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Am. Airlines
AIRWAYS

August 23, 1943

Dear Mr. Patterson:

Mr. Wheeler has asked me to return the enclosed negative number 2027. This was most useful in connection with our AIRWAYS TO PEACE exhibition. Thank you very much indeed for letting us borrow it.

Sincerely yours,

(Mrs. C. S. Hartman)
Assistant to Mr. Wheeler

Mr. Buell A. Patterson
Director of Publicity
American Airlines, Inc.
100 East 42nd Street
New York 17, New York

CH:mjm
Enclosure

4 pictures returned 9/14/43

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AMERICAN AIRLINES INC.
CABLE ADDRESS AMAIR

100 EAST 42nd STREET • NEW YORK 17, NEW YORK • MURRAY HILL 5-3900

July 7, 1943

Mr. Munroe Wheeler
Museum of Modern Art
11 West 53rd Street
New York, New York

Dear Mr. Wheeler:

Mr. Charles Planck of the CAA called and advised us you would like to borrow our negative number 2027 illustrating an overhaul scene for a blowup for your current exhibit.

We are happy to send you the negative and appreciate this opportunity of being of service to you.

Will you kindly return it as soon as you are through with it.

Very truly yours,

Buell A. Patterson

Buell A. Patterson,
Director of Publicity

Enc.

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Am. Airlines

AIRWAYS

May 20, 1943.

Dear Mr. Rheinstrom:

We are very grateful indeed for your kind letter of May 13 offering your assistance in connection with our air age geography exhibition, and I shall act upon your suggestion to get in touch with Mr. Willis.

Sincerely yours,

Mr. Charles A. Rheinstrom
Vice President - Traffic
American Airlines, Inc.
100 East 42 St.
New York City.

MW:lf

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# AFTER ALL IT'S A SMALLER WORLD NOW!

## The 4th Dimension* becomes the new measure of distance!

*10 Hours* to England! *12 Hours* to South America! *40 Hours* to Africa!

That's the way the U. S. Army Air Transport Command thinks today when it figures a logistical problem . . . *in terms of the 4th dimension—time itself!* And what a difference that is from the type of thinking which prevailed during the last war!

You and I can recall that the World War Chief of Staff of the American Army never had an opportunity to reach France . . . *it would have taken more than a week by boat!*

You and I still have fresh in our minds how quickly the Chief of Staff of the present American Army reached Africa *by air . . . it was hours!*

Comparing the war of 1917 with that of 1943, we find that while the latter conflict is global in scope, the fighting fronts are not nearly as remote from home . . . that is by air! After all, it's a *smaller* world today . . . *shrunk to approximately one-fifth its former size!*

For the modern transport plane has telescoped distance and junked the geography that you and I learned in school. Over the airways, it's not a matter of how *far* but how *short* a time it will take to get from one place to another . . . *regardless of statute or nautical mileage!*

To the bringing about of this revolutionary change in thinking, we of Eastern Air Lines can justly claim a significant contribution—not only on the basis of our current war activities with the Air Transport Command but also from the pioneering all of us did years back to popularize the idea that *time* was the most accurate measurement of the shortest distance between two points . . . *80 Minutes*—New York to Washington . . . *8¼ Hours*—New York to Miami . . . *9½ Hours*—Miami to Chicago!

And through both international air gateways to Latin America—*18½ Hours*—New York to Mexico City . . . *15 Hours*—New York to Balboa, Panama!

When the war is over, who can predict just what the future schedules of the Great Silver Fleet will be? Can we? Surely! . . . *service will become faster, schedules more convenient and flying more economical!*

Let's look forward to that day and credit our wartime aviation for so rich a promise. And let's speed the fulfillment of it by working harder and buying more War Bonds to achieve Victory! Then we will be able to enjoy a really new world—*a world measured by minutes instead of by miles!*

Eddie Rickenbacker

PRESIDENT AND GENERAL MANAGER
EASTERN Air Lines

*Physical space is sometimes regarded, as in the theory of relativity, as consisting of the three ordinary spatial dimensions plus a fourth dimension, which is Time itself.

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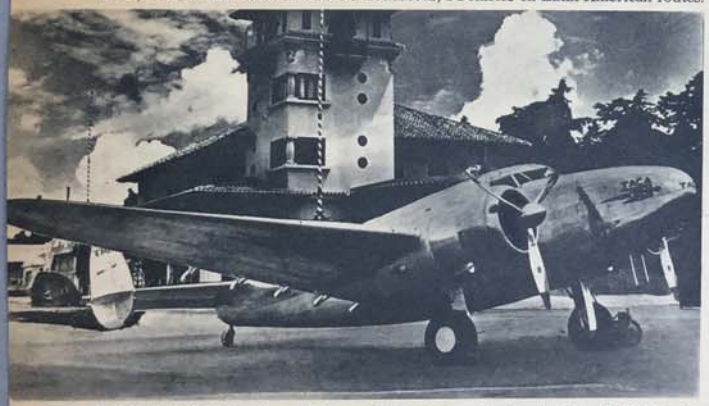
**Pan American,** like most domestic lines, has concentrated financial resources, technical experimentation on development of de luxe passenger and express operations in S. America. This small but modern field is 8,000 feet above sea level at Mt. Misti.

**In operation** between the Dutch islands of Curacao, Aruba, Bonaire since 1934, K.L.M. stepped toward Pan Am's markets by extending lines to Jamaica, ten hours from the U. S., in 1941. This Dutch line uses 7 Lockheeds, 2 Fokkers on Latin American routes.



**No longer serving** "La Aurora" airport (above) near Guatemala City, TACA Lockheed was pictured here when Yerex was carrying vast chicle loads in this country. An alleged Pan Am subsidiary now flies in Guatemala. (Below) Le Luz mines.

# FREEDOM Of

## LAW OF GRAVITY, NOT CONGRESSIONAL LAWS,

**By PAUL ANDREWS**

WHEN Connecticut's world-traveled, worldly-wise congresswoman called recent legislative attention to the diplomatic aspects of post-war global airlines, she added something more than a new word to the American scene. In immediate rebuttals and agreements, subsequent deliberations, leaders of government and the press became voluble on the subject of air freedom. Looking to the East and Europe, they saw financial controversy, potential military difficulty with England and possibly France. To the West, they considered Russia's successful polar air operations with only slightly less concern. But only United Airlines executives, who purchased a small but potentially valuable Mexican airline, indicated post-war interest in our southern neighbor republics, despite the fact that operators below the Rio Grande have, for more than a decade, used the airplane in a commercial manner still in the offing on this side of the Equator.

That Latin American operators have a ten-year edge over domestic airlines in the pitched battle for markets certain to develop after the war is well-known. Perhaps such operations have been discounted because equipment and cargo common to these air carriers hardly match the appearance of streamlined domestic planes and well-groomed passengers. Or it may be that most operators in the United States are overly impressed by the already elephantine proportions of Pan-American Airways System and see little chance for breaking Pan Am's virtual monopoly of southern skies. But whether or not government and aeronautical circles turn to South America in coming months, operations on the other side of the global girdle offer several aspects important in the whole broad picture of post-war air planning.

In the United States, the horse-drawn vehicle gave way to the railroad after the Civil War and the ironhorse in turn lost heavy cargo business to the motor carrier, lighter express cargo to the airplane after World War I. Below the Equator, neither the wagon nor the train could conquer the natural obstacles guarding the continent's virgin wealth and, in the decade following World War I, the mule and llama continued to carry the bulk of all land cargo while canoes and rafts moved the rest along tropical rivers. When the airplane appeared and proved its ability to span marshes, jungles, mountains, and deserts with equal facility, it solved a four-century communications problem, moving raw materials and finished goods to and from any locality which could provide a landing space. This latter factor is certain to dictate post-war international air operations. Planes may fly in the free air, but gravital force ultimately makes all planes come to earth—and landing spaces are unlikely to be free.

To appreciate the full scope of commercial aviation in Latin America, only the operating figures current on the eve of war need be considered. Actually, many new routes have followed in the wake of the Air Transport Command and Pan-American's stepped-up, though secret, flights to the African front and Europe. In 1940, forty-four airlines were serving 750 scheduled stops to give our neighbor continent an airline network 250 per cent greater than domestic operations by eighteen airlines with 260 stops. This intensity of operation naturally reflects South America's lower population density, demonstrated by the fact that total mileage flown was only one-quarter that of flights in the United States while passenger traffic was only one-sixth as great as on our domestic routes. But the Latin operators carried 650 per cent more cargo—the revenue-producing bulk which must be considered in all international airline planning.

Outwardly a commercial success story taunting American operators still stymied by under-loaded, unprofitable hops (in normal times), this is actually a natural phenomenon. With an area of eight million square miles, South America is roughly two and a half times larger than the United States while one of the twenty republics, alone, Brazil, exceeds our continental acreage. And in every country, nature has placed serious obstacles to surface transportation. From northern Mexico to Cape Horn, a mountain wall chokes east-to-west movement along a 7,000 mile stretch. Relatively low and jungle-covered in Central America, snow-covered and marked by peaks rising to 20,000 feet in Ecuador, Peru, Bolivia, Argentina, and Chile, this barrier, in all its diversity, is the world's most prominent single obstacle to communications. Jungles, swampy river basins, and barren deserts add further surface transportation hazards in other parts of the continent. The historical effect has been to confine commercial tolonization to those sections only slightly inland. The present result has been an extension of airlines until their total mileage in thirteen of the twenty republics actually exceeds railroad mileage. Thus, the airplane has skipped a full century of our transportation development by opening stores of mineral, agricultural, and horticultural wealth previously known only in legends.

