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WINGS OVER AMERICA

The Future of Air Power

BY JOHN STUART



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WINGS OVER AMERICA

By JOHN STUART

EUGENE WILSON of United Aircraft Corporation, former naval officer and Chairman of the Board of Governors of the Aircraft Industries Association of America, Inc., has drawn a nice analogy between Admiral Mahan's doctrine of sea power and today's doctrine of air power. The kernel of Mahan's doctrine was the "fleet-in-being." This was the basis of sea power that controlled the fate of the world. But behind the fleet-in-being were two other important things—a merchant marine capable of supporting the fleet and a seafaring people capable of making and manning both.

The same is true of air power, says Mr. Wilson. There must be a commercial air transport system capable of backing the air fleet and an air-faring people capable of making and manning both.

John Stuart, the author of this pamphlet, is an aviation reporter on the *New York Times,* and long a specialist on the subject.

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From the lessons of the war we may draw these two conclusions:

1. No military operation can be carried to success without control of the air.

2. Control of the air is not in itself sufficient to assure success.

To these two points may be added three other basic facts regarding air power which must serve as a guide in policy making:

1. It is possible to reach any place on the globe from any other place by air in a matter of hours—forty or fifty hours—instead of in a similar number of days by surface travel.

2. That ability may be converted into terms of both military power and peacetime trade.

3. The potential for war or peace in either is not automatic. It may be converted to actual power only through the most vigorously prosecuted and uninterrupted research and the most intelligently controlled application. It may be similarly used—or abused—by the United States, the United Nations, or any other power-to-be.

The development of atomic power does not affect the truth of these statements. Atomic power may be converted into the propulsion of a missile, guided or self-guiding, or it may be used as an explosive at the end of the missile's run. In either event its path will be through the air. Other uses of atomic power are likely to be secondary. Hence, offensively or defensively, control of the air is vital to our security.

Constant Research and Development Needed

The men who have fought this war, either in the air or on the ground or on the surface of the sea or under it, have little doubt as to the need for constant development of our own air power. For this war has shown above all, both in our own experience and that of the enemy, that the second-best airplane is almost as bad as no airplane at all. It is vital, therefore, that research and experimentation in air power be continued in peace

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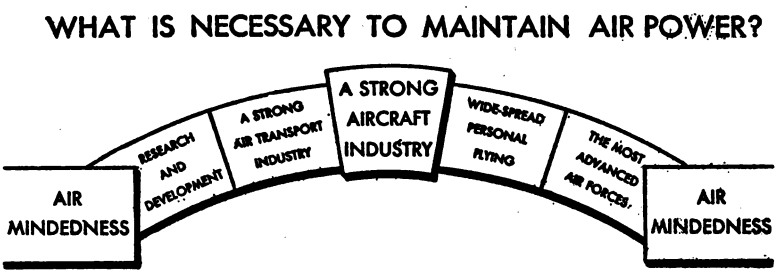
as in war. Much remains to be discovered in engineering, in metallurgy and chemistry, and in production. Much must be developed by a manufacturing industry that should have enough orders not only to survive but to progress. This body of learning must be applied, tested, and developed further by our military



air force, by a vastly expanded commercial air transport system, and by a volume of personal flying which should and can be big enough to supply markets for the manufacturers that are beyond the political power of government or the economic power of the commercial airlines to provide. And behind this chain of processes is the need for continued research in *basic* science to assure American leadership.

Minimum Requirements

As the war ended—indeed, for months before—aviation experts were planning on peacetime air forces at least ten times the size of those with which we entered battle. This would have helped nourish an aviation industry only 10 or 15 per cent of its wartime size but a dozen times bigger than that of the prewar period. The ability to expand the industry when needed was seen as of major importance.

But until the potentialities of the atomic bomb can be weighed, this program has been held up. Military orders to manufacturers have already been curtailed to a small part of what had been

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expected. One distinguished staff officer said recently, "Never in the history of military science has thinking been so confused. In the face of the atomic bomb we don't know whether we need no airplanes at all—or a million of 'em."

An immediate goal, however, has been set for the maintenance of an aircraft industry, lean but healthy, one that can quickly take up such tasks as may become necessary. This will not be easy. We can expect little help from the development of air transport, domestic or foreign. So few airplanes can carry so many people and so much goods that commercial aviation alone cannot provide the nourishment the aircraft manufacturing industry must have.

In the personal airplane field the opportunities for expansion are large. The Department of Commerce estimates that there should be 400,000 private airplanes ten years after the war. Other estimates are lower. Two things stand in the way of a great growth in personal flying: the lack of the right type of plane with the right performance at the right price and the lack of the airports that are necessary if the personal airplane is to serve its owner adequately.

Let us look in turn at the problems faced in each of the three great fields of airplane development—aircraft for military, transport, and personal requirements.

MILITARY AIR POWER

WHEN Japan surrendered shortly after the first atomic bomb was dropped, many air proponents were quick to claim that Japan was the first nation to yield to air power alone.

Blood on every beach and long rows of white crosses around the world cry out against such an easy assumption. From Casablanca to Okinawa, American men died to bring the fist of air power, long though its arm may be, within reach of our enemies. They did so for the simple and all-compelling reason that you cannot have an air base in the air. And until the arts and sciences

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have developed a method for maintaining men and machines in the air, there must be bases on land where they can be rested and repaired, fed and fueled. We had to capture a special island to launch the atomic bomb upon Hiroshima.

Air Power Not Enough

It has always been the plea of the air enthusiast that air power alone would be conclusive if only used to the fullest extent. The United States, the greatest industrial nation in the world, gave the airmen the biggest aeronautical industry in the world, the best airplanes, and the best weapons, including the atomic bomb. What more could the airmen ask? And still figuring in the final victory was the man with a knife on the end of a stick, the infantryman with the bayonet, the military descendant of the Greek hoplite with his spear and the Roman legionary with his short sword.

