cannot be tolerated.

Looking back to World War II for guidance, we find that the Eighth Air Force in its operations against Germany had an abort rate of approximately twelve to fifteen per cent per operation.¹ Can we afford to have that percentage of our aircraft turn back, ineffective, in the event of future hostilities? Any such reduced numbers of aircraft or missiles certainly blunts the effect of the attack, and in any future war it is easy to visualize conditions where the very life of the nation might depend upon those extra numbers reaching the target. There were many contributing causes to the abort rate cited above, but a large number of the turn-backs may

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Army Air Forces Statistical Digest, World War II, pp. 221, 232.

be traced to lack of proper training of the operating and maintenance personnel. We can eliminate these ineffectives in future operations through proper and intensive training.

In looking toward better training and eventually better quality in Air Force personnel, the effect of time on the training cycle has already been discussed. Now let us examine some of the other problems facing the Air Force if it is to insure quality in its operating personnel.

The increased emphasis now being placed on all-weather and Arctic training is a factor which further complicates the maintenance of quality combat crews. To meet this emphasis, pilots must have increased instrument flying proficiency, bombardiers must be more proficient in blind bombing procedures, and entire combat crews, as well as all ground personnel, must be proficient in the science of cold weather operations. They must all know how to properly live, work, and fight in the polar regions.

Another integral part of a "quality" Air Force is an effective Intelligence organization. We must have information upon which to base decisions as to which enemy objectives if destroyed will return the greatest dividends. This brings to light further training necessities in the field of reconnaissance responsibilities. Considerable time and intensive indoctrination of personnel will be required if the results obtained are to be of any value.

During the past war, the Air Force was the preferred service with respect to the availability of personnel from the high physical and mental categories. In future operations of the Selective Service system it is possible that such may not be the case. Since the Army and the Navy are also becoming more technically complicated, the Air Force will be required to share the highly qualified personnel. Each of the services will claim priority, and a compromise will be necessary. Consequently, the Air Force must be prepared to live within its available means, and its training policy must, therefore, be mutually agreeable to the other services.

This further demonstrates the necessity for a highly trained regular establishment. Each individual in the regular Air Force must be skilled in his own particular specialty.

Further, the Air Force must exercise care in the selection and classification of its personnel in peacetime to insure that it utilizes the capacity of the individuals for cross-training. In another war, every person in the regular establishment will be required not only to be able to perform many jobs, but also to instruct others in the performance of new and difficult duties. Only thus can the Air Force become strong enough to carry on a large scale conflict.

We positively cannot condone a gamble on the United States Air Force, our first line of offense and defense. The time has arrived when we must consider well the *quality* of Air Power our security demands.

*M*ilitary preparation should aim at the most favorable possible balance of strength of this country vis-a-vis others in an atomic war. It should be emphasized again that the primary purpose of a favorable balance would be to deter other countries from becoming involved in a war against us, rather than to use preponderant strength as a means of furthering external policies (which might be so distasteful to others that we would be attacked in spite of our precautions). Preparations would include:

(1) To have ready at all times an atomic assault force of maximum strength which would be able to function even if this country were the recipient of the first blow.

(2) To maintain strong defensive forces with the greatest possible capacity for intercepting air-borne weapons.

(3) To support research in and development of atomic explosives, conveyances for delivering atomic bombs, and defenses against air attack. The assault and defense forces should be kept fully equipped with late-model devices.

(4) To maintain in readiness, protected against attack, the facilities needed for prosecuting the war after the initial attacks.

(5) To determine from military intelligence the status of atomic-bomb stockpiles, of defenses, of vulnerability, and of strength in air carriers of foreign powers. The rate of bomb production might be difficult to determine, but the construction of thousands of late-model long-range heavy bombers, or of transoceanic rockets, would utilize such a large proportion of the national industrial output (particularly in countries other than the United States) that the activity should be readily discernible.

--Ansley J. Coale

Vulnerability to Atomic Bombs (1947)

PUBLIC OPINION AND WAR

Reavis O'Neal, Jr.

THE PURPOSE of this article is to examine the profession known as public relations and to survey its potential as a decisive weapon in modern total war.

An unusual fact about public relations is that while it stems back through much of history, it has only recently become public in the sense that large numbers of people have become conscious of its existence. From the military standpoint, it is just beginning to be recognized in its full stature. That recognition is being accelerated as study of the records of the recent war highlight the influence of public relations on many of the critical decisions of the war.

During the early stages of the recent war there suddenly appeared at fields across the country a special staff officer calling himself a "Public Relations Officer." His status was only vaguely defined by obscurely worded Army Regulations. He was nominally subject to the orders of the Intelligence Officer, while many of the fields in which he sought to become most active appeared at first glance to belong to Special Services.

The position of the Public Relations Officer evoked little sympathy from a good many station commanders. Being professional soldiers and charged with the greatest task which any professional soldiers have faced in our history, they saw little value in words. They were deeply immersed in the job of meeting quotas for the production of pilots, bombardiers, navigators, aerial gunners and all the other rated specialists necessary to operate the Air Force, and of coping with the manifold problems of personnel, supply and procurement for an organization which had mushroomed through dire necessity from 23,000 to 2,700,000 men.

Though charged with responsibility for the dissemination of all military information to the public and, in combat

theaters, with fast and accurate reports to the public on the results of engagements with the enemy, the PRO found himself still subject to the restrictions of Intelligence. Here began a basic conflict which had not been settled even in the last stages of the war. The prime function of Intelligence is, of course, generally opposed to that of Public Relations or as it is now termed, Public Information.

One result was that during the greater part of a war in which full public understanding of military aims was more essential than ever before, the officer charged with encouraging wider public understanding of all things military found himself hamstrung. Confusion of purpose from the standpoint of public relations was apparent in the most important theaters of operations. At one time, just prior to the invasion, there were no less than nine separate and distinct Army and Air Force public relations offices in London.

One of the most sensible practitioners of good military public relations throughout the war was General Spaatz. He named a highly competent man from the Washington bureau of the Associated Press as his chief press officer and backed him up with full authority and plenty of equipment. During the preparations for the invasion and thereafter, the PRO for the Strategic Air Forces was always briefed in advance of operations and allowed to make plans for adequate coverage. The special attention which was given to detailed explanation of the long-range objectives of the Strategic Air Forces was most effective. The work in preparing the Strategic Bombing Survey was a new high in competent military reporting. USSTAF enjoyed excellent relations with the press throughout the war, and its operations were always fully reported.

THE CAUSE for the errors and tragedies committed in the name of public relations during the recent war arose, in several cases, from misunderstanding on the part of influential commanders of what public relations is, and how one goes about acquiring and maintaining good public relations.

Much of this misunderstanding stems perhaps from the traditional preoccupation of the professional military man with ways and means of fighting, rather than an attempt to understand *why men fight in the first place*. The professional soldier throughout history has been primarily concerned with seeing that his orders were obeyed without question. But history also records that the greatest and most successful commanders were those who deliberately inspired and maintained the respect and admiration of their men. Some knew how to do it instinctively; but many did not.

It is with this latter class that this discussion is most concerned. There are certain basic rules for achieving and maintaining good public relations, and the alert commander should have at least a nodding acquaintance with them. The fact that the Air Force is giving thought to them is a most heartening sign. Heretofore, military education has been largely confined to technical studies, with very little time for history, literature, political philosophy, economics and other fields of knowledge from which most of humanity derives the basis of its thinking.

Few military men have understood throughout history--but every military man today must understand--that his very existence depends upon wide public acceptance of his mission and that, further, no modern war can be waged effectively unless it is supported by an aroused and continually sympathetic public opinion that extends all the way from the front lines back to the smallest war plant in the zone of the interior. One might observe that the time of the military martinet has passed; the day of the military diplomat is at hand.

That day has come to pass through the spectacular development of all the media of communications. When 60,000 words about an event can be flashed around the world in one minute, when a picture of the actual event can span the oceans in a matter of seconds, when hundreds of millions of people throughout the world are capable of reading and, what is more, of understanding at least the major outline of events, the swift and accurate presentation of facts becomes a matter of top concern to everybody, particularly those in high positions.

For when people look or read and hear, they form opinions, and the opinions they form can make or break most types of enterprises, the military not excepted. Further, the personal relations between men in positions of power and the representatives of press and radio now becomes of paramount importance. For the reporter is, in reality, the representative of the public, and his reaction to a particular man can credit or discredit that man and his projects.

One of the most rigid rules for conduct anywhere today is that anyone in authority must be frank, forthright, and courteous in dealing with the representatives of press and radio. No one must be misled into attempting to bamboozle the press. If you do not know the answer or if you have made a mistake, it is far better to say so at once than to try to conceal it. If the answer is embarrassing, it is often far better to blurt it out and let it be a one-day sensation than to try to evade or cover up. For the power of the press is very real, and newsmen, like everyone else, are only human.

Let us be kind to the press, not merely for the sake of what might be termed "enlightened self-interest" but because the newsman of today is fulfilling a most important role in the modern world. He is writing history as it happens, and because his words can be transmitted to all quarters of the globe in less than the twinkling of an eye, he has brought profound changes to the world.

HISTORY TODAY is written as it happens, and that development has great meaning for the military commander. Time was when the military man could screen himself from the inquisitive public. Until fairly recently, top commanders accounted for their actions only through the medium of official reports to higher headquarters. The real facts about some of the most decisive battles of history have often not been known to the general public for years. The customary procedure was for the commander to turn in an official report on an operation, usually at some considerable time after the operation. As often as not, these reports became restricted or confidential documents.

But modern history is an entirely different matter. It is not written months afterward on the basis of coldly calculated official statements. It is written by radio and cable and telephoto as it is happening. The public forms an immediate opinion, and woe to him who tries to cover up his inadequacy or his shortcomings. What is more, both sides of a controversy have access to the same media of communication. This is a relatively up-to-date development. It provides the general public with an immediate means of cross-checking its information.

With so much of history being written on the spot, an institution such as the Air Force must make sure that its version of events is made available while the subject is still news and while the public is still making up its mind.

But what really is public relations? One definition states that public relations is "the identification of the policies of an individual or an organization with the interests of the public." That, of course, is gobbledy-gook for "seeing to it that your policies are good ones and that they are understood by the public and that they may reasonably be considered to be in the best interests of the public."

A famous practitioner of public relations calls it "the engineering of human consent." That phrase, however, smacks more of secret seduction than of outright persuasion. Another definition says public relations is "the creation of a climate of opinion in which well-conceived policies can flourish." Yet another is that "public relations is a way of life."

One of the best definitions came from a rural pastor who said: "Public relations is living right and getting credit for it." This homely definition is preferable, because what it may lack in grammar is more than compensated for by the moral element which it contains. It implies the existence of the moral and ethical basis which any public relations policy must have if it is to achieve its purpose.

Throughout the ages men of high authority have recognized the potency of this tool or weapon which deals with the hearts and minds of men and have not hesitated to make use of it on the highest policy-making levels. It has been and

is today practiced by popes and kings and presidents and great leaders in many fields.

In 1776 a nation for the first time took formal notice in a state document of the first and basic principle of public relations. That principle is set forth in very clear words in the first paragraph of the Declaration of Independence: "When in the course of human events, it becomes necessary for one people to dissolve the political bonds which have connected them with another, and to assume among the powers of the earth the separate and equal station to which the laws of Nature and of Nature's God entitle them, *a decent respect to the opinions of mankind requires that they should declare the causes which impel them....*"

No American in public or private life today should ever forget that maxim which is so deeply imbedded in our national life. It is the greater because it implies that *if a cause can be stated, it is by and large a decent one.*

Many instances of the influence of public relations planning upon our national development can be cited. Well-conceived slogans have always exerted a powerful influence upon us. "Fifty-four-forty or Fight" gained us the Oregon Territory without a war with Great Britain. "Remember the Alamo" was a galvanic slogan in its time. "Tippecanoe and Tyler, too," is another powerful example of public relations thinking aptly expressed.

WHEN THE UNITED STATES entered World War II, proved methods of public relations were employed in many ways. Divulgence of military information was prevented and careful regard for freedom of the press was notably achieved through the Office of Censorship under Mr. Byron Price. Some 12,000 American publishers voluntarily enforced a code of censorship, and it is believed there was not a single wilful and serious violation of that code throughout the war.

But some of the most interesting experiments, from the standpoint of the military potential of public relations as a weapon, were conducted by the Office of Strategic Services and the experts in psychological warfare. Many military commanders through the ages have been conscious of the

potential of psychological warfare. Napoleon several times sent wagons of food ahead of his armies for distribution to the populace of a city which he was about to occupy. During the recent war, actions of both sides were somewhat less chivalrous. But the successful operations should receive serious consideration by staff planners.