Oddly enough, the airplane has even attained eminence over other forms of transportation on the main trade routes linking South American capitals, because of the block-to-block time factor and natural obstacles which make motor and rail transportation costly. On the east coast, Buenos Aires and Rio de Janeiro are six days apart by surface vehicles, only seven hours distant by air. Sur-

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# THE SKIES!

## TEMPERS ALL INTERNATIONAL AIRLINE PLANS

face travel from Rio inland to Ascuncion, capital of Paraguay, takes ten days, while planes fly the distance in six hours. Travelers between Lima, Peru and Santiago, Chile on the west coast must allow six days for ground travel but airlines cover the 1,650 mile hop in ten hours. And even though Brazil and Colombia have a common frontier, travel between Bogota and Rio, the capitals, takes three weeks by surface vehicles as compared with three days on present round-about air routes. The same trip could be flown in a day or two by more direct routes. That these examples are the rule, not the exception, is evident in the fact that travel time in South America has been reduced from an average of two weeks by surface transport to two days by air.

Off the main lines of travel, the value of air transport is even more apparent. In sections where available means of surface transport are not only slow, irregular, and uncomfortable but dangerous as well, the cost of air transportation is actually lower than surface fares. For example, Cuenca, an important source of Panama hats in southern Ecuador, is only eighty-five miles distant from Loja, a textile weaving center. But travel between the cities takes five days by mule over bleak mountain trails offering few facilities for overnight lodging. Mule hire is $10 and the scarcity of shelter makes food and lodging expensive. Panagra flies this route three times each week in forty-five minutes —and the fare is only $12. Despite this rate of almost fifteen cents per passenger mile—three times the normal domestic rate—the airline has little surface competition. From Lima, to Iquitos, in the northeast corner of Peru, the air distance is 735 miles, making four-hour schedules with modern planes entirely practicable. The normal mode of travel between these cities is by boat through the Pacific and the Panama Canal, around the Atlantic hump of Brazil, and up the Amazon. This 8,000 mile journey involves thirty to forty days' travel. The only alternate overland route is through the tortuous Pichis Trail by automobile, mule, raft, and motor launch. Economically, the value of this proposed air route is beyond belief. The boat fare between the cities is $450, which would amount to sixty cents per passenger mile on the direct air line.

Brazil, regarded by many diplomats and industrialists as the greatest reservoir of natural wealth still remaining in the world, provides the most striking example of air transport's potential worth. Travel from Rio Branco, at one end of the Acre Territory, to Cruziero do Sul, at the other extremity, takes five months by canoe and raft down the Rio Purus, along the Amazon, back up the Rio Jurua. The airplane can cover the distance easily in ninety minutes. In view of the fact that the Acre Territory holds much "upriver fine" rubber and, possibly, petroleum in which Brazil is notably lacking, the plane's value to the Brazilian government is obvious. Post war airlines may well restore Brazil to eminence as a source of crude rubber for the United States—a position of commercial importance which the republic lost to the East Indies more than twenty years ago.

With the financial prospects of South America so encouraging, it is hardly surprising that several important men have concentrated on air operations below the Rio Grande during the past ten years. In the case of Juan Terre Trippe, dynamic Pan-American president, little remains to be written that has not already appeared in the general press, and financial statement eulogies. Of the other man, Lowell Yerex, fact and fiction have been so consistently intermixed that his real contributions to the United Nations' war effort have been generally ignored. But his Transportes Aereos Centro-Americanos, better-known as TACA. British West Indian Airways, and the embryonic Empreza de Transportes Aerovias Brazil, may provide the best lead to post-war airlines linking the Americas.

Accidentally begun in 1931, with a single airplane, TACA has reached international proportions without benefit of government subsidy, the vast financial resources backing Juan Trippe and Pan-American, or access to lucrative cargo and passenger terminals in the United States. At the close of 1940, TACA operated into 236 landing fields with regularly scheduled and charter or flag stops. Maintenance of the firm's fifty-one planes, which included twenty-six Ford Trimotors and five Lockheed 14's, was handled in shops at Tegucigalpa, Honduras and San Jose, Costa Rica. That these shops match the best domestic counterparts is indicated by the fact that Yerex, in an attempt to augment his war cargo aid to the United States, has purchased Ford Trimotors abandoned by other operators, rebuilt them as serviceable cargo carriers. When Trans-Canada converted from Wasp to Hornet engines last year, TACA bought the Wasps, installed them in Fords to give Ceneral America a fleet of operationally modern, if externally unbeautiful, airplanes. In another case, Yerex created the world's first air tanker by mounting 600 gallon tanks in a Ford's passenger cabin. He is now considering purchase of the recently rebuilt Burnelli UB-14 all-wing monoplane for TACA operations.

During the five-year period ending with January, 1942, TACA moved some 93,000,000 pounds of express and freight for a volume three times as great as that carried on domestic airlines. In 1940, 60 per cent of the firm's total revenue came from this source while American air lines were getting only three per cent of their revenue

**Lockheed** above is used on TACA's successful, internationally important lines in Honduras, Nicaragua, El Salvador, British Honduras, Costa Rica, and Panama. Tegucigalpa, line headquarters, is one world capital never served by any railroad.

**Operating from** the Santiago airport (above), Panagra flies north thrice weekly to Antofagasta, Africa, the U. S., also makes four trips weekly each way between Santiago and Buenos Aires. Linea Area Nacional is also operating from this base.

**The nationalized** Lloyd Aereo Boliviano, operated by Panagra, has headquarters at Cochabamba airport (above) while TACA, without subsidies or financial encouragement, builds simple, serviceable fields, has fields in fifty Hondurian towns.

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from express. TACA's passenger traffic contributed nearly thirty-five per cent to the total income while air mail was responsible for five per cent of the earnings. In this latter regard, it is interesting to note that Yerex has never obtained a direct government subsidy and payments for mail have generally been at the rates previously paid for transportation of mail by mule. As a result, almost all local mail in Central America moves by air or surface means at the same rate under a system inaugurated several years prior to the much-publicized British "all-up" plan.

In TACA's rise to the position of a persistent gadfly stinging the flanks of gargantuan Pan-American, ability to haul freight economically has provided the main success factor. Before arrival of the airplane, movement of freight from the north coast of Honduras to Tegucigalpa, the capital, required two weeks. The same distance, only 150 miles by air, is flown in two hours. Tegucigalpa is interesting as the world's only major national capital not served by a railway. From a commercial standpoint, the value of this air link is obvious, for unit loads formerly limited to 100 pounds per mule on some routes have now been increased to more than 5,000 pounds. Naturally, TACA's cargo in this region has little of the glamor or publicity value of orchids flown from a Hollywood florist to a screen star visiting in New York. Hondurian air loads frequently include refrigerators, barbed wire, dynamite, locomotives, donkeys, mining machinery, vegetables, lumber and a variety of perishable food supplies. By introducing the principle of deferred freight rates, usually less than half the air express tariff, the company accumulates a back-log of freight which permits full capacity operation on almost every run.

Two of the largest gold mines of Nicaragua, the Neptune at Bonanza and La Luz at Siuna, are completely dependent on TACA for transportation of supplies from the Atlantic Coasts and from Managua, city of entry for most supplies from the United States. By installing 600-gallon tanks in plane cabins, the line has developed a fleet of flying tankers which successfully haul every type of fuel oil required by machinery at the mines. Similar planes, with different interior fittings, carry sheep, lime, fruit trees, live cattle, and poultry. The latter types of cargo are carried under a contract with the Nicaraguan government, which in 1939, reserved passage on every round trip between Managua and San Jose, Costa Rica with the express understanding that such passage could be exchanged optionally for transportation of essential meat and agricultural products.

In Guatemala, TACA inaugurated an important operation—best described as the "chewing gum express," inasmuch as the principal pre-war cargo consisted of chicle. This operation was begun in 1935, when Lowell Yerex purchased the defunct National Aviacion Company of Guatemala, which was reportedly forced out of business by competition with a local Pan-American subsidiary.