This does not in any sense detract from the magnificent record of air power in the last ten years. Rather, as we face a future almost infinitely wider than that which in the 20's and 30's confronted the designers of the airplanes of this war, we should avoid the mistakes of the overenthusiastic champions of "air power alone." By asserting that the bomber made the battleship obsolete and the air strafer made the infantryman a mere policeman, the late General "Billy" Mitchell probably did as much as out-and-out pacifism to hinder his own program. Some of General Mitchell's best friends, now in the highest echelons of air command, men who loyally stood by him in his time of stress at the risk of their own professional careers, now admit the harmful effect of an enthusiasm that turned to bitterness and delayed our progress in the air during the very days when Hitler was arming. These men know that in war, as in medicine, there is no panacea—not even the airborne atomic bomb.

The Germans, who started it all, made many mistakes but not that one. The Blitzkrieg was as much ground rush as it was air. The devastating attacks of the Stuka dive bomber were

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closely coupled with the movement of men in tanks and combat cars fed by piped gasoline. That combination worked beautifully for the Germans until the ground end of it was cut off by a mere thirty miles of the English Channel.

Germany's Mistakes

Germany's two basic mistakes brought ruin then and there. First, Germany had not devised an adequate amphibious force. It remained for the United States to do that. Second, the German swarm of one-design Messerschmitt fighters was checked by numerically inferior but technically superior British Spitfires aided by radar. And Germany had developed no bomber capable of softening the deep determination of the British people to withstand severe industrial devastation.

German air power then was, without doubt, the world's greatest. Yet it was not so good as it was great. And used alone, it failed.

The Plane and the Submarine

Germany turned then to a cure-all peculiarly its own—the submarine.

It is not too much to say that the thing that defeated the submarine in the critical moment was the air power of the United States. Some of us are prone to forget how critical that moment was. But German submarines, in 1942, made it necessary to build the Big Inch pipe line since the use of our own coastal waters was denied our tankers. And in mid-Atlantic, submarines using the new wolf-pack tactics were taking critical toll of nearly every convoy.

Then Rear Admiral Francis S. Low was put on the staff of Admiral King to handle the menace. A submarine officer himself, he knew the answer. With incredible speed, baby flattops were built on available freighter hulls. Navy pilots flew PBM's and Hellcats and Avengers, in fair weather and foul, from those tiny tossing decks that were hidden from all but

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radar perception. With the equally gallant crews of the destroyer escorts, they sank pack after pack of submarines and made possible our actual participation in force in the European war.

Beginnings of Mass Production

Meanwhile, French, British, and other Allied orders had brought our aircraft and engine factories into something resembling mass production in 1940 and 1941, despite the fact that Congress prevented the appropriations which air officers knew would be necessary for us.

The factories at least had had some training when President Roosevelt called for 50,000 planes in 1941 and 100,000 more in 1942. The first year's requirement represented more airplanes than the entire American industry had built since the Wright's first flight at Kittyhawk in 1903.

Using sheds and open-air assembly lines, calling on every industry from the great automobile companies to the humblest home welding shop, they made the American aircraft industry the greatest the world had ever known, doing a volume of $16,000,000,000 a year. We ended the war with what can properly be claimed to be the best in every category of combat and transport aircraft, each in overwhelming numbers, and each better armed and equipped than the aircraft of any other nation.

American Planes Supreme

At the outbreak of war we had in our few Flying Fortresses the tool which later, infinitely strengthened and supplemented by Liberators, destroyed German industry. Only in the last weeks of the fighting in Europe could we be sure of this, and only in the months since the peace has it been possible to assess their effectiveness. Wayne Parrish, editor of *American Aviation* and a keen, disinterested critic, recently returned from Germany and attested that everything necessary to the building, arming, supplying, and fighting of the Luftwaffe and the German Wehrmacht generally was destroyed or damaged by our carefully

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planned and well-coordinated attacks. They hit first the things that would hurt the most—ball-bearing plants and oil refineries.

We did it first at great cost, sending our heavies deep into enemy territory with gaps in our fighter protection. The Germans have admitted that when our first long-range fighters accompanied the bombers over Berlin they knew that the air war was lost.

The development of these fighters is a story in itself. Starting with only the Curtiss P-40, we developed the Lightning, the Thunderbolt, and the Mustang. We gave them the range that enabled them to escort Fortresses and Liberators on long-range missions, and we gave them the striking power and maneuverability that enabled them to meet and beat the best the enemy could send up.

At least a dozen types of fighters were built and tried out while the P-40 did its best against superior planes both in Asia and Africa. The Army finally settled on the Thunderbolt and the Mustang, and the Navy on Corsairs and Grummans. But the Thunderbolt that ended the war was the "N" series and the current Mustang is an "H." This means that fourteen major changes were made in the first plane and eight in the second, not counting minor modifications that went on from day to day. North American has estimated that by and large over two million engineering hours went into Mustang changes *after* the first design had been finally accepted.

This was true of every type of airplane we built and used. Despite their best efforts, neither the Germans nor the Japanese could keep pace with that day-to-day and month-to-month improvement based on the lessons of battle. They did in basic research. German laboratories were thick with airplanes, jet engines, and guided missiles of new and vastly improved type when we took them over, but their factories and airfields were not. Again and again in the last days our pilots over Japan reported the presence of occasional planes of a new and improved type. But these never appeared in sufficient numbers