At one point, the British printed a large number of cleverly counterfeited German ration cards and scattered them broadside with the object of confusing enemy food distributors and draining food supplies in critical areas. Unfortunately, the plan was not followed up to any considerable degree.

The American forces in France were very successful in inducing holed-up German forces to surrender. The Office of War Information sent out loud-speakers mounted on jeeps, and a German-speaking American coaxed the Nazis into surrender.

Wide new fields were opened for psychological warfare, although the details are only coming out piecemeal as individuals write their memoirs. One of the most tremendous feats was General Eisenhower's use of "The Voice of SHAEF" to broadcast to the people of the occupied countries prior to the invasion. The warnings to the Scandinavian, Dutch, and Belgian fishing fleets, combined with feints by the Air Force, are credited with having largely influenced the Germans to retain their 15th Army in the Pas de Calais instead of dispatching it to Normandy. The news broadcasts of the BBC in a dozen foreign languages not only kept the hopes of millions of Europeans alive during the darkest days of the war, but also provided the military authorities with a useful medium for getting code messages to the resistance movements in the various occupied nations. Our own O.W.I. scored notably with its dissemination of news about the volume of American production to such places as India and the Near East where disaffection of the native population could have forced us to take costly military precautions.

It is to be hoped that eventually a catalog will be compiled of the various stratagems devised and used by the experts in psychological warfare. Such a catalog should be

compulsory reading for all students on the command and staff level, for it is a new field which offers many military opportunities.

The modern military commander will be neglecting an important part of his duty unless he becomes and remains conscious of the decisive influence of public opinion upon military affairs. That is especially true because of the dramatic situation now confronting most of the civilized world. Two great and rival concepts of government are engaged in one of the most unusual struggles of history. In many ways, it parallels the crisis when the Mohammedans were invading Europe and threatening the whole structure of Christian civilization. Today capitalism and communism are fighting for control of the hearts and minds of men, with the sure knowledge that the system which wins the most adherents will automatically control vast reaches of territory. It is, indeed, the cold war, as Walter Lippman and Bernard Baruch have termed it, in which words are so far the principal weapons.

The consequence of this extraordinary situation is that Americans, great and small, are conscious of the power of words today as they have never been before. The average American has always had a profound distaste and distrust for official propaganda. This feeling was reflected by the Congress last year when it chopped the appropriation for the State Department's "Voice of America" radio program. But now Congress has gained a broader perspective of the cold war, and recently several millions in additional funds have been appropriated for the enlargement of the "Voice of America" broadcasts.

AT THE SAME TIME, we have witnessed the beneficial results of such propaganda ventures as the Friendship Train. This idea, conceived by Drew Pearson, did much to counteract communist propaganda in Western Europe. The genesis of the idea offers a profitable study in public relations as it can be carried out. During the past year, the Russians sent one ship of wheat to France. It docked in Marseilles and was the focus of a tremendous communist

demonstration. Through newsreels, news pictures, and broadcasts, the communists heralded the arrival of this gift from the Russian people to the people of France. By the time the communist propagandists were finished, a great many French people had the idea that the Russians were far more concerned with the welfare of France than the Americans.

Mr. Pearson had followed the misuse of some of the food and equipment we had pumped into Europe. He knew that some of it was being relabeled and passed off as a gift from somebody else. In the face of widespread apathy, he organized the Friendship Trains and procured ships to take the donations of the American people to Europe. He and a staff of newsmen accompanied the first ships. They saw to it that special itineraries were worked out for the trains carrying this food to the French and Italian people--and that the magnitude of the project was fully appreciated by the people to whom the food was given. The result was a public relations project of the first degree.

This campaign has an interesting counterpart in industry. A move is underway to make certain that every bit of equipment which leaves this country under the terms of the Marshall Plan shall be indelibly and unmistakably marked as a product of free Americans working together under our system of productive democracy.

These are only a few of the current undertakings which illustrate the high level to which public relations has progressed in recent years. The Air Force itself has made an excellent start toward a sound public relations program. But these gains can come to naught unless public relations is understood through all levels of the Air Force. Informed public opinion offers the best hope for the creation and maintenance of an Air Force which can in fact as well as theory be our first line of defense. Informed public opinion is the most effective way to prevent a war. But once a war is begun, public opinion can win it or lose it.

*A*ir Power is today the most dynamic force in the life of nations.

--John C. Cooper
The Right to Fly (1947)

SYNTHETIC FUEL

Lt. Col. Lloyd D. Chapman

MILITARY GASOLINE consumption at the height of World War II was 100 times the amount used by our overseas forces at the peak of World War I. In 1945 the American Army and Navy had 600 times as many automotive vehicles in Europe as had the AEF in 1918. The Army and Navy operated 1250 per cent more planes shortly before V-E Day than they did before Pearl Harbor. This was American armament alone. The planes, vehicles, and ships of our allies likewise multiplied in number and consumed proportionately greater quantities of oil products.

Not many years ago the major item of supply to fighting forces was food. In World War II, however, the volume of liquid fuel shipped overseas from this country was nearly sixteen times that of food. Fighting forces no longer move on their stomachs; an army marches, a navy sails, and an air force flies, on oil. Our overseas forces during the last months of the war required nearly twice as many tons of oil as of arms and armament, ammunitions, transportation and construction equipment, food, clothing, shelter, medical supplies and all other materials together.¹ In both essentiality and quantity, oil has become the greatest of all munitions.

Great as the overseas oil requirements were, two and one-half times as much was required for the war-supporting economy at home. Without rationing, conversion to coal, and other oil conservation measures, civilian demands would have consumed so much of the available supply that military needs could not have been met. Even with these measures, civilian consumption was not much below pre-Pearl Harbor volume; the savings were largely offset by the needs of a vastly expanded war industry. In an industrialized nation, the home front

¹Max W. Ball, "Petroleum in Modern War" (Economic Mobilization Course, The Industrial College of The Armed Forces, 1947), p.3.

requires even more oil than the fighting services. If the requirement for fuel is as great in the next war as it was in the last, many countries will depend on imports for up to ninety per cent of their needs. The terrific drain on the world's crude oil caused by World War II has depleted the supply of some countries to the point where their future reserve is estimated to be only enough to last a few more years.

The United States is one of the countries which has seriously drained its reserves of petroleum during the last six or seven years. Because of the war, oil wells of this country were obliged to exceed their maximum efficient rates of production. In spite of the realization that forced production would seriously waste reserves, this expedient was necessary because the United States, besides furnishing oil for its own armed forces, was required to furnish much of the petroleum needed by its allies. A serious question is therefore facing us today: Where is the necessary petroleum coming from to operate the armed forces if another world war is forced upon us? Perfection and increased production of synthetic fuel is surely the only possible answer.

RESearch in synthetic fuels has been going on for about twenty years, although numerous discoveries which led to the beginning of chemical research for synthetic fuel were actually made forty years ago. Germany has been outstanding in this research.

The results of German research enabled the mechanized Nazi Army of 1939-1945, fueled primarily by 100,000 barrels of synthetic fuel per day, to initiate and nearly win a war. Cost of this fuel was high and in the light of present day American engineering knowledge, the German installations were unnecessarily expensive. It is worth noting that when the Allied Technical Oil Mission rushed into Germany immediately after V-E Day, it found 250,000 pages of technical reports dealing with the production of cheap oxygen and synthetic gasoline.

Now that the war is over we are getting the truth about what happened toward its end when the German demand for oil

became so great that her leaders were desperately trying to increase production by any means.

Some of the synthetic plants built in Germany were of tremendous size. Their blending formulas and amounts of tetraethyl lead to be used in their aviation gas were all specified from Berlin. The makeup of the finished product was known only to a limited few high in the Nazi inner circle. Peak German synthetic production exceeded 350,000 metric tons per month in 1944, but under increased bombings output fell so sharply that by the end of the war it was almost negligible.²

American engineers first became seriously interested in oil synthesis a few years before the war. Efforts were concentrated on the synthesis of fuels from natural gas. It was estimated that if a satisfactory process could be developed for transforming natural gas into gasoline, it would double our oil reserves. Development of the so-called Hydrocol process was one result of these efforts. The two companies employing this process today expect that the cost of motor fuel produced will be at least competitive with the cost of motor fuel refined from crude oil.

For several years the Department of the Interior and private industry have been experimenting with the conversion of coal, oil shale, and natural gas into oil. Progress has been so rapid that the following developments have recently been announced:

- (1) Cost of synthetic oil has been reduced to a nearly competitive level with crude oil.
- (2) Enough of the technical problems have been solved in experimental and pilot plant production to assure the nation the rest can be conquered.
- (3) Within three to five years conversion of coal and shale into gasoline can be started on a commercial basis.
- (4) Resources are clearly available to assure an oil supply for hundreds of years.

²W. C. Schroeder, "Synthetic Fuel Methods--German Manufacturing Process," *Science News Letter*, XXXXVIII (8 December 1945), p. 357.

After an exhaustive study, the special committee investigating petroleum resources for the Department of the Interior recently concluded: "If the United States is to hold the place it now occupies on the world stage, it must develop a National Petroleum Policy that will make certain that we shall not become dependent upon any other country for our supply of liquid fuels." This leaves only one alternative--to make oil synthetically from coal, oil shale, natural gas and other materials.

As a result, Congress in 1944, gave the Department of the Interior \$30 million for work on synthetic fuel. The Department immediately began to study the possibility of converting coal and oil shale and left the problem of converting natural gas to private industry. So far the programs have been highly successful. In Louisiana and Missouri the Department is now completing demonstration plants which will make possible gasoline from coal. According to the tests at these plants the process has produced gasoline with a good octane value and good mixture characteristics.

To show that synthetic fuel will do its job, the Naval Engineering Experiment Section, in recent tests, used fuels made from natural gas, shale, and coal to operate landing craft, amphibious tanks, and turbo-jet engines. These fuels proved to be very efficient.

One of the most inviting prospects of the synthetic fuel industry is the large amount of readily accessible materials in the United States for use in production. The materials are so plentiful here that it seems unnecessary to mention any foreign sources of supply.

BOTH THE USE and the value of natural gas at the well have increased over the past five years. Vast reserves in Texas which only recently were capped over and ignored--some even wasted--have become valuable assets. The national reserve of natural gas, based on current consumption rates, should last nearly forty years.

Over half our reserves of natural gas are located in Texas, while principal domestic, commercial, and industrial fuel consumers are in the heavily populated areas far to the east, north, and west. Transportation has been one of the

big difficulties of the industry. Pipe-line transportation of the gas over long distances would not be necessary in the production of synthetic fuel. The synthetic plants could be built near the gas fields and a constant supply could be provided. New technological developments and processes are providing large new markets for natural gas and its components. More efficient pipe-line transportation of the gas at slightly over one cent per thousand cubic feet per hundred miles is one of them. With this new low rate of transportation assured, synthetic fuel plants could be built practically anywhere.

Under present processes of conversion, only natural gas can produce a gasoline which compares in price with fuels produced from crude petroleum. The amount of low-cost gas which is available for conversion to gasoline is relatively small, being estimated by the Standard Oil Research Corporation as equivalent to less than two billion barrels. Some have placed the figure at close to seventeen billion barrels, but these higher estimates generally overlook two facts--first, that gas which already enjoys a high-value demand in its existing state is not available for conversion; and second, that only those areas in which large gas-producing wells are reasonably concentrated are available for economic production. Moreover, it is likely that gas reserves will tend to decline with the oil reserves, and that the potential supply for the synthetic plants will decrease as the economic need for the process increases. Thus, the most we can hope for in the near future is that some ten to fifteen per cent of the country's needs in gasoline may be filled through natural gas.

THE ULTIMATE available coal resources of the North American continent and especially of the United States are huge. In the United States alone, commercially available coal reserves are scattered through twenty-nine states and are estimated to total 3.2 trillion tons. If fifty per cent of this coal could be utilized for synthetic fuel it would represent a potential gasoline reserve that would last over 2000 years at current American consumption rates. For the

synthetic production of gasoline the lowest grades of coal are almost as good as the best grades; and in the Rocky Mountain area lie huge deposits of bituminous and sub-bituminous coal and lignite which now remain entirely untouched for want of a market. With these reserves of coal, a synthetic oil industry would be able to furnish unlimited oil for the United States and its armed forces in the event of an emergency.

Prior to the discovery of well oil in Pennsylvania, there were more than fifty plants in the United States and several in Canada distilling oil from black shales and low grade coal. An examination of the shales at some of the localities in which these plants were located shows that they operated on rock that would yield only eight to twenty gallons of oil per ton. It is probable that nearly every state has considerable bodies of shale of equal grade. But under present conditions such shales cannot be classed as commercial possibilities.