To facilitate the movement of chicle, TACA built ten landing strips at their own expense within a fifty-mile radius of Flores, chicle center in the remote Petén District of eastern Guatemala. From Flores, the chicle growing regions could be reached in fifteen minutes by air as compared with an overland journey of six days. To move two tons of chicle from Flores to Puerto Barrios, the Caribbean port only 140 miles distant, required twenty mules two weeks or more. TACA made the run in one hour, was consequently able to conclude agreements with several chicle exporting companies. Under contract terms, TACA moved all inbound and outbound freight for these companies at a flat monthly rate which proved satisfactory to everyone concerned. TACA was assured of a steady monthly income, the exporters obtained vastly superior and less costly transportation for all supplies and shipments, and the Guatemalan government was able to collect an export tax of seven and a half cents per pound which had been previously lost through smuggling operations into Mexico and British Honduras. So successful was this operation that TACA carried more than 1,000,000 pounds of chicle out of the Petén District during December, 1940, only to lose this growing source of revenue as the result of an unfortunate series of events which caused TACA's withdrawal from Guatemala in 1940. The local service was taken over by Aerovias de Guatemala, S. A., a company alleged to be under Pan-American control. During the first six months of 1941, Aerovias reported a gross cargo business of 2,400,000 pounds, estimated future volume at 500,000 pounds monthly. Although some of TACA's excellent bases were appropriated by the government-encouraged Aerovias, other fields used and serviced by the Yerex line have not been used and have probably now been reclaimed by the jungle. But TACA's lead in chicle transport has since become an international factor, with similar operations in southern Mexico and the Yucatan Peninsula. Five of the sixteen existing Mexican airlines are primarily engaged in cargo operations, with chicle cargo exceeding tobacco, coffee, and sugar shipments by an appreciable margin. For example, CAS-Woodside, operating in the State of Tabasco, carried some 1,500,000 pounds of chicle during the first six months of 1941.

Although Juan Trippe, an American, and Lowell Yerex, a New Zealander, have exploited the airplane most successfully in the Latin republics, German enterprise actually established the first airline in South America in 1920. Organized by two German and Austrian pilots of World War I, known officially as Sociedad Colombo-Alemana de Transportes Aeroes, SCADTA operated with marked success for almost two decades. Then, in 1939, it was nationalized and merged with SACO, a small local airline, to form Aerovias Nacionales de Colombia, or Avianca. No small part of SCADTA's success was due to cargo operations, with nearly sixty million pounds carried in five years. This volume was double that of American domestic lines, eighty percent as great as TACA's total load, during the same period. As in Central America, natural obstacles to surface transportation gave impetus to the growth of Colombian air cargo. In 1920, eighty per cent of Colombian commerce moved along the Magdalena river route linking the Caribbean port of Barranquilla and the isolated (*Continued on page 52*

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EDITOR'S NOTE: *Too late for inclusion in the body of this story, the news of Pan-American's new route is added here for its probable interest to readers. About the first of May, New Orleans will become an international air gateway for air traffic from nineteen states in the Ohio and Mississippi Valleys through the Gulf of Mexico to Guatemala City, where connections will be made with the entire PAA Latin American network. The distance between the cities is 1,075 miles. Air travel time will be six hours.*

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weapons, the Russians were ready for still more bitter battles on all their fronts in the drive to push the Germans off Soviet soil.

But strong as the Russians were, there were two factors that for the time being might slow up their gains. One was the fact that until its railroads and other facilities destroyed by the Germans can be repaired, Kharkov will be of only limited military use to the Russians, whose communication lines are already well extended. The other was the approach of the September rains, bringing with them soggy roads and flooded rivers that could now hamper the Reds just as in the past they held up the Germans. And not until October or November would winter, traditional Russian ally, harden the path for attack again.

## Long-Ranger

### Liberator Carrying the Ball on Distance Bombing Forays

*Ploesti . . . Wiener-Neustadt . . . Paramushiru . . . Balikpapan.* In the last month all these outlandish places have been the targets in raids by Consolidated B-24 Liberator bombers. The remarkable thing about them was that they all represented round trips of between 2,400 and 2,600 miles from the bases of the American bomber squadrons. The raids on the Rumanian oil fields at Ploesti and the Nazi plane factory south of Vienna at Wiener-Neustadt were carried out by Liberators based on North Africa. Bombers from the Aleutians hit the Jap naval base at Paramushiru. Australia-based Liberators bombed the Jap-occupied oil fields at Balikpapan on Borneo.

The Liberators have thus at long last established their place in the sky alongside their rivals, the Boeing Flying Fortresses. The competition between crews manning Liberators and Fortresses continues as a kind of entertaining game for the protagonists of both planes, but confidentially each side will admit that the other has a fine plane.

The Liberator got off to a slow start in the war. The first models had been hailed by British magazines, such as The Aeroplane, as one of the finest planes ever produced. The big, fat fuselage was well designed and carried a good tonnage of bombs. The famous Davis wing and the four 1,200-horsepower Pratt & Whitney engines gave the Liberator great operating efficiency.

But the bomber still needed many modifications for combat conditions. It lacked sufficient altitude for the high-level technique developed by the Army Air Forces until changes had been made in the superchargers. Like the Fortress, the Liberator was also insufficiently armed at first. There were many difficulties in production.

All these troubles have now been ironed out, and the Liberator has emerged as the great long-range plane of the Allied air forces. It can make a round trip of a little

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more than 2,500 miles compared with the 2,000-mile range of the Fortresses. Its bomb load is slightly more than that of the Fortresses—3 tons as compared with 2½ tons—although external racks can be used to increase the weight carried by both planes. The Liberator now has fourteen .50-caliber machine guns. Production has also increased tremendously, and the giant Ford plant at Willow Run is only one of many turning out the Liberator.

The Liberator is ideally suited for operations over the vast reaches of the Pacific. Eventually the Army and Navy plan to use it exclusively in the war against Japan. For that same reason, the heavy bombers of the Fourteenth Air Force in China are Liberators. Its use in Europe against Ploesti and Wiener-Neustadt opens up new vistas of long-range bombardment, although the targets worth the losses involved are necessarily limited.

The big Consolidated planes have also served from the first as the workhorses of the air force. It was a Liberator that took Prime Minister Churchill on his trips to Russia and Africa. It was Liberators that were used largely as transatlantic transports. And it was Liberators that played a crucial role in what may be the most decisive battle won by the Allies—the victory over the U-boats in the Atlantic.

## Japan's Captives

Huddled in misery in disease-ridden prison camps, Allied prisoners in Japan figured last week in dispatches from both London and Washington:

¶ London provided the total prisoner roster: Excluding Chinese, the War Office disclosed, 370,000 prisoners are now held by the Japs. The captives include 100,000 British, 30,000 to 40,000 American troops, between 70,000 and 80,000 Indian soldiers, and 100,000 Dutch soldiers and civilians. So far, the report said, only 65 per cent of the captured British soldiers have been identified, while Tokyo still has failed to name 80 per cent of the 50,000 interned British civilians, thus keeping half a million relatives in suspense by this breach of international law.

¶ In Washington the War Department released International Red Cross figures showing that disease had killed 1,344 of the nearly 14,000 Yanks captured in the Philippines. This 1-to-10 ratio took on sharper meaning when compared with a Department of Justice survey placing disease-caused deaths among enemy aliens interned in this country at only one out of every 273. However, a brighter note was sounded in a State Department announcement that details for a second exchange of about 1,500 Japanese and American civilians had been virtually completed. The actual exchange, which will result in repatriating about one-third of the American civilians still in Japanese hands is expected to take place at the port of Mormagao, Portuguese India, in mid-October.

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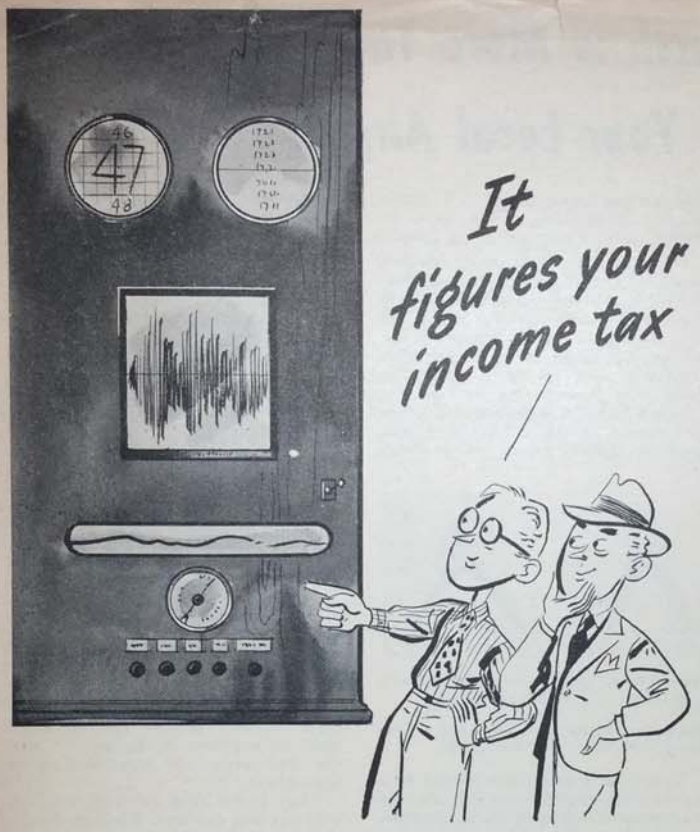


In post-war years the trouble of figuring your income tax may be eliminated (the headache will probably remain the same) with the clever application of electrical apparatus. Just whether this would be an unmixed blessing, we are not prepared to state.

That there will be innumerably more applications of electrical science in after-war years is too patent a fact to be questioned. Just what their manifold functions will be is a fertile field for prophecy.

But whatever their form or function, if they are operated by electrical circuits and made to the highest order, you'll more than likely find Cannon Connectors playing a vital part in their operation.