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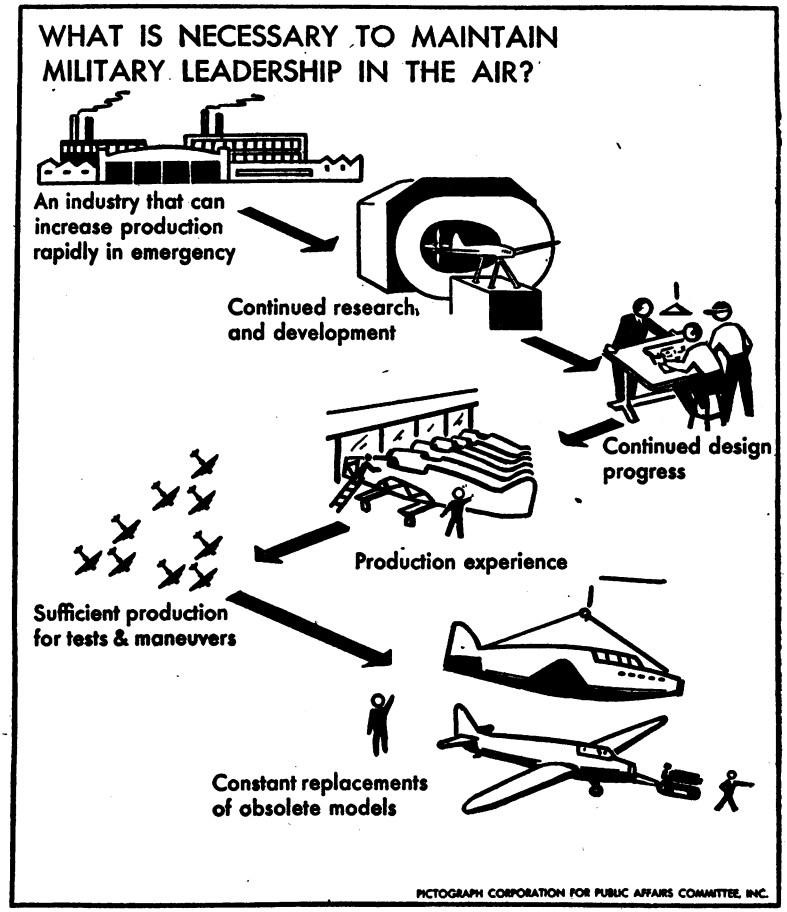

to count. Neither of our enemies had solved the problem of production. We had solved it in airplanes as we solved it in the race to produce the atomic bomb.

As the war ended we had practically caught up with the world in basic research facilities. We have Langley Field and Patuxent Field in the East, Wright Field and the Cleveland engine research plant in the Midwest, and the Sunnyvale and Caltech laboratories on the West Coast. Most of the aircraft manufacturers have their own research establishments, several

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of them with wind tunnel equipment exceeding that of the whole nation in 1939.

As they faced the first reduction from the wartime peak, the manufacturers had two cushions which together amounted to about $1,500,000,000 in orders for the next year. About half of it was military orders and half came from the equipment-starved airlines.

Naval Aircraft

The proposed unification of the three armed services in a single department will not lessen the needs of two essentially different air arms—Army and Navy. The carrier aircraft is basically different from the land-based plane. In speed, maneuverability, and weight-carrying the former must equal or exceed the land-based plane against which it must operate. Because its base can move about, the plane can sacrifice something in range. But to attain this compromise every part must be designed to withstand the terrific stresses of catapult launchings (the attainment of flying speed in ninety feet) and the equally terrific stresses of landing and stopping, as its tail hook catches, within two hundred feet.

Through the Ministry of Aircraft Procurement the British tried to unify Royal Air Force and Navy purchases and training. But when British carriers joined ours off Japan last July, every aircraft on their decks was American and, while our carriers were sending off six strikes a day, the British could get off only two. So absorbed had Britain been in producing the magnificent Spitfires which saved the home islands and the bombers that helped devastate Germany that they were unable to design satisfactory carrier aircraft.

Backbone of Our Pacific Assault

The Navy still gets the creeps when it thinks of the status of the British carriers and when it remembers what our own did in the Pacific. What they did can be stated without bitterness

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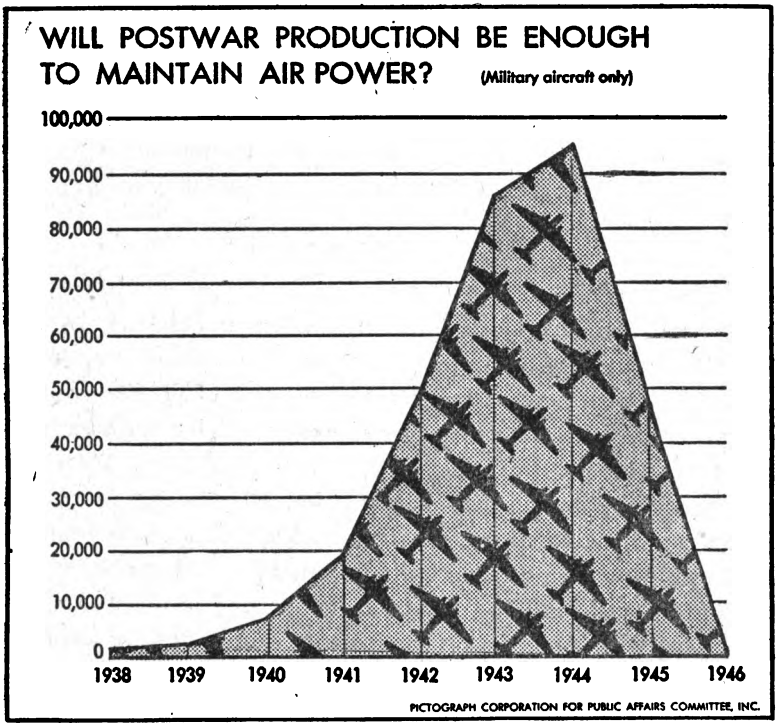
or controversy. Without battleships they turned the Japanese advance in the Coral Sea and at Midway. In the "Saipan Turkey Shoot" of the summer of 1944 the fast carrier task force—carrier



plus battleship was its backbone—broke the Japanese naval air arm, and then destroyed it in the Second Battle of the Philippine Sea in the spring of 1945.

Carriers made our amphibious advance possible. Carrier task forces provided the air cover for the capture of the Marianas and the Philippines. It may be granted that the B-29's, even before the atomic bomb, inflicted greater damage on Japan than the Navy did on the home islands. But the B-29's became effective not from China, but from the Marianas. They became

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completely effective only when Iwo Jima provided a fueling base and a base for fighter protection.

Thus, the Navy believes the war proved its case. Newer and greater bombers can strike atomic ruin from Alaska on any concentration in the Northern Hemisphere, as General Spaatz recently showed. But a fast carrier task force carrying atomic bombs might strike a more accurate blow, might provide even closer bases for greater devastation by the big bombers. Atomic fission, the Navy believes, will not alter the factors of range and mobility, but interference with its own peculiar design, procurement, and training might.