Reports of the United States Geological Survey show that east of the Mississippi river oil-bearing black shales exist in very great volume and are widely distributed. They occur mainly from New York to Alabama and westward to the Mississippi river. Their average oil yield is about 10.5 gallons per ton. The highest yield per ton is 20 gallons. As to the quantity of oil obtainable from the shales of western states, there can be little doubt that from workable beds of shales in Colorado alone there may be obtained ten times as much oil as has been produced in the United States since the discovery of petroleum in Pennsylvania in 1859.

Estimated costs of producing oil from coal present an increasingly optimistic picture. Testimony presented before the O'Mahoney Committee in 1943 showed that oil, using the high pressure hydrogenation process, could be made from coal for sixteen to eighteen cents per gallon, a cost which is so high as to eliminate immediate interest. Recently, however, a major oil company, familiar with hydrogenation, expressed a belief that with a "minemouth" coal cost of \$2.50 per ton, motor fuel could be produced for between seven and ten cents

per gallon, all costs included.³ Estimates by Hydrocarbon Research, Inc., indicate a possible cost of 6.5 cents per gallon, all costs included, with coal at the "minemouth" worth \$2.00 per ton. This latter figure is competitive to the cost of motor fuel produced from present day crude oil.

The world's largest coal company and the world's largest oil company, Pittsburgh Consolidation Coal and Standard Oil of New Jersey, joined forces last spring and put up \$300,000 for an experimental plant which may change the whole coal industry as we know it today. This experiment is the forerunner of one of the most ambitious research projects ever sponsored by American industry. It is designed to supply facts and figures for a proposed \$120 million plant to be built within the next few years. This giant production plant will consume 20,000 tons--approximately 300 railroad cars--of coal a day. It will produce 96 billion cubic feet of gas a year. It will also produce 14 million gallons of Diesel oil, assorted chemicals, and 114 million gallons of gasoline. With the value of the subsidiary products subtracted, the ultimate manufacturing gasoline cost would be reduced to 7 1/4 cents per gallon. Here is a gasoline which is not far outside today's cost range.⁴

However, specific costs for the production of synthetic fuel are hard to state at the present time. No commercial plants are yet in full operation and performance records and accurate cost data are lacking. Information which is available on such subjects is forecast from experimental work. In addition, most of the development work on such processes is highly classified information.

Several factors influencing the cost picture should be remembered. Based on present trends, costs of producing gasoline from petroleum in all likelihood will soar. Refinery expenses are rising, and so are costs of producing oil. We are hauling it ever greater distances by tanker. In addition, the cost of finding oil grows greater each year. Whereas it cost fourteen cents to discover a barrel of oil in 1937, it

³P. C. Keith, "Synthetic Fuel," *Chemical Engineer*, XXXIV (December 1946), p. 102.

⁴J. D. Ratcliff, "The Oxygen Age is Just Ahead," *The Saturday Evening Post* (20 September 1947), p. 28.

costs sixty cents today. Thus the cost gap between gasoline from petroleum and gasoline from coal, natural gas, and oil shale will close, more rapidly, perhaps, than anyone thinks. Our internal combustion economy is altogether too dependent on liquid fuels for us to take any chances. We must not curtail synthetic production because of the small difference in cost per gallon between synthetic and petroleum fuels. We must continue our research until the gap is closed.

THE CONCLUSIONS to be drawn from our present fuel situation are portentous. To a nation which is trying to preserve Western democracy and in doing so must be prepared to go as far as war, there is only one answer: *The United States Government should encourage the research and development of synthetic fuel and push this program forward as rapidly as possible. It must actively assist scientists to discover better and speedier methods of producing synthetic fuels.*

Fortunately, recent developments indicate that our leaders have recognized the besetting dangers. On 26 January 1948, Secretary of the Interior Krug proposed to Congress a nine billion dollar outlay over the next five years to produce synthetic oil and gasoline on a commercial basis. Mr. Krug stated:

It is clear now that the United States cannot rely exclusively on petroleum to supply all future requirements for liquid fuels and related products. The Nation already is squeezed between increasing demand and decreasing productive capacity. And if the international trend toward mechanized economies continues, the proportion of the world's oil available to the United States may diminish markedly. Setting up a synthetic fuel industry is far too large an operation and requires too much time to be undertaken under emergency or war conditions. To produce roughly 2,000,000 barrels of oil a day, which is less than 40% of the country's present daily consumption, would require about 16,000,000 tons of steel and the expenditure of around \$9,000,000,000. It should be undertaken now when the country is at peace and completed over a period of five to ten years.

This very realistic attitude provides the authentic impetus to a program which if carried out should prepare the United States for a possible future war.

It will require billions of dollars to construct the plants necessary for the production of enough synthetic fuels from coal, oil shale, and natural gas to replace petroleum. No one expects this to happen overnight. It will take years before all the mass production difficulties have been eliminated or reduced, and still more years before our dwindling domestic reserves advance the price of oil enough to make synthetics a competitive product. In the meantime, basic research and development should receive the strongest kind of government and Air Force support. In the event of a national emergency, rapid conversion to synthetics may prove to be a deciding factor between victory and defeat. With a sound progressive program in operation such conversion may feasibly be attained.

The next war, the pessimists say, will be a pushbutton war. In this catch-sentence they suggest that the next war will be impersonal, that men will be replaced by machines, that the men with the biggest and fastest rockets or the most devastating atomic bombs will surely win the next war. There is an awful truth in this suggestion, but it is a half-truth. The concept of a pushbutton war ignores these facts: the next war will be started by men in order to impose their wills on other men; it will be preceded and accompanied by large-scale psychological warfare; and it will be won or lost by the true fighting unit, the man-machine. In our fascination with the physical sciences and industrial technology let us not forget that the machine is only half the battle. No one has yet invented the pushbutton man, and military psychology is not intended to produce such a man. But there is a science and technology of man as well as a science and technology of the machine.

- Charles W. Fray
Psychology and Military Proficiency
(1948)

EDITORIAL

BY BRIG. GEN. JULIUS K. LACEY

TODAY the American people must understand that, just as wars are won by force, peace is maintained between wars by power. This has never been realized or accepted by enough Americans because of the comparative safety we have enjoyed behind our ocean barriers. If we had always been threatened by strong nations contiguous to our borders, we would not have become psychologically conditioned to security by isolation.

Since we have never felt constrained to maintain military power for safety, we have developed a dislike for nations which have kept their position by balance of power and large military forces. But today we must overcome our historical prejudice, and look at national and world power objectively and with an open mind.

Power, except for its abuse, connotes good as well as evil. We take justifiable pride in the use made of our national power in World Wars I and II in opposing the forces of evil. The legal power of government provides safety for law-abiding citizens. Power in our federal government prevents individual states from going to war with the government or with each other, or from seceding to go their separate ways.

Sufficient power centralized internationally would prevent wars and bring about a lasting peace. Unfortunately, such centralized world power is extremely remote, due to suspicion, distrust, lack of common language, interests and standards of living, and extreme nationalism. It is not enough to say that we should have world government. There are real obstacles, which only time itself can remove, to the establishment of a world government with power greater than any of its component states. For the present, then, power must be maintained by individual nations for protection; and the "balance of power" of nations and groups of nations must continue to be our only hope for an uneasy peace.

But what hopes do we have for lasting peace? The United Nations Organization and international law are steps in the right direction, but are not compelling forces for peace. Lawless men do not submit to punishment without the coercion of force--neither do lawless nations.

It has been said that world opinion will prevent another war. Yet public opinion has not prevented strikes, race riots, lynchings, and crimes of all kinds. It has been said that the *absolute* weapon will create such fear in the minds of men that the threat of mass destruction itself will prevent another war. But history refutes this statement and marks it as one of pious hope. Wars have always been initiated without sound logic or reason. And war can always be justified in the mind of the "war maker" on some economic, material, spiritual, or ideological ground, even though the war makes little sense to the millions of participants. From World War I the world as a whole was supposed to have learned such a lesson that henceforth no one would dare plunge a nation into another such cataclysm. But again men are not governed by logic and reason.

Will the new international morality principle that aggressive war is a crime serve to restrain dictators who wish to make war? Certainly not! Dictators are ruthless men. They live in an atmosphere of danger and excitement. Their profession has developed within themselves an immunity to principles of morality and to possibilities of punishment. They play for keeps and expect always to win. They shut their eyes to the possibility of failure. They will start wars whenever there are good chances of winning wars.

Will international social intercourse and the development of cultural relations help keep the peace? Yes, of course. But peoples with common nationality, language, and schools have race riots and pogroms. Age old sayings and beliefs have created images and impressions of other peoples and nations which only generations of education can dispel or change.

Will improvement and leveling of world-wide standards of living eliminate wars? The wealth of the world can probably never be evenly distributed, but even if it could be, some nations as well as some individuals would continue to covet one another's property.

And finally, will disarmament bring about lasting peace? Past experience has shown to our pain, sorrow, and loss that unilateral disarmament has not contributed to peace but has actually contributed toward war. We have also seen that a gentleman's agreement between nations to disarm cannot only be unsound but can actually be dangerous for the nation or nations which comply, as long as there are others which do not. The only sound approach to this problem is gradual disarmament backed up by international inspection to enforce

compliance. Without true disarmament the prospect of war must always be with us.

WHAT THEN if war comes? Will there be a defense against atomic attack? Certainly not for the nation caught off guard. Only a few atomic bombs, one, two, or three per city, need get through to kill millions and wreck our economy.

We may ask if it is likely or even remotely possible that atomic weapons will not be used in another war. Their use would seem to be inevitable. Nations wishing to survive must prepare for atomic war. The atomic bomb is the only weapon known to date which, especially with surprise, promises quick victory to an aggressor, and likewise the only weapon which offers a suitable deterrent to attack. With survival at stake no nation would hesitate to employ a weapon that has already proved so decisive.

Military weakness on the part of the United States will have the most certain result of assuring an attack upon this continent. If we are not continuously strong in research and development, and strong as well in military preparedness, we invite attack. We cannot afford to get behind--there is too great a time lag in design, development, and employment of modern weapons. Our strength during the past has been in our industrial capacity to produce, after a lengthy period of mobilization and conversion, the most powerful war machine in the world. Henceforth, our strength will not lie in our war potential but in our forces in being when the first blow is struck. Capacity to produce may well be paralyzed with that blow. The penalty for shortsightedness, ignorance, and misunderstanding will no longer be a serious depletion of natural resources and a heavy casualty list. The penalty will almost certainly be national death.

The consequences of again becoming a nation without the required "force in being" are crystal clear. We must realize that peace in our present world, like civil order, is maintained by force. We must be willing to give up some of our comforts and privileges for our safety, or we stand to lose all comforts, all privileges, and our very way of life. Finally, we must appreciate the urgent necessity for national security preparations, because at this very moment weapons which will determine America's ability to survive are almost surely being envisioned, designed, and tested.

AIR ANTHOLOGY

THE CAMPERS AT KITTY HAWK

ON DECEMBER SEVENTEENTH, nineteen hundred and three, Bishop Wright of the United Brethren onetime editor of the *Religious Telescope* received in his frame house on Hawthorn Street in Dayton, Ohio, a telegram from his boys Wilbur and Orville who'd gotten it into their heads to spend their vacations in a little camp out on the dunes of the North Carolina coast tinkering with a homemade glider they'd knocked together themselves. The telegram read:

SUCCESS FOUR FLIGHTS THURSDAY MORNING ALL AGAINST TWENTYONE MILE WIND STARTED FROM LEVEL WITH ENGINEPOWER ALONE AVERAGE SPEED THROUGH AIR THIRTYONE MILES LONGEST FIFTYSEVEN SECONDS INFORM PRESS HOME CHRISTMAS

The figures were a little wrong because the telegraph operator misread Orville's hasty penciled scrawl but the fact remains that a couple of young bicycle mechanics from Dayton, Ohio had designed constructed and flown for the first time ever a practical airplane.

After running the motor a few minutes to heat it up I released the wire that held the machine to the track and the machine started forward into the wind. Wilbur ran at the side of the machine holding the wing to balance it on the track. Unlike the start on the 14th made in a calm the machine facing a 27 mile wind started very slowly.... Wilbur was able to stay with it until it lifted from the track after a forty-foot run. One of the lifesaving men snapped the camera for us taking a picture just as it reached the end of the track and the machine had risen to a height of about two feet....The course of the flight up and down was

extremely erratic, partly due to the irregularities of the air, partly to lack of experience in handling this machine. A sudden dart when a little over a hundred and twenty feet from the point at which it rose in the air ended the flight.... This flight lasted only 12 seconds but it was nevertheless the first in the history of the world in which a machine carrying a man had raised itself by its own power into the air in full flight, had sailed forward without reduction of speed and had finally landed at a point as high as that from which it started.