Type P Cannon Connectors are universally used in radio, sound apparatus and allied applications. Other types of Cannon Connectors are used in a wide variety of wartime and peacetime industries including television, shipping, lumber, aircraft, motion pictures and in geophysical research; in fact wherever dependable connections are needed.

CANNON ELECTRIC

Cannon Electric Development Co., Los Angeles, Calif.

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Cover—Pictured in this Official United States Navy Photo is one of the newest battleships to join the Fleet. In the year since Pearl Harbor, the United States and Great Britain have regained from the enemy decisive superiority in naval strength. (For story, see page 25.)

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# LETTERS

## Setting the Record Straight

The Feb. 22 issue of NEWSWEEK, in an article discussing OWI's overseas Victory magazine, stated that "the fulsome piece about the President in Victory had been edited by Gardner Cowles Jr., a Republican and Wendell Willkie's stanchest Midwest supporter . . ."

The fact is that Victory is an activity of the Overseas Branch of OWI. Mr. Cowles is head of the Domestic Branch. He had nothing to do with overseas Victory or with editing any part of the content of the issue in question.

M. S. EISENHOWER

Office of War Information
Washington, D. C.

NEWSWEEK *gladly sets the record straight, but takes the occasion to point out that the OWI itself was its source for the statement that Mr. Cowles edited the issue of Victory in question.*

## Mr. Peters's Close Shave

As one of the few surviving "straight-razor" shavers, I fear Mr. Peter Peters is still in the amateur class (NEWSWEEK, Nov. 23, 1942). Not 5 per cent of the hairs of the beard grow out perpendicularly from the skin. On the neck, they grow upward, and on the cheeks they have a downward slant. As a result, most barbers and all expert home shavers go over the face first with the slant of the hairs and second against the direction of growth thus getting the closest shave that is possible with any type of razor. With this obvious fact established, it doesn't make any difference whether hot, warm, or cold water is used for none of them have any effect on

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# No Spot on Earth is More Than 60 Hours From Your Local Airport

ALONG with all that's being said and written about the kind of world we'll be living in after the war, here's one fact you cannot ignore:

"No spot on earth today, however distant, is more than 60 hours' flying time from your local airport!"

MERCATOR PROJECTION

**If a Liberator bomber,** *built in San Diego, were crated and shipped the 9240 miles to Algiers by sea, it would arrive about a month later.*

POLAR AZIMUTHAL EQUIDISTANT PROJECTION

**A Liberator** *is capable of flying the 6210-mile airline route from San Diego to Algiers in about 31 hours' flying time.*

If you doubt it, ask the pilots and crews who are flying today's big long-range planes, ferrying military personnel and supplies to our far-flung battle fronts. They'll tell you that the Atlantic is only 400 minutes wide—that Australia and San Francisco are a mere 35 hours' flying time apart—that you can hop from the U. S., touch Brazil's hump, and come down in Africa, all in 27 hours' flying time.

Or look at one of the new "aviation geography" maps, like those our children are studying in school. These maps make obsolete the maps we have always known. They show us the world as it really is. In this world, because of the plane, Main Street runs from your home town to London, Moscow, and Chungking. Nations and people we once thought remote are now merely hours and minutes away.

**From El Paso, Texas,** *to San Antonio, Texas, is 617 miles—an 18-hour trip by train.*

**The Airline Route** *from New York to London is 3480 miles—a 17-hour flight.*

Today, of course, the global skyways are reserved for war. But after the war, when freedom of the air returns, trade and travel by plane will become as much a part of everyday life as the use of cars, trucks, busses, railroads, and ocean liners. It is no dream of the future to count on global transportation in giant planes which fly almost with the speed of sound itself. Even today, such planes are being designed and are undergoing their wind-tunnel tests.

The Air Age has come, sooner than we thought. Already we have had to learn that wars must be won with the *aid* of the new Air-Age geography—not in spite of it. And we are beginning to see that the peace we win must be built on a clear understanding of this new global geography and how it can work *for* us.

**AIR-AGE TIMETABLE**

| FROM | TO | AIRLINE MILES | HOURS |
|---|---|---|---|
| New York | Berlin | 3960 | 20 |
| Chicago | Singapore | 9365 | 47 |
| New York | Capetown | 7801 | 39 |
| San Francisco | Wellington | 6759 | 34 |
| Washington | Moscow | 4883 | 24 |
| London | Rome | 887 | 4½ |
| New York | London | 3460 | 17 |
| London | Berlin | 574 | 3 |

The tens of thousands of men and women who make up the U.S. aircraft industry believe that America must be supreme in the air—to win the war today, to win the peace tomorrow.

They know that air power alone will not win the war. But they find it difficult to imagine a nation which possesses the *finest* planes, and the *most* planes, going down to defeat.

• • •

**Consolidated Aircraft Corporation**

San Diego, California • Fort Worth, Texas
Tucson, Arizona • New Orleans, Louisiana
*Member, Aircraft War Production Council*

★ ★ ★ ★ ★ ★

## QUICK FACTS FOR AIR-MINDED READERS

The famed Liberator (B-24) is a Consolidated bomber, built by mass-production methods, on moving assembly lines, at the huge Consolidated plant in San Diego and Fort Worth. The two Consolidated Navy patrol bombers known as the Coronado and Catalina also are built at San Diego.

• • •

**The 4-engine Liberator Express, (transport version of the Liberator bomber), is built at the Consolidated plant in Fort Worth, Texas. This giant plane, with its trans-oceanic flying range and multi-ton cargo capacity, is daily shuttling military supplies to our global battle fronts.**

• • •

"... today we are flying as much lend-lease material into China as ever traversed the Burma Road, flying it over mountains 17,000 feet high, flying blind through sleet and snow." *From the President's address to Congress, Jan. 7, 1943.*

• • •

**Major General "Jimmy" Doolittle was the first American aviator ever to take off, fly, and land "blind". He did it in 1929, piloting a Consolidated training plane known as the NY-2 Husky.**

• • •

At the Consolidated plant in San Diego, there are testing laboratories in which the temperature is maintained at 80 degrees below zero.

• • •

**One of the test pilots on Consolidated's staff has to his credit over 20,225 hours in the air. His total flying time equals more than 852 full days, or two and one third years.**

• • •

Consolidated designed and perfected the Liberator, which is also being built, today, by Ford and North American. Consolidated Catalina patrol bombers are also built in the United States by the Naval Aircraft factory at Philadelphia and in Canada by the Canadian Vickers Ltd. and Boeing.

**AIRCRAFT** DESIGNERS AND BUILDERS OF THE LIBERATOR, CORONADO, CATALINA, LIBERATOR EXPRESS

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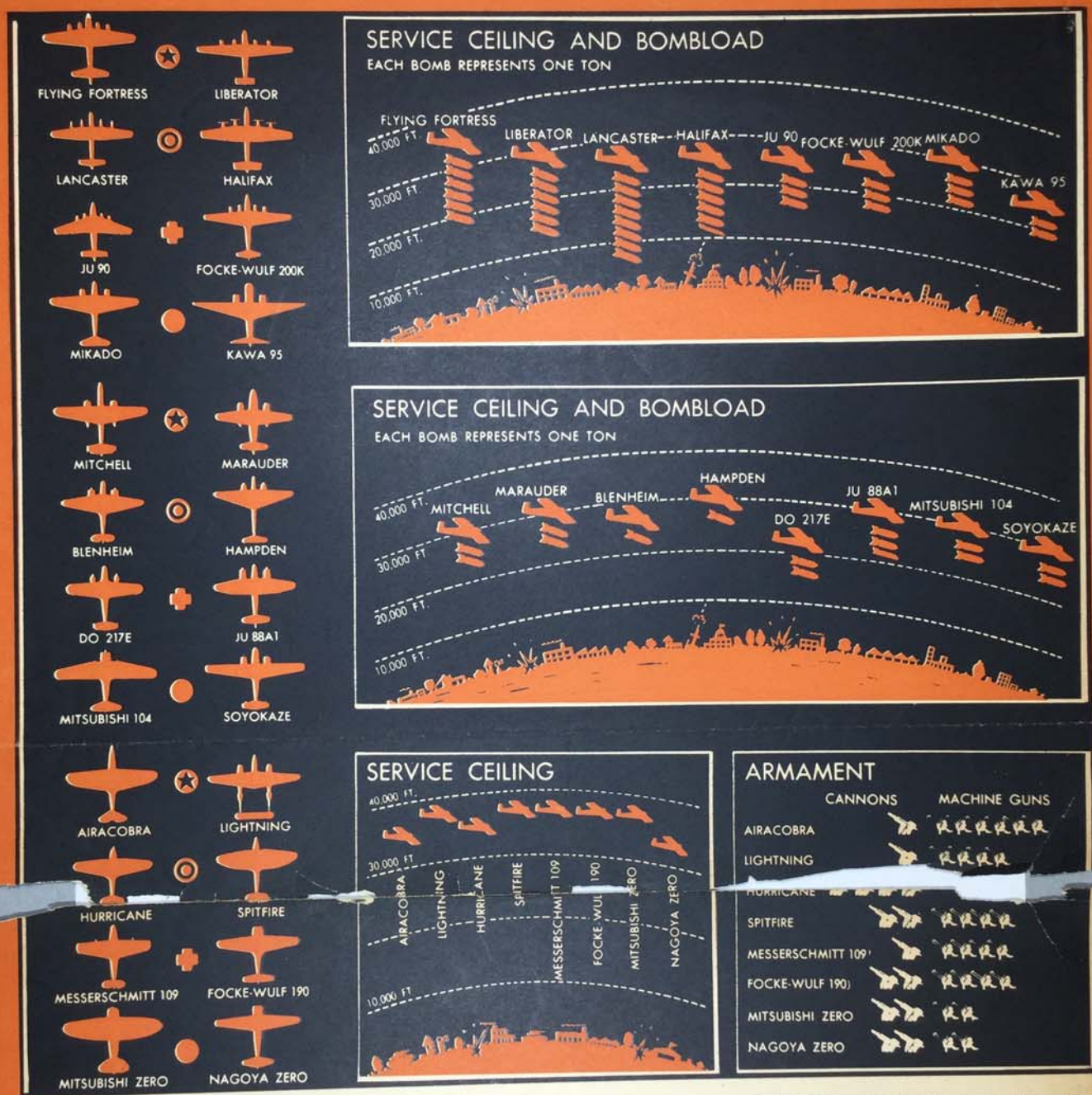