Peacetime Plans

The government's long-range program, as worked out by the Air Coordinating Committee of experts from the State, War, Navy, and Commerce Departments and the Civil Aeronautics Board, carries the following recommendations for military aircraft:

1. The government should buy from 3,000 to 5,700 planes each year with an airframe weight of at least 30,000,000 pounds. This would mean a total aircraft production at least double the 1940 rate, but less than 5 per cent of the 1944 production.

2. The War and Navy Departments should reserve enough building space to insure quantity production in an emergency. They would serve as a peacetime storage depot for 65,000 general-purpose machine tools that would be needed in the event of industrial mobilization.

3. Research and development of new air weapons should continue to the threshold of large-scale production and not stop with experimental versions.

4. The aircraft industry must be further dispersed because of the danger of atomic bombs and pilotless missiles.

The appropriations being considered by Congress will not support the program outlined by the Air Coordinating Committee; they provide for only 2,400 airplanes to be built for

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both Army and Navy in the 1947 fiscal year. For the moment, due to surplus war production, the Army faces no shortage of planes. Present plans call for the maintenance of 8,200 operational planes, together with an additional 6,000 in air reserve and air units of the National Guard. But the number of new planes is obviously insufficient to maintain the airplane industry. Some aircraft manufacturers will keep together a working nucleus of their engineering and research staffs; others will probably dissolve or merge with other companies.

MERCHANT AIRCRAFT

COMMERCIAL air transport in the United States today is neither a luxury nor a mad adventure. You will find mothers with children in arms as passengers on many commercial airplanes. Mothers do not take infants on mad adventures. The cost of air travel today in a great many instances is less than the cost of travel by rail and Pullman. Most airline executives are definitely counting on the day, not far off, when it will be at the level of coach and bus travel.

As of December, 1945, here are some comparative examples:

	Airline Fare	*First Class Rail & Lower Berth*
New York-Chicago	$33.50	$36.93
Washington-Chicago	28.30	31.70
Chicago-Pacific Coast	85.45	91.43

Similar comparisons in favor of air fare might be cited for almost any run over 400 miles. Air fare has a further advantage in that it includes all meals and gratuities, which add perhaps 10 per cent more to the cost of travel by rail and Pullman. And air travel has still another enormous advantage in that it accomplishes almost any given journey over 200 miles in from one-half to one-tenth the time of travel by rail.

In the international field, every applicant before the Civil

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Aeronautics Board for a certificate to fly the North Atlantic filed estimates of costs and rates which envisioned a future round-trip fare to Europe in the neighborhood of $200. That would assure a comfortable seat and a ten- or twelve-hour crossing. There were, of course, additional projects at much higher costs that included such luxuries as staterooms and crossings to permit lunch in New York and dinner in Paris.

Four Million Passengers to Europe!

That $200 round-trip "cabin" fare, however, will probably create a completely new kind of foreign travel. Its size has been most emphatically sketched by Parker van Zandt, economist of the Brookings Institution. He foresees 4,000,000 air voyages to Europe a year and a travel dollar balance against the United States thereby of better than a billion a year—a development that is to be wished for in view of Europe's difficulties in meeting its foreign debts.

The van Zandt estimate is based on two surveys, one by *Woman's Home Companion* and one by *Collier's*. The latter magazine tested a cross-section of upper income urban groups representing 10,000,000 families or 27,000,000 adults with the question: "If you could fly from New York to Europe after the war for $200 round trip, do you think you might go?" And 68 per cent answered "yes." *Woman's Home Companion,* testing its feminine readership of several millions, produced a remarkable affirmative of 51 per cent to much the same question, with the younger age-group equalling *Collier's* 68 per cent in favor of such a trip.

If each of *Collier's* 18,000,000 (68 per cent of 27,000,000) prospective travelers were to make the trip but once every four years, it would mean more than 4,000,000 Americans flying to Europe every year. They would create 30 billion air passenger-miles a year, plus some 5 or 6 billion passenger-miles by Europeans traveling to the United States. That would be more than eighteen times the volume of all United States air travel—

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domestic and foreign—in 1941, and it approaches the total of all the passenger-miles traveled by rail, bus, and air between cities in the United States in 1940.

Granted the heaviest cut that caution might dictate in the estimate, it is still many times the size of all transatlantic travel before the war. Airline men recognize the new market involved. It is one they have already tapped on their coast-to-coast and lakes-to-gulf routes—the two-week vacationists. Many men and women have the time and the money for vacation by air but not for a lengthy steamship voyage. The new market also includes most of those who formerly traveled by sea, the businessmen, the wealthy, and the students and teachers with long vacations who filled the summer steamer runs.

Prospects for Domestic Travel

If prospects for increase in domestic air travel are less spectacular it is only because the increase in domestic air travel has been spectacular already. Five years ago the City of New York was severely criticized for an investment of $40,000,000 in La Guardia Field. Now the Mayor for whom it was named has been universally praised for a prospective investment of more than $200,000,000 in the new Idlewild Airport to insure New York's future place in air commerce.

Together with La Guardia Field, Idlewild by 1960 is expected to be handling 23,000,000 passengers yearly in some 700,000 arrivals and departures of planes. It is significant, too, that under leases signed with twelve foreign and domestic airlines, the city's investment will be self-supporting and self-liquidating. It cannot be charged as a subsidy to air traffic. Even foregone taxes are included in its prospective budget.

Twelve Hundred Planes

The airlines themselves are already committed to an investment two and one-half times Idlewild's for new airplanes. The five hundred they have on order—most of them bigger, faster,

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four-engined craft and two-engined craft of vastly improved speed and efficiency—are to be delivered the moment manufacturers can turn from war planes and will, with present planes, make altogether a fleet of more than 1,200 by the end of 1946. This compares with 359 in their pre-Pearl Harbor fleet and a mere 166 with which they served during the peak of the war demand.