A little later in the day the machine was caught in a gust of wind and turned over and smashed, almost killing the coastguardsman who tried to hold it down;

it was too bad

but the Wright brothers were too happy to care

they'd proved that the damn thing flew.

When these points had been definitely established we at once packed our goods and returned home knowing that the age of the flying machine had come at last.

They were home for Christmas in Dayton, Ohio, where they'd been born in the seventies of a family who had been settled west of the Alleghenies since eighteen fourteen, in Dayton, Ohio, where they'd been to grammarschool and high-school and joined their father's church and played baseball and hockey and worked out on the parallel bars and the flying swing and sold newspapers and built themselves a printingpress out of odds and ends from the junkheap and flown kites and tinkered with mechanical contraptions and gone around town as boys doing odd jobs to turn an honest penny.

The folks claimed it was the bishop's bringing home a helicopter, a fiftycent mechanical toy made of two fans worked by elastic bands that was supposed to hover in the air, that had got his two youngest boys hipped on the subject of flight

so that they stayed home instead of marrying the way the other boys did, and puttered all day about the house picking up a living with jobprinting,

bicyclerepair work,

sitting up late nights reading books on aerodynamics.

Still they were sincere churchmembers, their bicycle business was prosperous, a man could rely on their word. They were popular in Dayton.

In those days flyingmachines were the big laugh of all the crackerbarrel philosophers. Langley's and Chanute's unsuccessful experiments had been jeered down with an I-told-you-so that rang from coast to coast. The Wrights' big problem was to find a place secluded enough to carry on their experiments without being the horselaugh of the countryside. Then they had no money to spend;

they were practical mechanics; when they needed anything they built it themselves.

They hit on Kitty Hawk,

on the great dunes and sandy banks that stretch south towards Hatteras seaward of Albemarle Sound,

a vast stretch of seabeach

empty except for a coastguard station, a few fishermen's shacks and the swarms of mosquitoes and the ticks and chiggers in the crabgrass behind the dunes

and overhead the gulls and swooping terns, in the evening fishhawks and cranes flapping across the saltmarshes, occasionally eagles

that the Wright brothers followed soaring with their eyes as Leonardo watched them centuries before straining his sharp eyes to apprehend the laws of flight.

Four miles across the loose sand from the scattering of shacks, the Wright brothers built themselves a camp and a shed for their gliders. It was a long way to pack their groceries, their tools, anything they happened to need; in summer it was hot as blazes, the mosquitoes were hell;

but they were alone there

and they'd figured out that the loose sand was as soft as anything they could find to fall in.

There with a glider made of two planes and a tail in which they lay flat on their bellies and controlled the warp of the planes by shimmying their hips, taking off again and

again all day from a big dune named Kill Devil Hill,
they learned to fly.

Once they'd managed to hover for a few seconds
and soar ever so slightly on a rising aircurrent
they decided the time had come
to put a motor in their biplane.

Back in the shop in Dayton, Ohio, they built an air-tunnel, which is their first great contribution to the science of flying, and tried out model planes in it.

They couldn't interest any builders of gasoline engines so they had to build their own motor.

It worked; after that Christmas of nineteen three the Wright brothers weren't doing it for fun any more; they gave up their bicycle business, got the use of a big old cow-pasture belonging to the local banker for practice flights, spent all the time when they weren't working on their machine in promotion, worrying about patents, infringements, spies, trying to interest government officials, to make sense out of the smooth involved heartbreaking remarks of lawyers.

In two years they had a plane that would cover twentyfour miles at a stretch round and round the cowpasture.

People on the interurban car used to crane their necks out of the windows when they passed along the edge of the field, startled by the clattering pop pop of the old Wright motor and the sight of the white biplane like a pair of ironingboards one on top of the other chugging along a good fifty feet in the air. The cows soon got used to it.

As the flights got longer
the Wright brothers got backers,
engaged in lawsuits,

lay in their beds at night sleepless with the whine of phantom millions, worse than the mosquitoes at Kitty Hawk.

In nineteen seven they went to Paris,
allowed themselves to be togged out in dress suits and silk hats,
learned to tip waiters
talked with government experts, got used to gold braid and

postponements and vandyke beards and the outspread palms of politicians.

For amusement

they played diabolo in the Tuileries gardens.

They gave publicized flights at Fort Myers, where they had their first fatal crackup, St. Petersburg, Paris, Berlin; at Pau they were all the rage,

such an attraction that the hotelkeeper wouldn't charge them for their room.

Alfonso of Spain shook hands with them and was photographed sitting in the machine,

King Edward watched a flight,

the Crown Prince insisted on being taken up, the rain of medals began.

They were congratulated by the Czar

and the King of Italy and the amateurs of sport, and the society climbers and the papal titles,

and decorated by a society for universal peace.

Aeronautics became the sport of the day.

The Wrights don't seem to have been very much impressed by the upholstery and the braid and the gold medals and the parades of plush horses,

they remained practical mechanics

and insisted on doing all their own work themselves, even to filling the gasolinetank.

In nineteen eleven they were back on the dunes at Kitty Hawk with a new glider.

Orville stayed up in the air for nine and a half minutes, which remained a long time the record for motorless flight.

The same year Wilbur died of typhoid fever in Dayton.

In the rush of new names: Farman, Blériot, Curtiss, Ferber, Esnault-Peltrie, Delagrangé;

in the snorting impact of bombs and the whine and rattle of shrapnel and the sudden stutter of machineguns after the motor's been shut off overhead,

and we flatten into the mud

and make ourselves small cowering in the corners of
ruined walls,
the Wright brothers passed out of the headlines
but not even headlines or the bitter smear of newsprint
or the choke of smokescreen and gas or chatter of brokers on
the stockmarket or barking of phantom millions or oratory of
brasshats laying wreaths on new monuments
can blur the memory
of the chilly December day
two shivering bicycle mechanics from Dayton, Ohio,
first felt their homemade contraption
whittled out of hickory sticks,
gummed together with Arnstein's bicycle cement,
stretched with muslin they'd sewn on their sister's sewing
machine in their own backyard on Hawthorn Street in
Dayton, Ohio,
soar into the air
above the dunes and the wide beach
at Kitty Hawk.

-- John Dos Passos, U.S.A. (1937)

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*M*any American advocates of Air Power as the primary element in our military organization have written of the defense of the continental United States as our primary military concern; but Mitchell never accepted any such limitations, and he was first to discuss the application of Air Power--with a minimum of support by surface forces--in global terms. He was a tireless advocate of the arctic air routes between the continents, which have recently become the subject of so much popular interest and have led to so generous a displacement of mercator by polar-projection maps. He dwelt endlessly upon the value of a transatlantic route by way of Greenland and Iceland, and the feasibility of its military use, and upon the corresponding value and feasibility of movement between the United States and Asia by Alaska and Siberia or by the Aleutian and Kurile island chains.

--Edward Mead Earle

Makers of Modern Strategy (1943)

FOREIGN HORIZONS

ACCURATE BOMBING

FUTURE DEVELOPMENTS INDICATED BY THE WAR

By

Wing Commander J. B. Tait, D.S.O., D.F.C.

Digested from The Royal Air Force Quarterly, April 1948.

AS FAR AS can be seen the future divides itself into three main phases. The first is the immediate post-war period in which the threat of a major war is not great because most of the world is struggling towards economic recovery. Bomber Command, reduced to a fraction of its war establishment, is still equipped with war-time aircraft, now obsolete. The second period will open when the new aircraft appear, jet-propelled, with a performance of the order of 10,000 miles range, 500 knots cruising speed and 45,000 feet ceiling. This period will not open for at least five years unless precipitated by an impending crisis. The third period is that of the long-range missile, rocket or winged projectile, which will eventually supersede the bomber as the main long-range striking weapon although it may not totally delete it for a much longer period. The perfection of a long-range missile can only be guessed at, but ten years is probably the shortest time.

The post-war period, in which we are at present, raises the questions of how the small bomber force is to be trained, what tactical doctrine is to be adopted and what standard of capability is to be expected of it. The war, with its formidable achievements, is still so close that it tends to exert too great an influence on planning. Circumstances have changed since the war ended and are still changing rapidly; it is a return to peace-time, but not the peace of before the war. The political equilibrium of the world is a different arrangement of the Powers and our strategic commitments are different.

In considering the next stage of the future, the introduction of the prospective new aircraft and new weapons produces a number of formidable problems in bomb-aiming which are obvious now. Others will doubtless present themselves when the aircraft come into service. Accurate bombing with unguided bombs will be difficult from an aircraft flying at 600 m.p.h. at 40,000 ft. The target will be about seven miles ahead at the moment of release, so that very precise alignment of the aircraft on the correct heading will be necessary; it will be difficult to locate a target by eye far enough away to make a bombing run; the aircraft will have a large radius of turn so that it will be necessary to make an early turn on to the correct heading; in practically all parts of the world the ground is frequently obscured by haze to oblique vision from this height, or is cloud covered. Apart from these aiming difficulties there is the problem of the behaviour of a bomb released at near-sonic speed, and when an atomic bomb is used that of delaying it until the aircraft is clear of the danger area.

The possibility of using the atomic bomb does not diminish the importance of accuracy. One atomic bomb is a very expensive item and will be so for a long time to come. The output of atomic bombs will be limited by industrial capacity to produce them; we are probably as far off producing atomic energy from non-radio active materials as the Athenians were from making an atomic bomb. Production rate will probably be the natural brake on the potency of the bomb as a decisive weapon. Costly and scarce, each bomb must pay a dividend by destroying a strategic target. The power of the bomb is not unlimited and it will be as necessary to place it in the selected aiming point as it was to centralize the bomb pattern of a mass raid in the last war.

ONE of the natural reactions to the advent of the atomic bomb will be dispersal, under threat of war, of everything vulnerable which cannot be put underground. Armies, storage depots, factories, human beings, will be dispersed evenly in small units instead of being concentrated in cities and congested areas. This process was

started by high explosive and will be pushed forward another larger step. The result will be that profitable atomic bomb targets in a country organized for war, and we can expect no other sort of enemy, will be fewer. The main strategical targets, oilfields, coalfields and metallurgical plants cannot be much dispersed, but there will be a multitude of targets which the bomber force will be called upon to attack for which high explosive bombs will be economical. To use an atomic bomb to destroy a bridge would be using a large steam hammer to crack a walnut.

The aspect of bombing in this visualized war of the future which stands predominant is locating the target to aim at it--the great problem of the last war rising again. Most of the methods of the last war will not work in the new conditions: targets will be beyond the range of the ground-controlled systems like Oboe and G.H., and visual location from high altitude will not be reliable. The weather cannot be permitted to be the controlling influence it was over the comparatively short range operations of the last war.

The remote-control-guided bomb offers possibilities. Both the target and the bomb must be observed for radar to be used at night or in bad weather. A radial scanning beam, movable horizontally and vertically, could be used. The operator would pick up the target, and the presentation would then show sufficient of the surrounds for him to select the aiming-point. The bomb would be constructed to guide itself down the centre of the rotating beam, and by controlling the beam so that the aiming point was held in the centre of the presentation tube the bomb would be guided to the target. This is a development of the German radio-controlled bombs, replacing the bomb-aimer's vision with a radar beam.

ALL METHODS of blind-bombing from high altitude depend, however, on the equipment being able to "see" the target. The vital targets will probably be the most difficult ones. If we are involved in another war it will be because the enemy has prepared for it, and he will not leave vital targets exposed. The aim of our bomber force must be the ability to hit in any weather the vital point of any

target, even though it is only represented by a point on a map or photograph.

It is difficult to avoid turning to target marking as a solution, although it savours of a retrograde step. Target marking has all the disadvantages of complication. The bombing aircraft have to depend on an outside organization instead of being self-sufficient; there must be synchronization between bombing and marking operations; there is the risk of failure of the marking system causing complete failure of the operation.

Nevertheless it does seem that the bomber must have an artificial aiming mark to hit a target at long range. Long-range radio aids, astronomical fixing systems or D.R. plotting by sensitive accelerometers may achieve accuracy of navigation of an order at present unknown, and place the bomber within reach or even sight of its target, but something else will be needed to hit it.

All the various bombing methods of the war had their own disabilities; every target had its own characteristics which one method suited best. There were many targets which were repeatedly attacked without success because there was no method or equipment good enough. It will be necessary to experiment with every device and method that can be devised because each will have its particular use.