# THE AIR OFFENSIVE AGAINST GERMANY

**A REVIEW OF THE NEW BOOK BY ALLAN A. MICHIE**
**AIRCRAFT PERFORMANCE DRAWINGS FOR AIR NEWS BY PICTOGRAPH**

SPEAKING with the tone of a small boy who admits a misdeed in hopes of a pat on the head, the author declares in his foreword that the book was written in ten days. This admission is unnecessary. The most casual reader will, after a few chapters, assume that not only the writing but the research was completed on the same ten-day Clipper flight from London to Lisbon to Liberia, and thence across the Atlantic to Pleasantville, New York, home of Michie's employer, *Readers Digest*. Allan Michie's own statements have been picked at random as the best denouncement of his factual carelessness in attempting to prove a particular, but not very important, point.

On page 26, Michie declares, "The largest weight

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**Piston** removed to top center in cylinder by use of prop turning bar, these cadets prepare for removal, while instructor Cpl John B. Hassinen advises on proper sequence. Engine is R-130-43 Pratt & Whitney used in Liberators. Officer graduates from Yale classes will be able to direct maintenance operations in any war zone.

**Adjusting oblique** view-finder on K-18 aerial camera, Lt. Leonard E. Wine explains its usage to cadets in Photographic course at Yale. These cadets also get training in optics, theory, mathematics, chemistry, mosaic printing and assembly mosaic flight administration. Peter Bowers, AIR NEWS photographer, recently completed course.

**Nerve center** of the Army, communications provide one of the Yale school's most rigorous training courses. (Above) S/Sgt. N. Sendebach demonstrates sequence for tube check removal on SCR-274N unit. (Below) Cadets in Maintenance Engineering use inside micrometer to check cylinder bore for taper, out-of-round.

**Striking power** of 30 and 50 cal. machine guns is compared (above) by cadets enrolled in armament course at Yale. S/Sgt. Robert S. Christopher, holding 50 cal. bolt assembly, emphasizes danger of jammed guns resulting from imperfect fit. (Below) Cadets study intake manifold of Allison V-1710-51 under tutelage of Cpl. Pitts.

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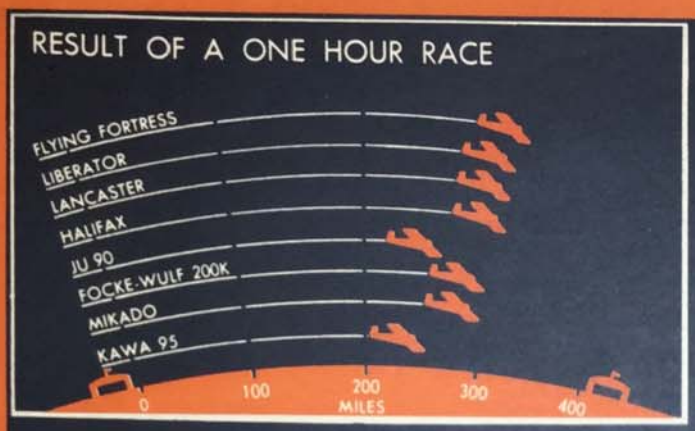

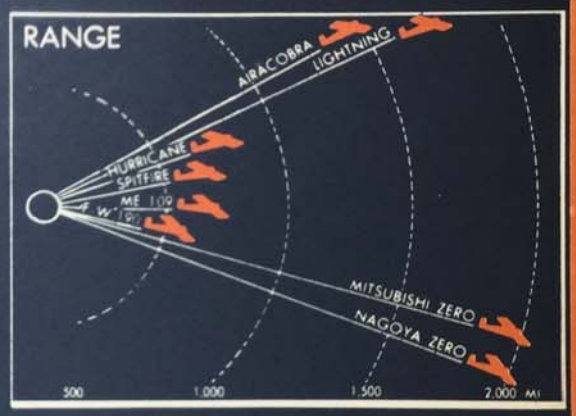


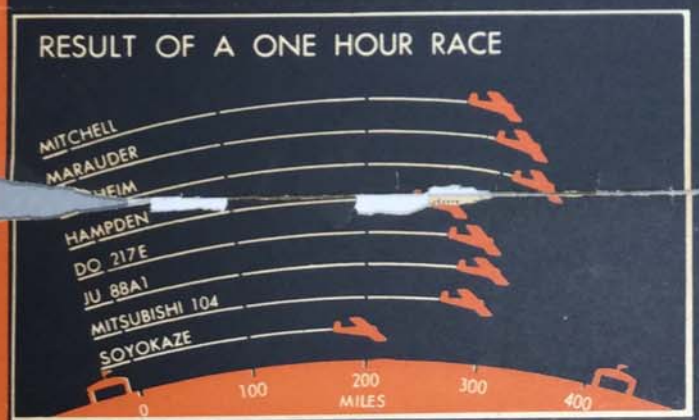

of bombs dropped by the Germans on any one night over Britain was the slightly less than 450 tons dropped on London on the night of April 16-17, 1941." Three pages further on, he remarks, "On the night of May 10-11, 1942, the Nazis concentrated 300 planes against London in what is generally conceded to be the worst raid any British city suffered." The inconsistency is interesting, but hardly informative. Convinced that heavy bomb loading can, single-handed, win the war, Michie makes mathematical theories into military axioms with amusing candor. On Page 75, he remarks, "We know that 300 tons of bombs can completely destroy one square mile and damage by blast proportionately. We know that 1,000 bombers, carrying about 3,000 tons of bombs, can demolish from eight to ten square miles of a city." His first proposition is correct in theory but the extension of his first figure is not even correct on paper because of the variable which economists describe as "law of diminishing returns." In practice, neither of his dogmas are proved by actual combat experience, as evidenced by his own report on Page 27, "The small German city of Osnabruck, about one-fiftieth the size of London, crumpled under the weight of more than 450 tons of bombs." The answer is, of course, that when hundreds of bombs are dropped simultaneously in the same area, many of them drop on already demolished targets. In other words, to use a colloquial, even a bomb can't get blood out of a turnip.

Michie declares, "With airdromes scattered about three miles apart over the face of England and Scotland, the British could send out two or three thousand planes in one night—if they had the planes." Actually, they could send out ten times that many planes with Michie's three-mile gaps between fields. But Michie ignores, with one sentence, the problems of wind direction, landing speeds, level surface, and natural flying obstacles which have stumped aeronautical engineers for a generation. In other words, Piper Cubs could operate safely from fields three miles apart, Lancasters couldn't—even if many parts of England were not hilly or marshy (*Continued on page 40*)

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# BOOKS

(Continued from page 39)

and thus hardly adaptable to airdrome construction. With the same reasoning, the author dismisses the gasoline problem saying "For one 1,000-plane raid on the Ruhr, from 300,000 to 500,000 gallons are required. Even if we could stage twelve 1,000-plane raids each month, the present convoy system easily fulfills these requirements." Unfortunately, arrival of a tanker does not put the gasoline into the tanks of a thousand planes. Collective fueling of 1,000 planes is a matter of hours, not seconds, as Michie apparently believes.

Preceding statements are all included in Michie's chapter titled "Bombs Can Do It." His subsequent chapter on "The Planes" is even more entertaining. On Page 88, the author declares, "Regardless of the tremendous publicity given to the Fortresses and Liberators since they arrived in Britain, the truth is that we do not yet have in operation a plane comparable to any of the three British heavies." Evidently, Michie's statement was based on performance figures which he presented on the preceding and succeeding pages. These figures are particularly interesting in the light of Michie's foreword statement that his performance data were derived from personal observation or British periodicals because "performance figures in British periodicals are more accurate than those contained in American."

Michie states that the Short Stirling can carry up to 18,000 pounds of bombs, has a maximum speed of 280 mph, range of 2,050 miles at 227 mph. The inference is, of course, that such performance figures are operational, except for the "on short trips" qualification of the 18,000 pound load. Official RAF figures give maximum load of 14,000 pounds and maximum speed is 280 mph without bombs. And normal bomb load is 9,000 pounds. Of course, only quibblers will argue a matter of several tons.