Yet with only 166 planes, the airlines flew 1,481,876,329 passenger-miles in 1942 as against 1,491,734,671 passenger-miles with 359 airplanes the year before. They learned to use their airplanes more hours per day. On some lines their planes were in the air twelve and thirteen hours out of every twenty-four. It explains why in 1944 with 279 airplanes the domestic lines carried 4,688,330 passengers as against 461,743 passengers in 1934 in 417 airplanes. The airplanes, of course, had grown bigger. But passenger-miles flown had also increased tenfold.

It seems likely that another tenfold increase in domestic passengers will be attained by 1955, or a total of some 44,000,000 air voyagers, half of them as usual coming to New York. With such a prospect, Mr. van Zandt's estimate of 4,000,000 annual passengers to Europe does not seem fantastic—and Europe is but one part of the world already made familiar to millions of men in the fighting services, hundreds of thousands of whom have been transported by air.

Advantages of Air Travel

Certain cost factors basically favor air transport. Despite others that work against it, the favorable ones may yet appear large in the equation. Largest is the basic fact that airplanes fly through the free air. They have no cost for right-of-way. The costs of a few radio stations or beacons are insignificant compared to the railroads' cost for roadbed maintenance alone. And second, there was, as the war ended, not a single penny of funded debt in the financial structure of any airline in the United States. Nor does any airline contemplate the financing

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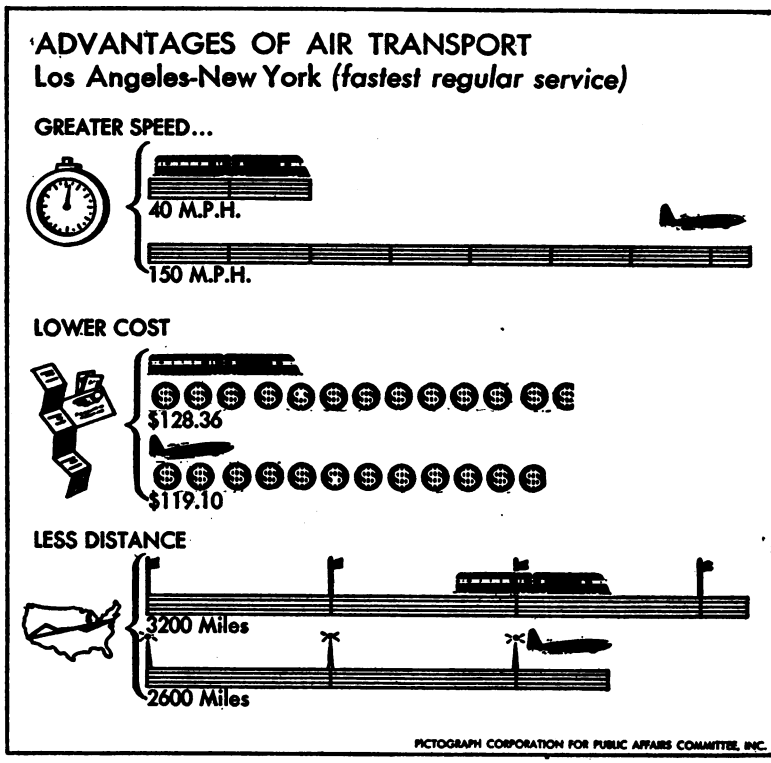
of its postwar expansion by bond issues. The principal cost of that expansion, the purchase of airplanes, will generally be financed by simple and flexible chattel mortgages, conditional



sales, and, in rare instances, equipment trusts. The life of all such loans will be short in view of the high rate of obsolescence which must be set up for airline aircraft despite their mechanical durability. Though trimotor Fords of fifteen years ago are still flying remote cargo lines satisfactorily, the art of air liner design is progressing so rapidly that he would be a rash airline executive indeed who would commit himself to the use of any present or contemplated type for more than five years.

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Air Freight

Nothing has yet been said about the two other important components of airline business—mail and goods. And nothing definite can be said. American Airlines, which pioneered in going after air freight with a rate of approximately thirty cents a ton-mile a year ago, still does not know what this service costs it. Other lines are in much the same boat, even those especially organized to experiment in the carriage of everything from household goods to fresh vegetables and fruit.

Manufacturers, on the other hand, put forward claims for airplanes specially designed for freight which place direct operating costs around six cents a ton-mile. In airline practice, direct costs are somewhere around 50 per cent of total costs. If the manufacturers' claims are proven in practice, this would seem to mean that an air freight rate of from twelve to fifteen cents a ton-mile is within immediate reach.

If it is, the result will be important. The most extensive investigation into the possible size of this field has been made by Wayne University of Detroit. It examined the possibility of carrying fruit and vegetables by air to ten metropolitan centers in the United States: Boston, New York, Philadelphia, Chicago, St. Louis, Atlanta, Washington, New Orleans, Los Angeles, and San Francisco. These centers in 1941 received fresh fruit and vegetables involving 7,582,000,000 ton-miles of carriage or about 28 per cent of all such traffic moving over 250 miles. The following table represents the survey's estimate of the amount of air freight that would be carried at varying rates and the possible percentage of the entire traffic in these commodities that would be carried by air at those rates.

	15¢	*10¢*	*7¢*	*5¢*	*3¢*
*Amount that would be carried by air**	24,419	63,714	333,127	907,711	4,018,743
Per cent of gross traffic	0.15	0.39	2.06	5.99	24.89

**The figures are given in thousands of ton-miles for rates per air-ton-mile.*

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"At a rate of ten cents per ton-mile," the survey points out, "the volume of traffic in sight is still only negligible. However, at seven cents per ton-mile, a wide range of fruits and vegetables . . . responds to air shipment and definite commercial possibilities begin to appear."

Yet seven cents a ton-mile is about one-quarter of the present air freight rates. But present rates have been cut in half in the past year, and no airline executives are ignoring the possibilities of such a volume business, however astronomically unattainable they may think the volumes at five cents and three cents may be. As against the estimates for this one class of commodity, the airlines carried a total of 17,094,029 ton-miles of express and freight of all kinds in the cost-careless year of 1944.