THE FOLLOWING are suggested requirements of bombing equipment.

The bombsight should be a tachometric sight connected to the automatic pilot, to be used for visual bombing or as a radar sight obtaining data from a lock-follow beam. The beam should be capable also of locking on to a radar responder-beacon used as a target marker or scanner to produce a circular presentation, and the scanner of being swivelled or depressed to follow a target.

A marking force will have to mark targets at low-level because it cannot do anything at high-level that the bombing forces cannot do for itself. It is assumed that targets will be out of range of ground-controlled systems such as Oboe. Low-level marking was dangerous in the last war and it is not to be expected that an increase of speed of about 200

m.p.h. will make it safer. The key to low-level work is surprise, and the greater areas of territory over which operations can be expected, compared to the last war, will make surprise easier to attain. The difficulty will be to obtain an aircraft of adequate range, equal to the heavy bomber's, of a reasonable size. The larger an aeroplane is, the more vulnerable it is.

The bombsight for the marker force should be primarily a radar set of very high discrimination for map-reading at low-level at night or in fog, with a computer into which bombing information is fed when the target is located. The high discrimination of the radar equipment will be made possible by the short range at which it operates, and this is the only reason for low-level marking when the ground is not visible. For daylight marking below cloud a visual bombsight for accurate shallow-dive bombing will be necessary.

Target indicator bombs should be of both pyrotechnic and radar types.

THE FACTORS involved in the future high-altitude, high-speed, bombing problem are so adverse to accuracy that it seems that some control of the flight of the bomb after release will be necessary. To depend entirely on guided or homing bombs for the aiming process does not, however, cover all contingencies. The problem of guiding a bomb from high altitude is that of locating the target. The target must be visible to the eye or the radio equipment. Discrimination is the limitation of radio equipment: only certain types of target can be seen. Similarly, a homing bomb can only guide itself to a target it can discriminate. A system of marking the target with some form of radio beacon on which the bomb will home itself offers promise, but there will be limitations to its use. It may not be possible to mark all targets (even if marking is possible at all from low-level, which is the only means seen at present of overcoming the difficulties of high-level bombing). All types of bombs may not be suitable for the incorporation of homing and steering mechanism. At present it seems that the best development

policy will be to aim the bomb as accurately as possible from the aircraft and use the homing or guiding to improve the accuracy. The less correction the bomb is going to require in flight the smaller and simpler will be the guiding mechanism which has to be built into it, and if a reasonable degree of accuracy can be obtained by straightforward bombing methods there is an independence of the more complicated systems when it is not possible to use them.

The weapon of the future is clearly one of the family of missiles, but what form it will take, winged or wingless, rocket turbo-jet or thermo-duct propelled, or how soon it will appear it is too soon to judge. When it becomes a reality the bomber will lose its position as the long-range weapon. It may still be useful, even necessary, for certain purposes, but the missile will be less vulnerable to the enemy's defences and cheaper if it can hit the target.



FIRST LINE OF DEFENSE

Digested from The Aeroplane (London), 9 April 1948.

FIRST DUTY of the Royal Air Force to-day is to defend this country against attack. That responsibility has to be carried in the first instance by Fighter Command. Consequently, special interest attaches to the demonstration given last week at Horsham St. Faith, near Norwich, by squadrons of No. 12 Fighter Group. The demonstration showed how well the R.A.F. handles its jet-powered equipment. It is worth pointing out that the jet fighters of the Royal Air Force are, in the opinion of those who should know, the finest fighters in the World.

Air Vice-Marshal T.C. Traill, C.B., O.B.E., D.F.C., the Air Officer Commanding No. 12 Group, is, in common with the rest of Fighter Command, faced with the usual peace-time dilemma. The R.A.F. has to be at the peak of efficiency (as the first attack against this country would come from the air), yet there is no indication of the type of warfare which would mark the opening phase of another conflict.

Since the War, it has been assumed that in the Meteor IV we have an aircraft capable of destroying effectively attacks by all known types of enemy bombers--at any rate those fitted with piston engines. This claim is one which can be soberly made and is not a loose expression of the air power represented by squadrons of Meteors placed at different strategic places. At the same time it should not be thought that all piston-engined bombers are necessarily easy to destroy. Trials in America have shown that the speed of the Boeing B-50 at 35,000 feet is such that unless an interception is perfectly planned without the smallest error by either the radar teams or by the pilot, even jet fighters will miss their chance to intercept.

This, therefore, is the sort of thing that No. 12 Group is up against. Indications are that the exceptional performance at altitude of the Meteor IV does guarantee a degree of real security. At Horsham St. Faith we watched some formation take-offs, individual aerobatics and formation aerobatics by two Meteors. The leader was British and the second man--who, of course, had the harder task of forming--was an American pilot based with 12 Group under the exchange of pilots system which exists between the U.S.A.F. and the R.A.F. The military significance in the amusing hesitation rolls, the aerobatics and formation flying, is that the pilots, after only some 50 hours of flying on most of the aircraft, seem to have gained complete confidence of their mounts.

We arrived at the Station in a V.I.P. York, which was intercepted by two Meteors some 50 miles off the coast near Yarmouth. The initial attack consisted of a couple of tremendous sweeps. From the York, all that could be seen was a brief flash of silver before the aircraft disappeared out of sight. The speed of the first attack was most salutary. The York was cruising at some 200 m.p.h., and we were, of course, a "dead duck," but one experienced an extraordinary sense of helplessness in the face of fighters with such a difference in performance. After we had been well and truly shot down the Meteors came up and formed with us for a little while.

LATER WE SAW an interception exercise in which the "bomber" was represented by a Spitfire.

Attacks are carried out at speed--elapsed times of 4½ minutes have been recorded from the take-off to the kill at 15,000 ft. Some very fast scrambles can be made--the starting operations taking 30 seconds and the aircraft can be hurriedly trundled along to the downwind end of the runway without the usual ignition and power checks and without warming up. If the aircraft happen to be dispersed near the downwind end (as they would be in an emergency), it will be evident how quickly the aircraft could be flown away, and they can reach 25,000 ft. in about six minutes or less.

We were told of some new methods in the control and reporting of aircraft which have been evolved due to quickened tempo of operations. The early warning information received at the reporting stations is passed over land lines to the control stations, where it is filtered and identified before being presented to the fighter controllers.

The Fighter Command control and reporting organization is the medium through which all air defences of the country are co-ordinated. Fighters, A.A. guns, and civil defences and, to some extent, the Army and the Navy, all depend on the complex and widespread system for the early warning of the approach of enemy aircraft, flying bombs, rockets and ships. And it is at the master radar stations that the interception is controlled; the nearest unit to Horsham St. Faith is No. 3620 (Norwich) Air Defence Unit, with headquarters at Norwich.

In an age of such advancements in science as the atom bomb, biological weapons, guided missiles, radar, and air transportation on a global scale for civilians and military personnel, the Air University offers fertile soil for stimulating the thinking of its students to the end that development of personnel capable of efficient leadership will be insured. From the Air University will emanate the true philosophy of education for Air Power.

Airman's Reading

Airborne Warfare, by Major General James M. Gavin (Infantry Journal Press, \$3).

Reviewed by
Colonel Noel F. Parrish

THERE IS NOTHING dull or tedious about the personality and manner of Major General Gavin and there are no wasted words in this book on his favorite subject. General Gavin possesses the physical and mental agility characteristic of successful cavalry officers in the days when "dashing" was the word most coveted by all field commanders, no matter how bewhiskered.

The paratrooper, rather than the airman preoccupied with instruments, is the modern successor to the self-reliant cavalryman of the past. The paratrooper's role in modern war is even more dramatic, for he cannot be expected to fight his way out, nor can he, like the cavalryman, continue to fight or even to survive behind enemy lines without considerable assistance. He goes in, as general Gavin says, knowing full well that he must conquer or die, even in the first few hours. He knows also that other victories must be won within the next few hours, either on the ground or in the air above him, if he is to receive essential ammunition and supplies.

The stories of the Allied airborne operations of World War II are told simply and effectively, and they are interesting stories. The glamour is left to the reader's imagination, a practice which more writers of Air Force history might well follow. Was there a more picturesque incident than the piper of the ill-fated British First Air Landing Brigade marching up and down the rendezvous area at Arnhem, playing "The Blue Bonnets Over the Border?" General Gavin refers to it merely as "a novel method of assembly." Although he is writing about men of heroic courage, he praises only

one, Lt. Col. Frost of North Africa, Sicily, and the bridgehead at Arnhem. General Gavin's admiration for this paratrooper is based not so much on his unit's last-man defense of the Arnhem bridgehead as upon his exemplary tactical employment of a parachute unit. He also expresses his admiration for the stubborn determination of Troop Carrier pilots in delivering their cargoes over the airheads, even with two dozen of their planes burning in sight at one time.

Many items of information are mentioned which have an important bearing on the success or failure of airborne attacks. The methodical Germans, for instance, covered probable landing areas with artillery and had the fire data already figured before the landings, only to be frustrated by their own anti-airborne patrols moving everywhere without regard to the artillery plan. Parachute resupply is so inefficient that even when properly dropped one-third of a combat force is required to recover and handle it. "A usable airhead should be at least of corps size and at least forty-five miles in circumference." The problem of resupply is apparently most serious. "If our development of equipment for amphibious warfare were as retarded as our development for airborne warfare has been, we would have made the Normandy assault in rowboats. The most acute requirement of all is the organization and equipping of the many service units needed in an airhead to handle the hundreds of tons that can be airlanded hourly from modern transport."

No airman could quarrel with the majority of General Gavin's conclusions. He sees Air Power "as the decisive element in modern war" and he defines it as "every contribution to wage war that man has created and that can be flown." He refers to the Normandy landings as "sea power at its peak. Air power was just beginning and this is the critical point we have now arrived at and this is the competition we are in." His concluding statement is "the nation or nations that control the air will control the peace."

General Gavin seems to see control of the air as being achieved not only *for* airborne armies, but *by* airborne armies. He states, "the nation that in the future has the best trained and equipped airborne forces has the best

chance of survival.... Airborne troops are our best national security and the world's most promising hope for international security." On this point his argument is not entirely clear. The airborne operations he describes could scarcely have been carried out and certainly could not have been supported until the actual air war for control of the air had already been won. Even that elusive circumstance known as "local air superiority" can hardly guarantee the success of an important airborne attack against an enemy whose air force has not already been beaten down by our own Air Power in direct application. Doubtless there will arise, during the next war, circumstances in which a foot soldier, awkwardly and expensively dropped at low altitude and supplied with great difficulty, will be more effective than 500 pounds of TNT or special weapons dropped from the stratosphere on a strategic target. It is difficult, however, to envision such circumstances as constituting, within themselves, the decisive phase of a future war.

But General Gavin is writing about airborne operations, not air warfare. He does not state what percentage of our potential air strength should be devoted to troop carrier aircraft. He does argue that our most important offensive and defensive ground operations will, in the future, be airborne. In this respect his arguments are convincing and his information is certainly first-hand.



The United States and Russia, by Vera Micheles Dean (Harvard Univ., \$3).

Reviewed by
Hilton P. Goss

"THERE CAN be few such soul-searching tasks as to attempt appraisal of a revolutionary epoch before the revolution has run its course--before its eddies, remote and near, have gradually disappeared, and the current of history runs smooth again." With these words, Vera Micheles Dean begins her fact-packed analysis of the foremost problem of the present day--can the United States and the USSR live together in a world which, for better or for worse, both

dominate? That Mrs. Dean fails partially in her try at this ambitious attempt should not detract from the earnestness of her effort. That she succeeds in presenting a calm and, on the whole, exceedingly fair view of this grave problem at a time when most other writers and speakers have given way to hysteria, name-calling, face-making, and unreason, is a tribute to her integrity and her striving for objectivity.

Sensationalism has no place in Mrs. Dean's approach to the discussion of the positions taken by Soviet Russia and the United States since the outbreak of war in 1939. If the reader seeks evidence of the party line, or thinks the book will reveal inclinations toward fellow-travelling, he is bound to be disappointed. Instead, he will discover a sober examination of the heritage of Russia, and an extensive digest of facts about resources, population, industries, politics, finances, foreign policies, transportation, history, theories, and personalities of the present day Soviet Union. In fact, the major part of the book is given over to just the sort of information, distilled from many sources, which the busy reader would most want to find in a single, brief, well written volume.