Describing the Halifax II, Michie states that "it has a performance about equal to that of the Stirling. It's bomb load on short range is 15,000 pounds." The same British Air Ministry source quoted above gives the Halifax a top speed comparable to that of the Stirling but special attention to a cruising speed 145-165 mph—and bombers seldom operate at maximum speed. Moreover, the maximum bomb load is given as 11,000 pounds—another discrepancy of a mere two tons—and a normal load of 8,600 pounds.

Michie's description of the Lancaster, admittedly the finest night-bomber ever sent aloft, is closer to fact but still misses the mark by an appreciable amount. He lists a "normal maximum load of 18,000 pounds and it can climb to around 30,000 feet, which is about equal to the normal operating ceiling of the Fortress."

It is hardly necessary for an aviation magazine to point out the obvious fact that "normal" and "maximum" loads are two different things—not one figure as Mr. Michie prefers to believe. Quoting our RAF "bible" once more, the Lancaster's normal load is given as 10,000 pounds, normal overload as 12,000 pounds, maximum load as 18,000 pounds. The latter figure is qualified with the statement "this is seldom attempted." Michie continues in his Lancaster description by stating, "it can reach a speed of just under 300 mph." Actual top speed is exactly 300 mph but cruising speed, the tactical factor, is 190-235 mph. Range with 10,000 pounds is 1,000 miles at 230 mph but the range drops to 600 miles at the same speed when 12,000 pound bomb load is carried. This contrasts sharply with Michie's declaration, "it has a range of 3,000 miles."

On the American side which cannot, according to Michie, present a single plane in a class with any of these three ships, the figures are equally interesting. Michie comments, "The Boeing B-17F, powered with four Cyclone motors, developing a total of 3,600 hp (as against the more than 5,000 hp of the Lancaster's engines, has a maximum speed of 250 mph at 25,000 feet, and has a range of 2,000 miles at 225 mph at 30,000 feet. The bomb load is limited to 5,000 pounds." British official intelligence figures again disagree with Michie. Each of the four engines develops 1,200, hp which totals 4,800 hp by most arithmetical reasoning—not Michie's 3,600 hp, although battle-scarred B-17's frequently do return to base on three engines which would give Michie's output. With maximum load—6,000 pounds, not Michie's 5,000 pounds—the Fortress has a range of 2,230 miles at 211 mph. Maximum speed is 317 mph, about 25 per cent more than Michie allows. And the Fortress has a service ceiling of 36,200 feet—roughly two miles higher than that of the Lancaster.

With so many flaws in his research, Michie quite naturally built his own picture of the Consolidated B-24 also. For example, he insists, "The top speed of the B-24D is about 280 mph at 25,000 feet, and it has a range of 2,500 miles at 220 mph at 30,000 feet. The maximum bomb load is 6,000 pounds as compared with the Lancaster's 18,000 pounds." In the first place, Michie has again inferred that his figures apply to the latest model to reach the fighting scene. The current Liberator has a top speed of 316 mph at 25,000 feet, a service ceiling of 31,000 feet, and carries a maximum bomb load of 9,040 pounds. And the Liberator's now going into service so far exceed this performance that Michie's statements are little more than very bad guesses.

All of the preceding inaccuracies have been culled from fewer than a dozen pages of "The Air Offensive Against Germany," which might better have been titled "The Rover Boy at the British Air Ministry" or "The Voice of Peter Masefield." When one considers that Michie has 154 similar pages in his book, the total of misinformation is appalling.

# AIR MAIL

Gentlemen:

I think AIR NEWS is one of the best aviation magazines on the market, and I haven't missed an issue since it first began. Now that you have colored photos for your covers, the magazine is much more attractive. Let's have more.

At the bottom of Page 39 of your February issue there is a photo of a Grumman Goose, not a Widgeon, as the caption says. The Widgeon has in-line Menascos, not radials as shown in your photo.

Peter Viemeister,
Roslyn, N. Y.

*Mr. Viemeister is right about the Grumman pictured in our February issue. The vigilance of this correspondent and others like him presage an even greater future for AIR NEWS. We can't get away with a thing!*

Gentlemen:

Just received your letter in answer to my card—and I still think you're wrong. I don't set myself up as an expert spotter, but I've had considerable experience with Army planes, being a civilian mechanic and crew chief at Wright Field.

That picture on Page 62 (No. 66) of the December issue is a Lockheed Hudson type light bombardment plane, either an A-29 or A-29A. The "dorsal turret" you mention is not in place—only the English Hudsons had full power turrets, and the Army planes had a streamlined windshield and open pit, in which was mounted a brace of machine guns. Quite a few of the planes sent to England had no turret, but a piece of sheet metal over the open cockpit. So has your picture on Page 62, if you'll look closely. You can see the joint made by this piece of metal and the fuselage skin—right above the insignia. The bomb bay you mention is also visible (note the outline under the wing section). Then, too, your picture has a cut-out nose, for the bombardier—the C-60 or C-57 is primarily a cargo plane, and has no provision for a bombardier. As a matter of information, the Army has another Hudson, the A-28—but this has a twin-row Pratt & Whitney (R-1830), and is recognizable by a longer engine cowling and cowl flaps. Another thing about that pix on Page 62—you say it has a P & W 1200 engine. [illegible] is impossible as you can see by the narrow engine cowling, denoting a single-row engine and the absence of engine cowling flaps (to cool the back row of a twin-row engine) and clinching the fact that the picture on Page 62 is a Wright Cyclone (R-1820) powered Lockheed Hudson. Are you not convinced?

Now to take apart your next sentence: "The only difference between the C-57 and the C-60 is internal installations." Baloney. Is an engine an "internal installation"? The C-57 has a P & W engine and the C-60 has a Wright. The outside difference is only in the engine cowling, as the P & W engine, being a twin-row, will have a longer engine cowling, and cowl flaps, and the C-60, having a single-row engine, has a narrower cowling and no flaps. The picture on Page 58 is a C-60, one of the few originally made for export, but taken over by the Army, noticeable by the camouflage. Satisfied?

Now—I said in my card that the C-46 is P & W-powered, and so it is—the fact that it was intended to be Wright-powered is incidental—you said, in the December issue, Page 63, that the C-46 is Wright-powered, while in reality it is P & W-powered (noticeable by the engine cowling on the C-46 in the picture).

On Page 62, the picture of the C-47 is *not* correctly captioned. The C-47 was formerly a DC-3, right, used by various airlines, also correct, but only using P & W engines. The other DC-3's taken over by the Army that are Wright Cyclone-powered are known as the C-49, C-50, C-51, C-52. The Army uses a different designation when there are two planes with different engines but like body styles. Is there any argument that the plane pictured on Page 62 is not Cyclone-powered? I thought not. The picture in the quiz on Page 60 is a C-47.

I didn't intend to get sarcastic in this letter, but I feel that I'm in a position to criticize you, since I've worked on all the types mentioned in this letter. I've been a crew chief on the A-28, A-29, C-47 & C-60, so I ought to know.

Donald F. Kauer,
Dayton, Ohio.

*No editor would, in sober moments, challenge aeronautical criticism from an aircraft crew chief. On some counts, Mr. Kauer is so right that apology is definitely the only rebuttal. However, he seems to forget that a Spotter's Quiz is not prepared as an engineer's handbook. Therefore, only one type designation is described in each unit of the quiz. Official recognition lists, for example, include the DC-3 design only as the C-47 and C-53. Change in engines, like any other change inside the airframe skin, is always considered an internal alteration. We will challenge our critic to distinguish between Wright and P & W engine mountings on a plane 5,000 feet away. Some specific information contained in Mr. Kauer's fine letter has been deleted as information of value to the enemy. For this same reason, the prototype power plant was described with the C-46 in the December AIR NEWS because listing of the P & W output [illegible] publication. Altogether, we owe Mr. Kauer a dinner—which he can collect on his next visit to New York or on our next trip to Dayton.*

Gentlemen:

As one who has been associated with the engineering and development of the SB2C-1 Hell Diver for nearly two years, I enjoyed your article on "Hard Hitting Hell Divers," March issue, very much.