Carrying the Mail

The prospects for a huge increase in mail volume are more immediate. It is generally expected that all first-class mail will be carried by air after the war if it will get to its destination sooner that way. If Congress should take such a step, it would result in 77,500,000 ton-miles of mail in 1946, according to most estimates, and to 86,800,000 ton-miles in 1950, as against 50,825,202 ton-miles in 1944. In view of the fact that 1944 air mail tonnage more than doubled that of 1942, despite an increase from six cents to eight cents in the air mail letter rate, these estimates seem unduly conservative.

Probably in preparation of a demand for all mail by air, the Civil Aeronautics Board is in the process of reducing all payments to carriers from a current average of 60 cents a ton-mile to 45 cents and 30 cents except where extreme hardship and loss might be shown by an individual line—this despite the fact that post office payments to carriers at the 60-cent rate are several million dollars below the Post Office Department's receipts for air mail postage and far below the entire cost to the Post Office for handling and carrying such mail with liberal allowances for department overhead thrown in.

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In other words, with all the major carriers and most of the minor ones well out of the subsidy class—in fact, returning a handsome profit to the government on its mail business—the only excuse for cutting the carriers' payments instead of the postage rate is the prospective increase in volume through the carriage of all first-class mail by air together with the desire to show Congress that such a step would not be unduly costly. This is particularly necessary because the present additional revenue from air mail stamps would be abolished.

Comparatively Few Planes Needed

However handsomely all of these potentials develop into passenger, goods, and mail traffic for the airlines, all of it can still be carried in remarkably few airplanes. Parker van Zandt estimates that all this huge traffic can be carried in 1,500 planes. For the Curtiss-Wright Corporation, makers of airplanes and engines for the transport market, B. A. McDonald and J. A. Drew, company economists, take an even dimmer view. In a well-documented study, they estimate that all the air traffic of the entire world three years after the war can be carried in 1,454 airplanes, American and foreign. In view of the fact that they allot but 571 airplanes to the operation of all domestic air commerce when the domestic airlines have almost that number (500) of new ones now actually on order and cannot foresee any great surplus of seats with 1,000 in their hands a few months from now, this estimate, too, seems conservative. It seems conservative also in the face of the fact that the United Nations have built and are operating somewhere between 12,000 and 15,000 air transport planes in a global war, almost all of them American.

Some Estimates

Even splitting the difference, however, between 12,000 and 1,400 airplanes would indicate the necessity for a world-wide fleet of some 5,300. Renew it every five years and we shall have

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an annual air transport production of only 1,060 airplanes for the whole world. The Air Coordinating Committee estimates the needs of the air transport industry at from 325 to 475 planes a year. This is but a few weeks' production at war rates for a single American manufacturer. It would certainly leave it pitifully short of constituting a backlog for military needs.

That business will not, of course, come wholly to American manufacturers, any more than all the air transport in the world will come to airlines under the American flag. Both manufacturers and lines, however, stand in a magnificently favorable competitive position toward the rest of the world. It was the realization of this that was at the base of the controversy between the British and the American representatives at the International Civil Aviation Conference which was held in Chicago in the autumn of 1944.

International Regulation

We had hundreds of modern, efficient transports capable of flying any place in the world; Great Britain had but a handful of her own and a larger number lend-leased from us. We were talking of rates at three cents a passenger-mile on our utilization of aircraft at upwards of 3,000 hours a year; Great Britain was talking of seven and eight cents a passenger-mile on the 800 hours a year she got out of her planes. We foresaw an almost unlimited business; Great Britain saw it in terms of prewar driblets and weekly instead of daily services. We were ready to build even more modern and efficient craft immediately on the signing of peace; Great Britain could not see her new airplanes in the air in less than two years.

Hence Great Britain sought the most rigid international regulation of rates and frequencies of services through an international body similar to our Civil Aeronautics Board. We believed that there would be international business for all, and accordingly we wished to be free to compete for business, with our own planes or anyone else's.

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Results of the Chicago Conference

Although we failed in a meeting of minds on this, there was a great and important area of agreement at Chicago which is already bearing fruit. In the first place, all nations agreed to work out an international air technical code covering airworthiness of aircraft, qualifications of airmen, rules of the road, and of procedures in ticketing and tariffs, weather reporting, communications, and search and rescue—all the things that would make flying free and safe.

More important still, practically every one of the nations at Chicago agreed to make arrangements permitting the airplanes of any nation to fly over the territory of the other without special permission and to land for noncommercial purposes. They agreed to standard forms under which either two-country or international agreements could be worked out covering commercial stops. Thirty countries have already signed agreements enabling airplanes freely to carry traffic into their territory from the airplane's homeland and from their territories back.

These agreements—the "four freedoms"—were called by Adolf Berle, Jr., American representative at Chicago, a greater advance than all that had been accomplished in attaining freedom of the seas since the days of Grotius. They are being worked out by the Provisional International Aviation Organization in Montreal, as established by the Chicago conference. There is every likelihood that new means of control of the high air will emerge, encouraging rather than restricting its freedom.

The "Fifth Freedom"

The one thing on which the British and Americans failed to reach agreement at Chicago—there is evidence at Montreal that the British attitude has softened—was the right of the airline of one country to pick up traffic in another and carry it to a third. This was the so-called "Fifth Freedom." Many nations followed the British lead in being wary of this because it might

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destroy their own local and regional national airlines. Yet, as the score stands now, twenty countries have signed all five freedoms.

Ten of them, it is true, are in territory that might be considered American. But the other eleven are so strategically scattered through the world that the airlines of the United States are in fact today free to fly and seek business in almost every trade region. These key nations are Afghanistan, China, Denmark, Lebanon, the Netherlands, the Philippines, Sweden, Switzerland, Thailand, and Turkey. The United States makes the eleventh.

U. S. Favors Competition

Meanwhile, the Civil Aeronautics Board has put into effect the doctrine of regulated competition so far as our own airlines are concerned rather than the doctrine of the chosen instrument, or national monopoly, advocated by Britain and some other countries as well as by Pan-American Airways and United Air Lines in this country. Three airlines have been licensed for the rich North Atlantic routes and similar decisions are expected on applications for the Pacific and for South America.