Although the title of Mrs. Dean's book implies that the two powers are considered coequally, the emphasis is decidedly upon the USSR. After a short review of Russo-American relations before 1947, the attention is almost entirely upon the Soviet Union for 200 of the remaining 290 pages of text. This is done in an attempt to explain Russia to the American audience and to point out the actualities of Russian domestic and foreign policies as they operate in the complicated social structure of the existing world system. A careful reviewer is tempted to quote from the book itself rather than risk misinterpretations on a subject so delicate as the attitudes of these two great powers. However, to do this would mean lifting whole sections of Mrs. Dean's writings, and this is obviously impractical. *The United States and Russia* is a book which should be read thoroughly by anyone interested in the subject.

In the main, the book is remarkably free from emotionalism on a topic which commonly arouses intemperance and intolerance. Nevertheless, even so judicious a writer as Mrs. Dean

remarks, "What Moscow has been building in Eastern Europe is more like a *cordon sanitaire* of its own than a base for westward expansion." (p. 154) While this quotation is cited here out of context, it does indicate that the differences between the USSR and the United States must be resolved not on the basis of feelings, but on the ground of facts, if there is ever to be peace between these powerful rivals. Although Mrs. Dean tries to do so, she does not answer the burning questions: How can socialism and capitalism combine to ward off the challenge of communism in a global cold war of economics? What can be done to convince both the Soviet Union and the United States that peace in our time cannot come so long as powers, both great and small, cling to the belief that national sovereignty and collective security are compatible?

Not the least valuable feature of the book is an excellent annotated list of suggested readings for a further exploration of the subject on which she writes so fully. With Mrs. Dean's volume as an introduction, the reader should find his way made easier when he ventures deeper into the labyrinth of the Russo-American question.

War As I Knew It, by General George S. Patton, Jr. (Houghton-Mifflin, \$3.75).

Reviewed by

Major James O. Crutchfield

WRITTEN with all the vigor and straight-forwardness of the inimitable General Patton, here is the record of victory. Through sheer force of personality he has tied together a series of chronologically interrelated events and made what would otherwise be a dry, disjointed dissertation on the art of war, into a vitally interesting account of the problems confronting a senior army commander and how he met them.

General Patton wrote as he spoke--simply, directly, and to the point. For example, some of his observations are: on how to fight Germans, "Hold them by the nose and kick them in the pants;" on Russians, "Next day we had a visitation of Russians whom I avoided by going to the front, but I retaliated for their treatment of our observers by fixing

them a G-2 map which showed exactly nothing;" his cooperation from SHAEF, "I believe this is the only time in history when it was necessary to buy, borrow, and even steal troops in order to win a Victory;" the XIX Tactical Air Command, "It was love at first sight between the XIX Tactical Air Command and the Third Army." As a matter of fact, the author spreads his praise for air-ground cooperation throughout the entire account.

This volume is composed of three parts: Part One, "Open Letters from Africa and Sicily," which deals primarily with the North African and Sicilian invasion; Part Two, "Operation Overlord," which comprises the bulk of the material presented and is an account of Third Army activities from Brest to the crossing of the Danube and entering Czechoslovakia and Austria at the end of the war; and Part Three, "Retrospect," in which the author presents his suggestions and reflections.

As one proceeds through this volume it becomes increasingly apparent that the author is writing for the record. For this reason, a great amount of tedious detail concerning the movement of particular units and personnel has been included. However, this condition has been somewhat alleviated by Colonel Paul D. Harkins, Patton's Chief of Staff throughout the war. His first-hand knowledge and careful research reflected in the footnotes and prefaces, greatly enhances the value of this document by clarifying certain vague illusions particularly with regard to relatively obscure personnel.



Jet Propulsion Progress, by Leslie E. Neville and Nathaniel F. Silsbee (McGraw-Hill, \$3.50).

Reviewed by
Major Richard E. Ryan

HERE is a history of the development of the aircraft gas turbine engines of Germany, Great Britain, and the United States. In as non-technical language as the subject permits, the authors have described the development of individual engines as they occurred in each of these three

countries. Beginning in 1923, when an NACA report concluded that "propulsion" by the reaction of a simple jet cannot compete, in any respect, with airscrew propulsion at such flying speeds as are now in prospect," they have traced jet propulsion through its early stages of painful and enormously laborious growth to its present position wherein it has placed man on the threshold of a new transportation era.

In their discussions of the development of individual engines, the authors have presented their material in an orderly manner. This volume, unlike most others on the subject, is not devoted primarily to the theories of jet propulsion, but rather it is a study of the trials and tribulations that the jet propulsion engineers encountered and how these difficulties were successfully overcome.

However, while Neville and Silsbee have been able to accomplish this with very little use of weighty technical terms and formulae, they have impaired the readability of the book by introducing frequent lengthy discussions of the constituent parts of certain engines, down to, and including, the size, number, and location of nuts, bolts, and rivets. As a result of this, the reader frequently finds himself bogged down in a maze of inconsequential data. Since the book was apparently written for readers with a limited engineering background, it is unfortunate that such detail has been included.

As a source of general information and a handy reference, this volume will undoubtedly be of value. The bibliography should be of considerable worth as a guide to additional material on the subject.

Personnel Research and Test Development in The Bureau of Naval Personnel, Edited by Dewey B. Stuit (Princeton, \$7.50).

Reviewed by
Warren G. Findley

PERSONNEL RESEARCH is one of the many fields of research on which the military drew heavily during World War II. Reports on the AAF Aviation Psychology Research Program, in which selection by stanine scores was so highly developed,

are now being published in nineteen volumes. This report on the Navy program, in 22 chapters by 27 authors, describes similar research and test development conducted by the Test and Research Section of the Bureau of Naval Personnel in cooperation with the College Entrance Examination Board. Since the Navy's air officer program was the responsibility of the Bureau of Medicine and Surgery, it is not discussed in this volume; but the specialized training programs for such enlisted personnel as Aviation Ordnancemen, Aviation Radiomen, and Aviation Machinist's Mates are among those treated. Otherwise, materials relating to officers and enlisted men are given equal attention.

An historical description of the training programs is given first. This is followed by several chapters describing the selection and classification tests used. Statistics are then presented to show that the selection and classification tests were approximately as effective in predicting achievement in training schools as are similar tests in predicting academic achievement in civilian schools and colleges. Construction of the achievement tests for the training programs is described in instructive detail, reflecting the care and insight exercised. Since the book is intended for personnel psychologists, basic statistical measures are used throughout without explanation.

In measuring personal adjustment, ordinary pencil-and-paper adjustment questionnaires were found to detect many of the persons screened out by psychiatric examination. War pressure, however, prevented adequate validation of either the questionnaires or the psychiatric examinations against the ultimate criterion of adjustment to regular duty and combat.

A fine chapter on problems in establishing criterion measures introduces the last section on follow-up studies. Two significant findings are reported in the next chapter: that supervising petty officers agreed remarkably well in ranking enlisted men on competence aboard ship, and that the men's scores in the Basic Test Battery predicted these estimates of performance as successfully as did the men's grades in training schools.

One chapter also is devoted to questionnaire studies of

opinions on instruction in Navy training schools, on off-duty educational services, and on duty in amphibious forces. The opinions on training, given by men working in the specialties for which they were trained, indicate that instruction could have been improved with better instructors, equipment more like that in the Fleet, greater opportunity to operate equipment, increased time in shop and laboratory, additional demonstrations, and more time for questions and discussion.

The final chapter on problems for further study is in keeping with the emphasis on recommendations for future planning which appears in the individual chapters throughout the volume.



Psychological Warfare, by Paul M. A. Linebarger (Infantry Journal Press, \$3.50).

Reviewed by

Chaplain (Lt. Col.) Wallace I. Wolverton

NO ONE will doubt that Mr. Linebarger has written on a subject about which we need much more understanding. His book supplies a thorough and detailed analysis of propaganda in World War II, and reviews much of the history of psychology in warfare. One would be hard put to find any aspect of the subject that he has not at least touched upon. The author would doubtless protest this statement because he actually includes a list of unexplored subjects to intrigue the researcher.

It is the very complicated wealth of material, however, which dismays the reader. This is both a strength and a weakness of the treatment. The book will discourage many who ought to read it. It will continue to fascinate those whose leisure and inclination motivate repeated reference to it. It will be invaluable to the psychological warfare officer not only as a fund of techniques, but also as a store of essential doctrine.

One might wish for a much more trenchant handling of the subject, especially with respect to the theory and concept of psychological warfare. When Mr. Linebarger states that "psychological strategy is planned along the edge of

nightmare," he gives the impression that there is much that is fundamentally bizarre about the business. The impression is not completely dispelled by reading his book. Because the subject is admittedly complex, which the book proves beyond a doubt, there is a need for all possible clarification of theory and concept if direct-thinking military men are to gain from a study of it.

The author often delights and surprises one with the adroitness of his treatment and his ability to think "around the corners." It is doubted, however, that he will enlist many in this new military specialization. It is feared that potentially capable officers in this field will be discouraged by the book and retreat into the opinion that it is a subject for the "long-hairs."

The author is of the opinion that the United States, by reason of its democratic structure, could not engage in *warfare psychologically waged*, i.e. employ all national external forces for psychological effect upon the collective minds of nations who are ideologically in opposition and actively engaged against us. This thesis could well stand re-examination. A truly coordinated "cold war" would be a fairly close approximation of this type of conflict in "peace time."

It is hoped that Mr. Linebarger will yet produce a shorter, less complicated book. He has certainly demonstrated that he is capable of doing so. Lest the reviewer by the above criticisms give the wrong impression, he goes on record to say that he will be consulting this book for many months to come, and with profit.



Peace or Power, by Sir Harold Butler (Faber and Faber, Ltd., London, \$4.50).

Reviewed by
Captain Paul J. Sterne, Jr.

THE DREAM of an effective international organization which could control the incipient power urges of rogue nations and provide a world agency for the advancement of economic well-being and the spread of humanitarianism is not a new concept in world political thought. The failure of

such organizations, unfortunately, also is not a new experience for the world.

The story of the failure of the League of Nations, the first real attempt at an organization of nations, was told by Sir Harold Butler in another book, *The Lost Peace*. In *Peace or Power*, the same author gives a clear and easily read account of the events in the years between wars. A partial failure of democracy, he feels, caused the downfall of the League.

This failure of democracy led to the rise of the reactionary right, ultimately to Mussolini and Hitler, and to the Japanese militarists. Fascism in Italy, Nazism in Germany, imperialism in Japan, a rising Communist dream of world domination in Russia, all fed by the fires of power and nationalism, were opposed in the assembly of the League by only two democracies, England and France, both weakened by economic ills. As the League could only succeed as a meeting of free men of free nations, when the majority of the powers did not conform to this postulate the League was doomed.

In a series of clear-cut chapters, the author analyzes the effect of the war on the peoples of Europe. Russian history is discussed in some detail, as is the effect which Russian participation in the victory has had on historic Russian imperial desires. The old ideals of Leninism have entirely disappeared, leaving only a Bolshevik empire to replace that of the Czars.

The author believes that the resurgence of the Slavs, epitomized by the Russian advance into Western Europe, is only counter-balanced by the impact which America by her assumption of the responsibilities of power has made in Europe. It is this fact which has brought the question of peace or power to prominence again.

War today is not ended with the defeat of an army, which defeat, has little affected large masses of the people. Totalitarian war is war of all the people. Thus, power is the assembling of all forces within a nation. It follows, therefore, that defeat of this power is destruction of the people.

The decision which must be made, according to Sir Harold Butler, is whether or not the great nations--and it must be

only the great nations as power has reached such proportions that small nations no longer matter in the decision--can realize the implications of another surrender to the nemesis of power, and can construct the framework of an organization for peace. He does not envisage an idealistic cooperation, but despite present Soviet attitudes toward the United Nations, he is not pessimistic.

The rulers of Russia, the author thinks, are practical men, and in the continued firm, calm resolution of America and the West, he sees the means to force the Politburo to a practical decision for peace. The policy which the Western nations should adopt is strength, individually, through social liberalism and democratic processes, and strength, collectively, through mutual respect for each other and for the international organization they have constructed--the United Nations. Russia, confronted by a democratic power equaling its communist totalitarian strength must see that world domination through world revolution is only a dream and must finally come into the community of nations as a friend, if she cannot bring herself to do so as a brother.



The Frontiers of Flight, by George W. Gray (Alfred A. Knopf, \$6).

Reviewed by
Major Jessup D. Love

THIS BOOK cannot be described as required reading for the military airman. It does, however, constitute generally informative and at times interesting supplementary reading for officers concerned with the technical problems of aircraft development.

Described are the activities and achievements of the National Advisory Committee for Aeronautics from its meager beginning in 1915 down through two world wars and twenty-five years of peaceful aeronautical development to its present day prominence as the largest single research organization in aviation.