However, in the interest of accuracy in possible future references, I should

(Continued on page 42)

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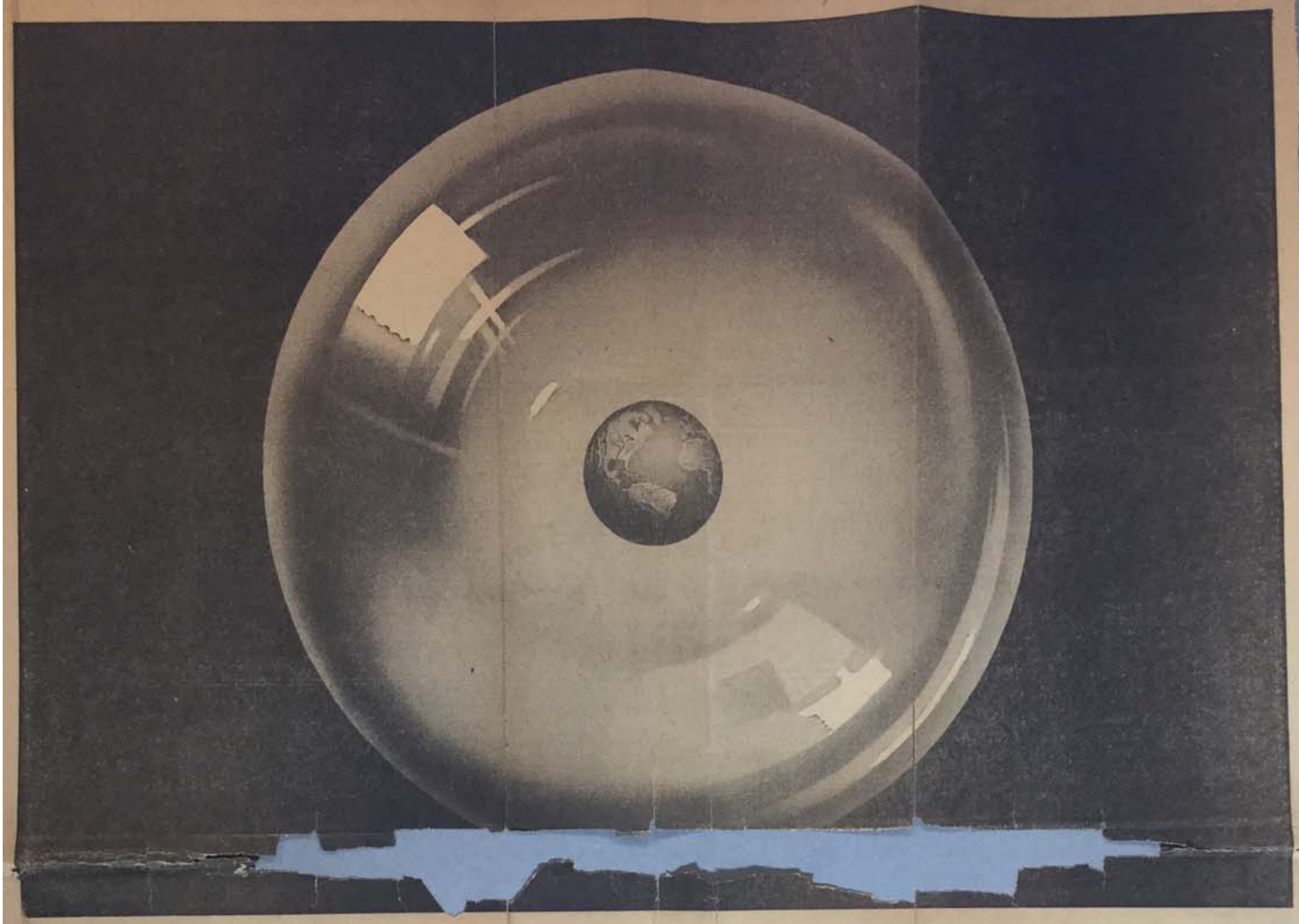

*WE SUBMIT THIS CONCEPTION OF OUR CHANGED WORLD AS THE BASIS FOR OUR*

# WAR-THINKING

**We exist upon one globe, and inside another globe.**

Our planet-earth is the center of a larger air-globe . . . It is like a small spherical kernel within a large spherical shell. Both globes, as one unit, follow the same orbit. We take our air with us—and always have.

The new factor that changes our world is the *use* of air as the only *universal* realm for transportation. In ratio as we *do* use it, we change the proximity and accessibility of all places, and effectively we make the world smaller.

* * *

With this conception as the basis for our war-thinking the world *could* make Peace permanent.

Not that human nature will change that much, that quickly, but because, after centuries of recurring wars, the human race now does possess the physical means of *enforcing* Peace.

Consider the *protective* possibilities of air:

Since air is *everywhere*, it is not possible for any person, clique or nation to hide anywhere upon the earth from air surveillance. If we have mastery of the air, we can reach the spawning grounds of the war plotters and prevent their preparations for war.

* * *

Consider the *productive* possibilities of air:

Today, *all* world markets are much *closer* neighbors than cities of the United States used to be. Air transportation makes possible a quicker post-war rehabilitation and a better world economic system.

* * *

World War I was a localized war. It was won by *surface* strategy. World War II is a *universal* war where there are no safety-zones, because every inch of the earth's surface is a potential target for bombs from the air.

The world geography of 1918 is as obsolete as that of the ancient flat-world. That is why the post-war world will present problems as great as does this war-world—and why we will need aviation more *after* this war than during it.

After the Peace Conference we will have a much more *vulnerable* nation, because it is no longer an isolated piece-of-land, but an integral, inseparable and indivisible part of today's air-world. The *waters* of our two oceans could no more prevent air attack than did the *cement* of the Maginot Line.

* * *

The pre-air conception of the world was one of nations protected by vast oceans. All world economic, political and military thinking was predicated upon that surface-conception. Aviation has turned the page on that era!

Of course nations will continue to have boundary lines and will use land and water methods of transportation. But aviation changes all relative values; it nullifies the buffer nations, and makes possible that which has, for all man's prior history, been impossible.

* * *

Since it is primarily the use of *air* that makes this a Global War, it must follow inevitably that a *dominant* use of air can maintain Global Peace.

* * *

The United States has the beginning of the aviation machinery necessary to implement its democratic ideals and prevent a repetition of the war-crime l any nation.

Attain the most powerful position in the air a automatically we will become the greatest Po for Peace.

A. N. KEMP
*President,* **AMERICAN AIRLINES, Inc.**

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Bach-Met. Mus.
AIRWAYS

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c. Mr. Wheeler ✓

September 14, 1943

N.W. Ayer

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Mr. Richard F. Bach
Dean of Education
Metropolitan Museum of Art
New York

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Bach - Met. Mus.
AIRWAYS

, 19

c. Mr. Wheeler

September 14, 1943

Dear Dick:

I have come back to town to find your kind note of several weeks ago about the Airways to Peace show. I am delighted to know how much you liked it. Actually I had no hand in it at all, it was done under the direction of Monroe Wheeler, Herbert Bayer designing the installation. I have let them know of your enthusiasm.

Sincerely,

Mr. Richard F. Bach
Dean of Education
Metropolitan Museum of Art
New York

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Bayer

# THE MUSEUM OF MODERN ART

Date AIRWAYS

see also CM correspondence

To: Mr. Bayer

Re: AIRWAYS TO PEACE

From: Mr. Wheeler

July 9, 1943

Dear Herbert,

In regard to the series of paintings to illustrate the Nature of the Atmosphere which you did for the AIRWAYS TO PEACE exhibition, it is, of course, understood that, although they were done for the exhibition, the originals are your property and lent to us for the duration of the exhibition, both in the Museum and on tour. They have elicited the most favorable comment and constitute a brilliant contribution to the success of the exhibition.

If you know Mr. Piening, the Art Editor of Fortune, you might call him up and ask him about a criticism which he voiced to someone the other day regarding a minor detail in one of the pictures. I received it only second-hand, and I am not sure what it was.

With renewed thanks for your magnificent work on AIRWAYS TO PEACE, I am

Ever yours,

Mr. Herbert Bayer
850 Seventh Avenue
New York, New York

MW:CH

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# THE MUSEUM OF MODERN ART

**Date** June 21, 1943

**To:** Mr. Bayer

**Re:** AIRWAYS TO PEACE

**From:** Mr. Wheeler

---

The following is a list of the most important Army and Navy planes:

ARMY

Many Catalina substituted for Consolidated Liberator

✓ B-17 F Boeing Airplane Company, Seattle, Washington in exhibit

✓ B-24 Consolidated Aircraft Corporation, San Diego, California in exhibit.

B-25 & P-51 North American Aviation, Englewood, California

✓ B-26 Glenn L. Martin, Baltimore, Maryland

✓ A-20 Douglas Aircraft Company, Inc., Santa Monica, California

P-38 Lockheed Aircraft Corporation, Burbank, California

✓ P-39 Bell Aircraft Corporation, Buffalo, New York

✓ P-40 Curtiss Airplane Division, Buffalo, New York

✓ P-47 Republic Aviation Corporation, Farmingdale, Long Island, New York

PB2Y-1 4½ prop

NAVY F4F Grumman "Wildcat" in exhibit.

Vought-Sikorsky Corsair, United Aircraft Corporation, 230 Park Avenue, N.Y.C.

F6F Grumman Hellcat Hellcat — in exhibit.

SB2A-2 Brewster Buccaneer in exhibit

TBF Grumman Avenger Grumman VF-6

Martin Mariner

307-8 Boeing Stratoliner — in exhibit.

SBC1

A 24 Lockheed 1938 Interceptor — in exhibit

XL35 Vultee Vengeance

Curtiss Hawk

Harvard Primary Trainer S-40 Pursuit Curtiss Pursuit in exhibit.

Ryan Trainer Vought Sikorsky Army Plane

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SEP BEASLEY

October 18, 1943

Dear Miss Beasley:

Thank you for your recent letter concerning globes which you might use in your Solid Geometry classes. The special globes shown in the Airways to Peace exhibition were made in the Museum's own shops. I am sorry to say that I do not know where you might find a transparent globe made of mesh. I fear that it would probably be necessary to have it constructed to your order.