PERSONAL AIRCRAFT

IF the freest kind of air transport development, domestic and foreign, will not nourish a manufacturing industry large enough for our national military needs, as the foregoing seems to show, what then of the personal airplane and its uses? Charles F. Kettering, vice-president and inventive genius of General Motors, has given his prescription for the personal airplane that will sell in something resembling a mass market, as follows:

"It must be," he said, "capable of carrying four people and baggage at a cruising speed of at least 125 miles an hour wherever they want to go. And it must sell in the $2,000 price range."

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No Air Flivver in Sight

Then he admitted that no such airplane was in sight. To perform such a task would require an engine of at least 200 horsepower. You can scarcely now buy a reliable 200-horsepower air engine for $2,000. You cannot buy all the radio and instruments to enable you to fly wherever you want to go for $2,000. It is doubtful if you can buy the airframe alone for that price. Such an airplane today would cost well above $6,000, and that is not in the price range of the kind of mass market needed to sustain an adequate aircraft-manufacturing industry.

Insufficient Airports

Nor are there a sufficient number of airports properly located and equipped in the United States today to enable the owner of a personal airplane to go to a sufficient number of places to put the use of such a plane on an economic basis. And present costs of private operation—notably, expert servicing and inspection, hangar rent, and insurance—raise operating costs to levels that have forced many former pilots to dispose of their planes after brief experience.

But No Lack of Airminded Men

The prospect, however, is not entirely gloomy. The brightest spot is the fact that there are nearly 3,000,000 men in the armed services who are used to flying and like it. About 250,000 are qualified pilots. The rest are airmen of one technical sort or another, many of whom might easily qualify as civilian pilots.

Even allowing for a certain percentage who "never want to see an airplane again" once out of the service, there are many estimates of more than a million potential customers for the right kind of cheap airplane after the war. And when there are a million potential customers for anything, American ingenuity is likely to meet their needs.

Although many of these men will seek jobs in aviation, there will be room for only a small part of them in commercial air

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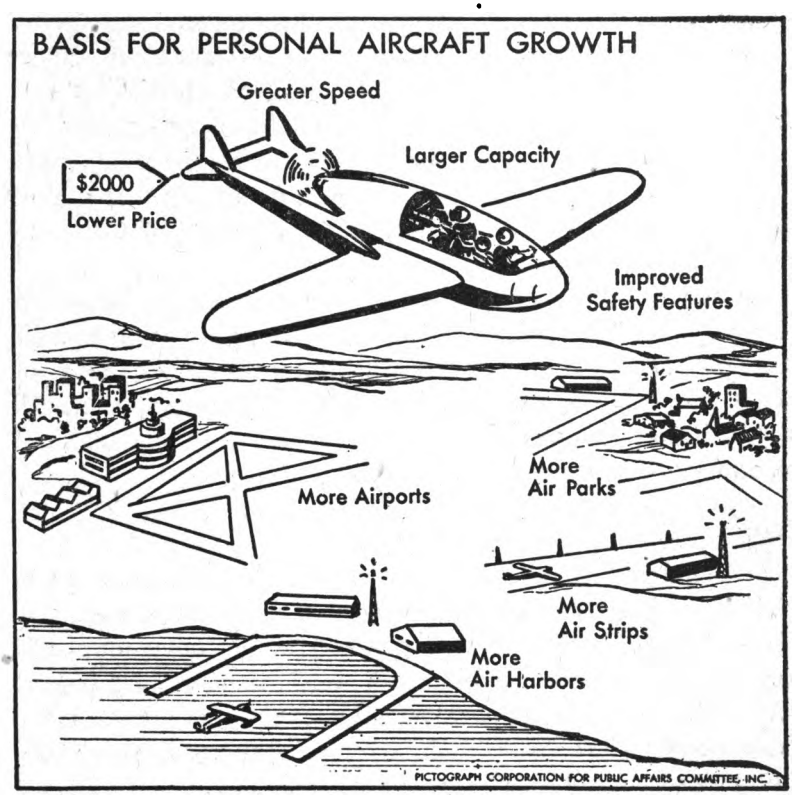
transport and its allied trades. Here again widespread development of private flying will help solve an American problem.



Developing Landing Facilities

The Civil Aeronautics Administration has recommended a well-thought-out airport program which would put landing facilities adequate for present needs within reasonable distance of every sizable community in the United States. The cost, running close to two billion dollars to be spent over a period of years, would be shared with local government, if the CAA

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recommendation is followed by Congress, on much the basis and for much the same reason that the good-roads program was thus shared.

In 1939 this same body recommended a $600,000,000 airport program for needs as then foreseen. War prevented any serious consideration of the program; but war itself provided a vast new number of air fields. Unfortunately, however, they were built for strictly military needs. By far the larger number fail to meet civilian needs because they are remote from the communities they might serve in peacetime. But some of them can and will be used.

A third and very important suggestion has been sponsored by the Personal Aircraft Council of the Aircraft Industries Association, Inc., successor to the Aeronautical Chamber of Commerce and the trade body of all manufacturers in the field. This involves the development of "air parks, air harbors, and landing strips."

Air Parks

The air park would consist of two or three runways. In some instances, it is suggested, they might form the nucleus of new communities, either residential or industrial. The homes of people who want to fly or the businesses of firms that need air transport might be located near such facilities. Plans are already being considered for the integration of such facilities with already established centers such as downtown St. Louis.

Air Harbors and Air Strips

The air harbor is, as the name implies, the same kind of facility, close to the heart of the community, where an adequate body of water permits its use for seaplanes.

The air strip is a mere safety measure, not intended for the storage or major maintenance of the private plane, but sufficient for it to land and refuel. Some of the larger oil companies have already taken steps to secure real estate at junctions of

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trunk highways and other points where they believe the itinerant flyer might patronize the same gas station as the automobiles on the road if there was a safe place alongside the road for him to land and take off.

New Planes

Despite Mr. Kettering's pessimism, the aircraft manufacturers have not given up hope of developing the right kind of private plane. Stimson's four-place, 165-horsepower plane that has served so valiantly as a liaison, close observation, and ambulance plane for the Army is probably nearest actual expression of the type needed. It is, however, still in a price range that is probably beyond the reach of the mass customers who have come out of the Army with all sorts of personal problems to solve before they buy "that airplane."