The activities of the laboratories and their subordinate groups are illuminated by detailed discussions of

representative problems in each field of study. The fields covered include wind tunnels, seaplanes, vibration, compressibility, airfoils, stability and control, loads and structures, engines, propellers, jet propulsion, and supersonic flow. The problems described under these topics vary from testing the overall aerodynamic qualities of a complete aircraft in the full-scale tunnel, down to the design of a rivet or a valve stem.

In addition to covering specific problems handled by NACA, the author explains in simple non-technical language, for the layman rather than the professional airman, the principles of aerodynamics and propulsion.

Mr. Gray has been writing about the advance of science for over twenty years and this book clearly demonstrates his ability to describe and explain scientific matters in clear non-technical language that the general reader can understand. He shows high competence for weaving the multiplicity of details into an orderly, coherent narrative. At times his efforts to add color and life to research and development are forced. The injection of suspense and excitement into routine development problems seems unnatural.

Throughout the book the author shows an increasing awe at the wonders of NACA. He begins by describing NACA as the greatest single research organization in aviation and proceeds to impress the reader with the fact that it is not only the greatest but virtually the only organization dealing with aeronautics. By including basic aerodynamic theory as an integral part of the description of NACA, by mentioning NACA engineers frequently and by name, and by only vague and very infrequent mention of any organization or person not a part of NACA, the author creates the illusion that the fundamental principles of aerodynamics and propulsion are products of NACA. NACA may be the largest organization of its kind in aeronautics, and is undoubtedly a great organization, but it is only one of a large team concerned with aeronautical research and development. Its position in the aircraft development field, although a necessary and important one, is not as portrayed by Mr. Gray.

Nuremberg: The Facts--The Law and the Consequences, by Peter Calvocoressi (Macmillan, \$2.75).

Reviewed by
Colonel Dale O. Smith

FEW AUTHORS have had the courage or the objectivity to analyze the war crimes trials in their true light, studying both sides of the problem, and then publishing their findings in an unbiased manner. Mr. Calvocoressi is most decidedly not one of those few. One need only read the first chapter to realize that the author has a deep pre-conviction, and succeeding chapters serve only to confirm this. All of the arguments justifying the trials are repeated, while the arguments opposing the trials are either scrupulously ignored or passed off with the most vapid type of rationalization.

For example, on page 65 the cross-examination of Goering is discussed, as follows: "Mr. Justice Jackson tackled him first and Goering got the better of him. After a good start Jackson got tangled up in his own documents, one of which had been mistranslated and another misinterpreted by him. He was insufficiently prepared, unable to stop Goering from making speeches and apparently unfamiliar with his documents. His inadequate knowledge of his subject-matter began to show and finally Goering made him lose his temper. Goering, who was obviously scoring heavily on points, could afford to hold himself in and let the prosecution make itself look silly, but the tables were turned when Sir David Maxwell-Fyfe took over."

It may appear from this quotation that the author is being unprejudiced, yet not one single quotation of Goering's testimony is given. If Goering conducted such a skillful defense, as suggested above, perhaps the reader, to get an overall view of the question, would like to learn what Goering had to say. On the other hand, eight pages in the Appendix are devoted to the dissenting opinion on Schacht, who was acquitted. By including this dissenting opinion and failing to include defense testimony, the author suggests that not only did the accused lack a defense worth mentioning, but that the acquittal of Schacht was a mistake.

Concerning Goering's suicide, the author has this to say: "From Goering's point of view this last piece of smartness was probably ill-judged. A final appeal to German public opinion from the scaffold might have bred bigger consequences." This point smacks of wishful thinking, and is not a unanimous view. Every school child, even in this country, looks upon the classic suicide of Hannibal, the great Carthaginian leader, upon his capture by the Romans, as heroic. More recently, the suicide of Jan Masaryk in Czechoslovakia was hailed by the democratic world as a noble gesture of protest. Is it not likely that the German people look upon Goering's suicide in a similar light?

The author of *Nuremberg* bases many of his arguments on sweeping assertions, one of which he makes on page 42. "Those who advocated restricting the Nuremberg trials to charges based on the commission of well-understood War Crimes to the exclusion of the charge of planning and waging aggressive war ignored one very important point. It is the planning and the waging of aggressive war which are the *fons et origo* of all crimes." In view of the author's avoidance of a definition of "aggressive war," and in consideration of the International Military Tribunal's strict refusal to define the slippery term, we are left with a very hazy picture of what the "*fons et origo* of all crimes" might be.

No mention is made by the author of the thought-provoking defense of von Ribbentrop, who said: "When I went to Marshal Stalin in 1939 he did not discuss...the German-Polish conflict on the basis of the Kellogg-Briand Pact.... The conduct of the war in 1939 was not considered an international crime. Otherwise I could not repeat nor explain Stalin's telegram at the end of the Polish campaign, which read: 'The friendship of Germany and the Soviet Union is based on the blood that has been shed commonly, and has all prospects of being enduring and steadfast.'"

In this reviewer's opinion, Mr. Calvocoressi's book contributes little to an understanding of the implications of the Nuremberg trials.

BRIEFER COMMENT

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The Price of Power, by Hanson W. Baldwin.

MR. BALDWIN has based this remarkable book upon the results of a study group of the Foreign Policy Association. The group's objective was "to discuss the meaning of the technological and political revolution to the strategic position of the United States and to determine, if possible, the consequential effects upon our military and foreign policy." As military editor of the *New York Times*, Mr. Baldwin was a highly qualified chairman for the group. Recognizing the likelihood and awful portent of World War III, the volume attempts to show how America can mobilize her national economy in peacetime--her commodities, weapons, industry, production; her government and personnel; her transport, her communication systems and cities; her scientific research; her intelligence services so that she will be adequately prepared for total war. No serious student of modern strategy can afford to miss this book; it is a superior estimate of the overall situation.

Harper \$3.75

The Air Officer's Guide.

ALTHOUGH patterned after the popular *Officer's Guide*, this new military encyclopedia is directly slanted at Air Force officers. Its pages are packed with pertinent, up-to-date information covering hundreds of subjects such as retirement, discipline and training, decorations, leadership, insurance, and customs of the service. Included is a chapter on the history of the Air Force. The new *Guide* also contains a detailed

survey of the National Military Establishment and includes comprehensive sections on the organization of each of the three major services. The Air Force's broad educational program is described in the chapter, "Educational System of the Air Force," which outlines the purpose behind the program and catalogues and describes the curriculums and other significant data of The Air University and the various service schools. Charts, diagrams, and photographs are generously sprinkled throughout the volume. Both active and inactive air officers will find this handy reference valuable.

Military Service \$3.50

Survival in the Air Age, by the President's Air Policy Commission.

THE FUTURE security of this country is primarily dependent on the strength of its air arm. Such is the essence of this thoughtful report which outlines in detail the goals we must pursue to attain adequate Air Power. The aircraft industry and the commercial air lines must also be made healthy. The commission realizes the financial burden will be heavy, but that "self preservation comes ahead of economy." By 1 January 1953, the Commission argues, we might reasonably expect an atomic attack against us. No professional military airman should miss this vital document.

Government Printing Office \$0.75

America's Destiny, by Herman Finer.

THE THESIS of this book is that it is America's destiny to assume

the position in world politics that was formerly held by England. It is sheer romanticism, says Professor Finer, to think that we can arrive at world peace by creating a world state. National differences are too many. Force must be used to maintain peace. It is not yet possible to exert force through the United Nations--some great power must provide it, and that power must be the United States. There is a power vacuum in the world today which will be filled by either the U.S.A. or the U.S.S.R. It is America's duty to be "the chief salvation of the World." This is a learned book and a passionate defense of democracy. It makes a significant contribution to an understanding of our present-day dilemma.

Macmillan \$5

American Foreign Service, by J. Rives Childs.

IN ITS position as "the eyes and ears of the United States abroad" the American Foreign Service has become one of the most vital organizations of government. Its development, relationship with the State Department and other government agencies, intricate mechanism, personnel, and other component parts are fully treated in this book. The author describes the delicate problems of diplomacy, the necessity for diplomatic protocol. This profession is a career service open to well informed men with initiative. For those who want information on the pay rates, regulations, benefits, and various positions open, the full text of the Foreign Service Act of 1946 is included.

Holt \$4

Psychology and Military Proficiency, by Charles W. Bray.

THIS book is the official history of the Applied Psychology Panel

of the National Defense Research Committee, of which the author was at first technical aide, and later chief. Successes with gun crews, night lookouts, radar operators, and other personnel are presented as examples of what can be accomplished by psychology when applied to military problems. The final chapter, "The Future of Military Psychology," emphasizes that the "success of future psychological efforts to reduce human error in the military situation" rests with the services themselves.

Princeton Univ. \$3.50

The Far East, by Paul Hibbert Clyde.

JAPAN'S ATTACK on Pearl Harbor was one expression of powerful and complex revolutionary forces which have long been stirring in the Orient. Asia's contemporary revolution is a child of westernization and modernization. Its character has been shaped by the impact of European and American thought and action upon the traditional cultures of the East. The societies which will emerge from the present chaos of change have not yet taken shape. They are being fashioned by conflicting patterns of thought and action. To those who seek an historical introduction to this eastern Asia, to a revolution that we have in part created and with which we are now inextricably involved, this book is addressed.

Prentice-Hall \$7.65

How to Stop the Russians--Without War, by Fritz Sternberg.

BY FIRMLY allying ourselves with non-communist, anti-reactionary forces in Europe--primarily the democratic socialists--we can avoid war with Russia. Since war with the Soviets would only

result in barbarism for most of the world, our salvation lies in building up Europe economically and politically into a strong united force to act as a buffer between the two leading global powers. This volume is simply constructed and all the author's war-cures are carefully spelled out. The only alternative to this program, he warns, is *war*.

John Day \$2

Farewell to European History, by Alfred Weber.

HISTORY up to the present is seen by the author as an interplay of conquest, of the appearance of one dominant power after another. This period is over. The Europe of the future will be only a part of a vastly greater unit since the materials for its dominance over the world have been consumed. The extraordinary dynamic force of the West resulted in the technological revolution, the expansion of capitalism, and the world's unprecedented population growth. But Europe became a prey to its own division and its order disintegrated in the wreckage of two world wars. Now that the separate nations have played out their historical parts, fresh world concepts are essential for man's survival.

Yale Univ. \$3.75

I Saw Poland Betrayed, by Arthur Bliss Lane.

THOSE WHO belittle the Soviet menace will be hard pressed to gloss over the indictments of Russian political methods and imperialistic aims as presented in this volume by the former (1944-1947) United States Ambassador to Poland. The Reds, through the communist controlled government at Warsaw, created a terrorist

police state. Political opposition and freedom of speech have been wiped out. The January 1947 elections were a farce, being won for the communists by duress and other strong-arm devices peculiar to the Gestapo. Of the future, the author has this to report: "He [Stalin] will proceed on his policy, which was also that of Hitler, of seizing control, state by state, until he obtains world domination...or until he meets the effective resistance of a stronger power...."

Bobbs-Merrill \$3.50

Since 1900, by Oscar T. Barck, Jr. and Nelson M. Blake.

FRESH interpretations of contemporary American history are required for an understanding of the role of this nation in world affairs. In this book, subtitled *A History of the United States in Our Times*, the authors hope to provide a frame of reference that will be a guide to wise political and economic action. To accomplish this purpose they have devoted a major portion of their space to the two lines of development which seem to them most impressive--the steady expansion of the functions of government to deal with the complex problems of a new age and the increasing involvement of the United States in global politics. An element of timeliness is added by the numerous use of political cartoons from newspapers all over the country.

Macmillan \$4.75

Fallen Sun, by Noel F. Busch.

RESURRECTED in part from articles appearing in *Life* and *Horizon* magazines, this is one newsman's report of the "occupation of the oldest country in the world by the newest." Closely examined is the occupation machinery and the

character of the Japanese people and their culture. To the question "Is the occupation a success?" the author's reply is "Yes!" But in Japan, as elsewhere in the world, the shadow of communism is ever present. The Japanese are subservient people, easily coerced. Should our forces evacuate, as it is eventually intended, the former island Empire might be easy prey to the Soviets.

Appleton-Century \$2.50

The United States in the Postwar World, edited by William B. Willcox and Robert B. Hall.

IN 1945 the University of Michigan held a summer conference to discuss the problems "that underlie the peace." This volume is a compilation of the lectures delivered at that gathering. Then--to the lecturers--future world peace was not the enigma it is today. High hopes were held for the United Nations. Of Russia, it was said: "it is doubtful whether her interest lies in contesting the leadership assumed by the United States, or in endangering the peace after a war which has been more costly to her than to any other power." Included are lectures on international economic, military, educational, political, and social problems.

Univ. of Michigan \$4

Unknown Germany, by Hanna Hafkesbrink.

FROM LETTERS, diaries, and autobiographies, most of them written by soldiers, the author depicts the unofficial Germany of World War I. Here, from the first burst of enthusiasm for the war in August 1914, through the disillusion and revulsion that left finally only the sustaining hope

of a better world to be wrought from the sacrifice, is the Germany behind the false front of their propaganda and ours. The book tries to present the war from the point of view of the average human being and is less concerned with political and economic factors. Those interested in the state of mind of the German people during the wars, as well as the psychology of the soldier, will find this volume useful.

Yale Univ. \$2.50

Silver Wings, by Edwin L. Wilbur and Estelle R. Schoenholtz.

AIR VETERANS of the China-Burma-India theater will encounter many old friends in these pages. Each episode--the volume is composed of a series of short anecdotes--has a factual basis, and the characters are genuine pilots and airmen who served in that sector. Some of the tales emanated from bull sessions; others were constructed from authenticated records. All are simply fabricated. General H. H. Arnold has written the preface, and artist Milton Caniff's drawings are generously scattered throughout. Profits from this book will go to the Air Force Aid Society.

Appleton-Century \$2.50

Flying Minute Men, by Robert E. Neprud.

DURING THE past war thousands of our citizens from all walks of life, most of whom were unable to meet the qualifications of military service, joined a citizens' Air Force--the Civil Air Patrol. This was a tenacious "volunteer organization pledged to the nation's defenses." These patriots routed out enemy subs, performed rescue missions, towed targets for anti-aircraft training, and flew

courier missions. They flew their cubs, Stinsons, and other tiny aircraft month after month on hazardous, essential missions, thereby freeing Army and Navy pilots for combat duty. CAP's achievements are aptly revealed in this lively history.

Duell, Sloan and Pearce \$3

From Fiji Through the Philippines, edited by Lt. Col. Benjamin E. Lippincott. Paintings by Staff Sgt. Robert A. Laessig.

THE WARTIME record of the 13th Air Force is highly worth telling. It is the story of air units which operated over millions of square miles of land and sea, which knocked out Rabaul, and which led the drive for the recapture of the Philippines. This narrative of the 13th Air Force is delineated by a unique method. Artist Robert Laessig has painted 96 full-page water colors, 16 of which are reproduced in natural colors and 80 in duo-tone. There are stirring reproductions of air engagements; picturesque sketches of coral-encircled tropical islands; air views of remote landing strips; paintings of crew members at work and at play. The result is one of the freshest, most exhilarating unit histories of the war.

Macmillan \$10

American Diplomacy in Action, by Richard W. Van Alstyne.

EMBRACING the latest moves in power politics, this new edition of a leading book on America's role in world affairs is revised throughout. Modernized are the chapters on the defense of North America, solidarity and the Good Neighbor Policy, and the Second World War. The author's method of

presenting diplomatic history is to focus attention on the evolution of policy rather than mere turn of events. Recognizing three existing underlying concepts inevitably associated with American diplomacy--security, expansion, and neutrality--the author has arranged his studies in three parts: Part I, "Security and the Monroe Doctrine;" Part II, "Expansion and the Concept of Manifest Destiny;" Part III, "Neutrality and Isolation."

Stanford Univ. \$5

Democracy and Progress, by David McCord Wright.

PROFESSOR Wright says this book "represents an attempted general synthesis of the whole problem of democratic progress from the point of view of philosophy, government, economic policy, and international relations. It is an attempt to interpret our culture to ourselves in terms of the values of our own time, and to forecast its fate...." Such pointed questions are asked as, What kind of Democracy? How? Why? Whither? The author finds his answers in a society based on the values of sympathy, mutual respect, and cooperation.

Macmillan \$3.50

A History of World Civilization, by James E. Swain.

DESIGNED as a basic college level text, this is the second edition of Professor Swain's concise world history. Politics, art, religion, literature, society, and economic progress are covered from earliest times to the present, with the twentieth century as the focal point in all previous developments. New material covers such recent events as attempts being made to

settle World War II, and present-day cultural and scientific changes, including the discovery and use of atomic energy. Nationwide adoption by American colleges and universities has made this a standard work in its field. Broad in scope and condensed in presentation, it is one of the best surveys of world civilization.

McGraw-Hill \$4.50

Highways in the Sky, by Major Louis Shores.

IN NOVEMBER OF 1938 the Army Airways Communication System, inspired by a few radio-minded airmen who understood the urgency of a military highway network in the skies, was born. Up to Pearl Harbor it had charted the airways of the Western Hemisphere. When war came the AACCS began to build air highways over the entire world. This vital global communications organization was manned by a small but determined group of radio operators, cryptographers, control-tower operators, and other specialists. This is their story.

Barnes & Noble \$3

The Portable Veblen, edited by Max Lerner.

LATEST addition to the Viking Portable Library series, this volume presents in one handy package the essence of the economic and social thought of Thorstein Veblen. Edited and brilliantly introduced by Max Lerner, who calls Veblen "the most creative mind American social thought has produced," the collection contains the complete first half of *The Theory of the Leisure Class*. Pertinent section headings are "On War and Peace," "The Case of

America," and "The Roots of Institutions." Altogether, parts from ten of Veblen's books are included.

Viking \$2

Civilization on Trial, by Arnold J. Toynbee.

AGAINST the background of Toynbee's vast erudition the essential elements that lie at the heart of our time are examined in this collection of thirteen essays. Concerned with the meaning of the present point in the long view of history, such subjects as the national psychology of Russia, the problems of world unity, and the immediate future of international relations are discussed. Readers of the author's *A Study of History* will find the present work a useful key to Toynbee's theory of history. Whether we can save our civilization from impending disaster is not guaranteed, but steps we can take on the road to survival are pointed out.

Oxford Univ. \$3.50

Barbed-Wire Surgeon, by Alfred A. Weinstein, M.D.

THIS REPRINT of a 1947 best seller is a powerful drama about the victory of man over extreme physical and mental torture. An American medical officer, Dr. Weinstein was captured in the Philippines and spent forty months in Japanese prison camps. The brutality, filth, starvation, and heartbreaks which he and his cohorts suffered were titanic. Shuttled from camp to camp, each a worse hell than the one previous, only a few pitiful survivors were ever to see home again. On one occasion, a sadistic guard clubbed the author on the neck. His windpipe dislocated, and undergoing excruciating pain, he himself wrenched

the bone back in place. His vocal cords are still partially paralyzed. But this was just a minor atrocity. Hundreds are revealed in this moving story.

Macmillan \$3

The Man in the Street, by Thomas A. Bailey.

SUBTITLED *The Impact of American Public Opinion on Foreign Policy*, this book realistically shows how public pressure affects the actions of Congress, the State Department, and the President; how our wars have been hampered by public opinion; how we mingle dollars with idealism; how we dislike certain peoples and nations and with equal irrationality like certain others. This is a cynical book which will destroy many illusions, but a necessary one for a nation which must educate itself on the truths of politics and power. Results of public opinion polls--Gallup, *Fortune*, Roper--provide the basis of this study.

Macmillan \$5

The Coming Age of Rocket Power, by G. Edward Pendray.

ONE NEW chapter--a discussion of pilotless aircraft and guided missiles--has been added to this revised edition of a book which surveys the various aspects of rocket power. Eliminated is the lexicon of the scientist. Remaining is a lively account of the development of jet motors, robot bombs, jet-propelled planes, war rockets, and skyrockets, plus abbreviated explanations of their operational principles. Entertaining incidents revolving around the pioneers of these weapons and future potentialities of this great power are also presented in this readable handbook.

Harper \$3.50

World Wars and Revolutions, by Dr. Walter Phelps Hall.

THIS second edition of a contemporary history text attempts to catalogue the reasons for, and describe the actions of all wars, both major and minor, fought during the period from 1914 to 1945. Political, economic, and social developments of the era are discussed only to show how each contributed to the struggle of arms. Considerable coverage is accorded the Second World War, most of which is an uninspired review of the various campaigns. At the book's conclusion, the author ponders the possibility of another world war. He believes man capable of finding a way to live peacefully in the atomic age.

Appleton-Century \$3.50

World Communism Today, by Martin Ebon.

SHOULD the Communist party in the United States be banned? Is communism likely to achieve world domination? These and other cardinal questions are examined by Mr. Ebon in this detailed survey of present civilization's most patent political force. He only briefly outlines the background of the movement, reserving the book's bulk for a comprehensive study, country by country, of the Communist party as it now exists: its organization, leaders, aims, strength, and policy. In the concluding chapters the objectives of world communism are reviewed; methods for halting its spread are stated. That the leaders of this force--"organized desperation"--expect to dominate the world, the author has no doubt.

Whittlesey House: McGraw-Hill

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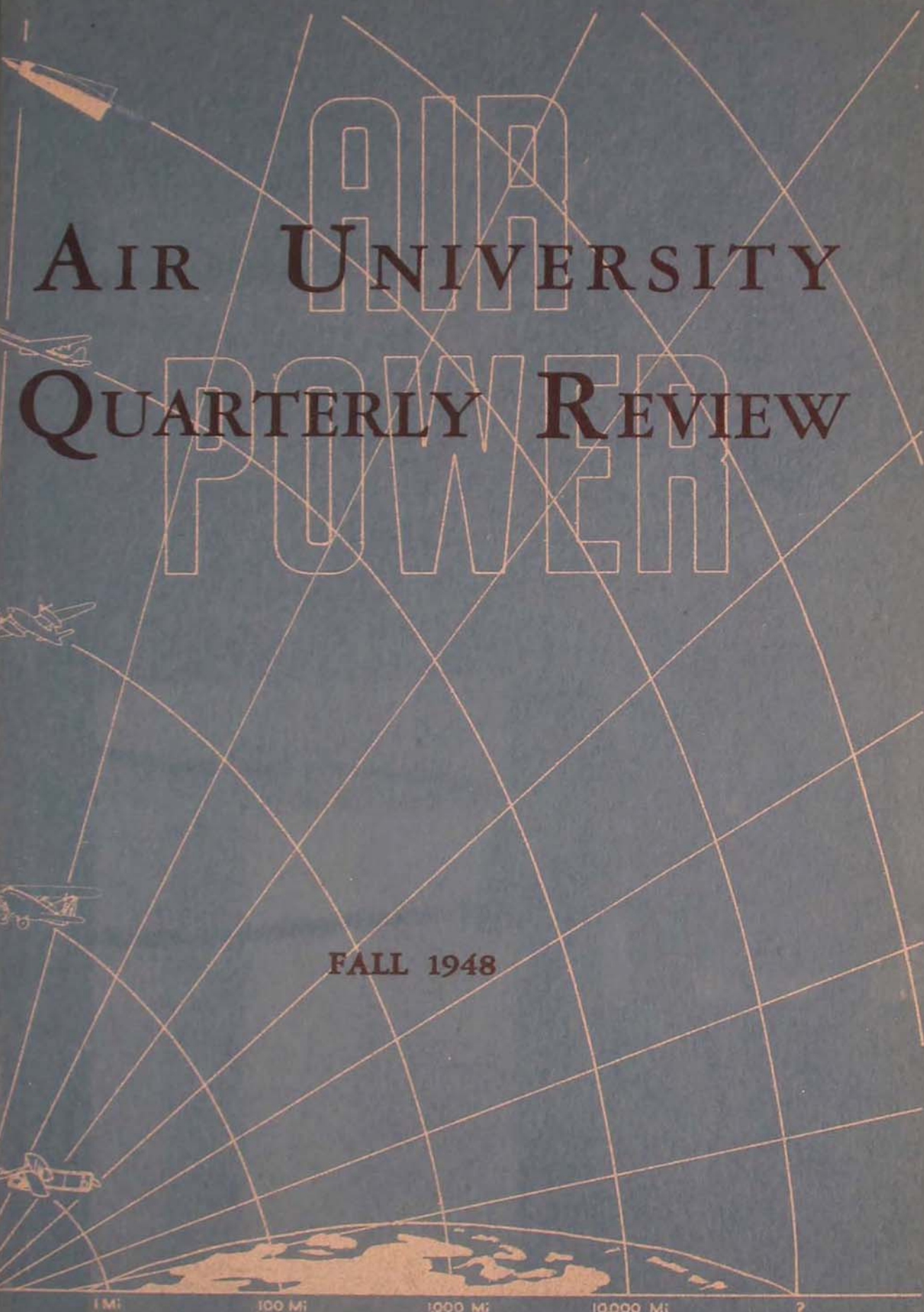
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