Piper Aircraft, which sold more units of air transportation before the war than any other, is understood not to be satisfied that its present planes will fill the final bill. Its immediate post-war production will be devoted to improvements in its famous Cub and to a new "aircycle" suitable for sport but of limited usefulness.

Fairchild, Cessna, Beech, Taylorcraft, Aeronca, General Aircraft, Luscombe, Waco, and others are all working on improved types and looking for new ones. The Engineering & Research Corporation of Riverdale, Maryland, for example, has already licensed the manufacture of planes based on its sensational "spin-proof" Ercoupe, developed before the war. This type, involving patented features of wing construction and limited controls, proved so safe in operation that the CAA has put it in a special category requiring less time for training to qualify as a pilot. Macy's big New York department store is offering it on easy terms at under $3,000. Other light planes are being sold from the floors of other department stores throughout the country.

Of the manufacturers of military planes, only Republic, maker of our biggest single-engine fighter—the Thunderbolt—has an-

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nounced plans for a personal plane. This company has tested and is prepared to manufacture on a large scale a four-place amphibian of great promise.

The Helicopter

In the nonconventional field there has been a distinct deflation of the uninformed enthusiasm that greeted Igor Sikorsky's first actual flights in a true helicopter in 1942. It has been recognized that the helicopter today, far from being everyman's airplane for everyman's roof or backyard, is, in the first place, difficult to fly, particularly in those tight places like the backyard where its usefulness would be greatest. Not only Sikorsky but a half dozen others, however, are devoting millions to its further development and it may one day be a highly useful vehicle of the air. A helicopter "bus" has already been built and tested, designed to be flown by professionals and to serve as a connection between big airports far out and the communities they serve.

Other Experiments

While nonconventional craft are in development there is an equally active field in the development of nonconventional material and methods of construction. The hope that plastic airplanes can be stamped out like cookies has long been abandoned. But almost every manufacturer and purveyor of aircraft materials has his eye on experiments in a large number of possible combinations of fiber and plastics.

With the arrival of inorganic glues, such as thermoplastic and thermosetting synthetic resins, there was a rush to mold them with plywood for aircraft use. It was found, however, that wood fibers vary so widely, even in the most uniform types of lumber, that they cannot be engineered into safe aircraft structures in competition with lightweight metals. They do, however, possess the advantage of presenting a true aerodynamic surface with a minimum of interior bracing and external fastenings. Man-made fibers, either glass or the celluloses, are the subject of extensive

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experiments in this field and may yet produce the needed answer.

The personal aircraft field, therefore, can be said to present a potential healthy demand and the possibility of meeting it—first, through the development of current types and, second, through the development of new ones.

CONCLUSION

IF Congress follows the present thinking of our military and civilian leaders, the government will buy from 3,000 to 5,780 military planes a year, with an airframe weight of at least 30,000,000 pounds. That would be one-twentieth of our peak wartime capacity but some three to six times our military production in 1939. Even with the reserve plant capacity in government hands, the industry would be incapable of immediate expansion to meet an emergency such as the threat of destruction by atomic bombs which cannot be excluded from our vision of the future. If Congress further cuts its appropriation to 2,400 planes in the fiscal year 1947, the prospect is even gloomier.

Great as is the probable expansion of the air transport business and important as its effect will be on the economy and politics of the United States and the world, it cannot be counted on for an annual production of even a thousand transport planes in the United States. Such manufacturing capacity cannot possibly support our military needs.

The prospects for the production of the personal airplane in mass are indefinite but they do hold promise. For the years immediately after the war, a production of some 15,000 to 30,000 planes a year seems probable. Dependent on the production of a more suitable type and on the construction of adequate airports, there should be a place for up to 400,000 personal airplanes in ten years, which with a lower replacement rate than either military or commercial types should create a demand for from 30,000 to 45,000 planes a year.

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All such estimates are limited by the possibility of a world so economically involved that it cannot turn its eyes to the air because of the necessity for seeking mere bread. All limits to such figures are removed, however, by the infinite technological advances within our grasp. These range from radar, now a two-billion-dollar industry, which will tremendously increase the safety and utility of all aircraft, to jet and turbine propulsion and new materials and methods of fabrication.

But above all, our security depends on provision for adequate research and the preservation of that manufacturing ability which served us so well during the war.

FOR FURTHER READING

Cleveland, Reginald M., and Neville, Leslie E. *The Coming Air Age*. New York, Whittlesey House. 1944. $2.75

Final Act of the International Civil Aviation Conference. Ottawa, 1945. Obtainable from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25¢

Fryhoff, E. V. *The Economics of Airpark Development*. State Resources and Development Department, State Office Building, Jefferson City, Missouri. 1944

Hershey, Burnet. *Skyways of Tomorrow*. Headline Series No. 47. New York, Foreign Policy Association. 1944. 25¢

Hutchinson, Keith. *Freedom of the Air*. Public Affairs Pamphlet No. 93. 1944. 10¢

International Air Transport Policy. Report of the Attorney General to Congress, March, 1945. House Document No. 152. Superintendent of Documents, Government Printing Office, Washington 25, D. C. 15¢

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Kaempffert, Waldemar. *The Airplane and Tomorrow's World.* Public Affairs Pamphlet No. 78. 1945 edition. 10¢

The Municipal Airport in the National Airport Program. U. S. Conference of Mayors, 730 Jackson Place, N.W., Washington 6, D. C. March, 1945. 50¢

Recommendations on National Aviation Policy. National Planning Association, 800 Twenty-first Street, N.W., Washington 6, D. C. October 22, 1945. 10¢

Van Zandt, J. Parker. *Civil Aviation and Peace.* Washington, Brookings Institution. 1944. $1

————. *The Geography of World Air Transport.* Washington, Brookings Institution. 1944. $1

Will There Be a Plane in Every Garage? (Prepared by the American Historical Association for the armed forces.) Education Manual 37, GI Roundtable Series. Superintendent of Documents, Government Printing Office, Washington 25, D. C. 15¢

Wilson, Eugene. *Air Power for Peace.* New York, McGraw-Hill. 1945. $2

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