Sincerely yours,

Monroe Wheeler

Miss S. Louise Beasley
Head of Mathematics Department
Drury College
Springfield, Missouri

MW:joc

P.S. Although it is not a mesh globe, I am sure that Professor Irving Fisher's icosahedron would interest you if you have not already seen it. Professor Fisher, who can be reached at Yale, has recently issued a new version. The icosahedron is available in quantities at very low prices, also, which would be an advantage if you wished copies for your students.

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SEP 7 - 1943

DRURY COLLEGE
SPRINGFIELD, MISSOURI

September 1, 1943

The Museum of Modern Art
11 West 53 Street
New York 19, N.Y.

Dear sirs:

I am very much interested in the models that are shown in the Bulletin for August 1943, esp. Page 21.
I teach mathematics in the college and have made all of the models that I need for discussions in my solid geometry classes. I have a blackboard globe as well as a Physical and Political Globe. I have wanted a transparent globe for a long time, a shpere that I can see through and illustrate spherical polygons. . I want to be able to follow a spherical radius into the center of the sphere, and to see the poles and the axes.
In other words I want a transparent globe but I also want it made of mesh so that I can place cords through and indicate the radius and various other lines through the sphere.
Your picture interested me and I wondered if there is a company that has such a model on hand or if not is there a possibility of one being made. It is so difficult to make a sphere that I have never been able to fix me a satisfactory one to work with in my classes. In these days of navigation we need to study the sphere as never before.

If you can give me any information, I shall appreciate it very much and shall be most interested in your reply.

Sincerely,
S. Louise Beasley

S. Louise Beasley
Head of Mathematics Department

transparent globe
wood rail
on stage

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AIRWAYS

Consolidated Book Publishers, Inc.

Consolidated Book Publishers
re photostats

BREWSTER
Dept of Public Relations

Returned 4- 9/14/43

address in red book

returned

1943

Dear Mr.

Regardin
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Mr. Fran
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AIRWAYS

Consolidated Book Publishers, Inc.

Consolidated Book
re photostats

July 27, 1943

Dear Mr. Meine:

Regarding your recent request for reproductions of materials relating to the Pan American Airway System appearing in our current exhibition Airways to Peace, I must inform you that there is no special section on Pan American Airways. A few photographs supplied by them do appear among the several hundred which make up the exhibition, and there are no charts and maps supplied by Pan American. The map we use in Airways to Peace is based on that which appeared in Fortune magazine earlier this year.

Very sincerely yours,

Mr. Franklin J. Meine
Consolidated Book Publishers, Inc.
153 North Michigan Ave.
Chicago, Illinois

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Lin Wheeler

# Consolidated Book Publishers, Inc.

153 NORTH MICHIGAN AVENUE • CHICAGO, ILLINOIS • ANDOVER 1270

July 22, 1943

Mr. Alfred H. Barr, Jr., Director
Museum of Modern Art
11 West 53rd Street
New York, New York

Dear Mr. Barr:

On July 12 I wrote the Museum concerning our desire to have material exhibited by Pan American Airways photostated, but have not had a reply.

We are very anxious to have glossy black and white photostats made of this exhibit. Mr. R. C. Walker, advertising manager of Pan American Airways, in a letter dated July 8, refers me to you on the ground that they have no authority to secure reproductions of this material which is exhibited.

We should appreciate hearing from you at your earliest convenience in order that we may consider this material at once.

Sincerely yours,

CONSOLIDATED BOOK PUBLISHERS, INC.

Franklin J. Meine

Franklin J. Meine
Editor-in-Chief

FJM:JH

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CABLE ADDRESS • CONSPUB

Consolidated Book Publishers, Inc.

153 NORTH MICHIGAN AVENUE • CHICAGO, ILLINOIS • ANDOVER 1270

July 12, 1943

Museum of Modern Art
11 West 53rd Street
New York, New York

Gentlemen:

We are advised that you have on exhibit a display of materials prepared by the Pan American Airways System.

We have written to Pan American Airways asking if any reproductions were available and they have informed us that they do not have any reproductions.

Will you kindly advise us approximately what the expense might be in having glossy black and white photostats made of the charts and maps prepared by American Airways.

Sincerely yours,

CONSOLIDATED BOOK PUBLISHERS, INC.

Franklin J. Meine

Franklin J. Meine
Editor-in-Chief

JUL 14 1943

FJM:JH

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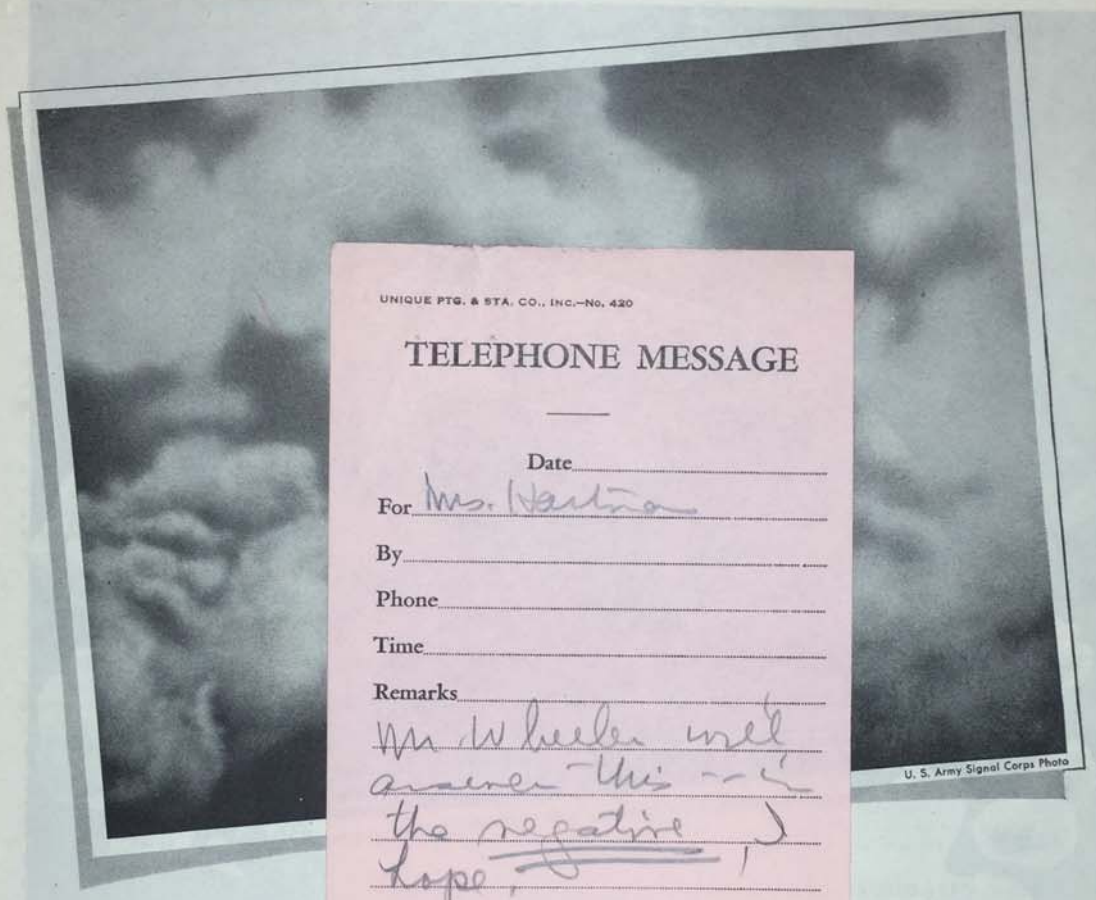


U. S. Army Signal Corps Photo

UNIQUE PTG. & STA. CO., INC.—No. 420

TELEPHONE MESSAGE

Date

For Mrs. Hartman

By

Phone

Time

Remarks

Mr. Wheeler will answer this — & the negative, I hope, Schwarzer

Rec'd by

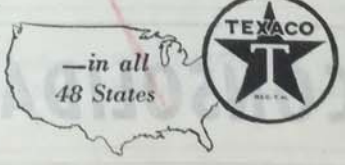
**HOW M**
**IN THI**

in the thick o
chanical fitne

Backing them up are the thousands of unseen workers on home production lines. Some shaped the intricate parts of the armored patrol car's engine. Others forged the steel. These parts made by thousands of workers go into every tank, truck, jeep, plane, big gun or ship . . . are produced in hundreds of plants scattered clear across America.

Yet each of these plants can count on a nearby, convenient source for fine Texaco Industrial Lubricants . . . on Texaco's specialized engineering service . . . from any one of more than 2300 Texaco wholesale supply points.

**THE TEXAS COMPANY**



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# CONSOLIDATED VULTEE AIRCRAFT

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# Try to Find a Spot that's more than 60 Hours from Your Local Airport!

No matter where you look on a globe today, you won't find a spot *anywhere* that can't be reached in 60 hours' flying time from your local airport!

Perhaps you hadn't realized that the world had become so small. Many Americans didn't . . . until it was almost too late.

They thought of the earth in terms of vast distances and natural protective barriers. They believed that a country "isolated" by two oceans thousands of miles wide, had little to fear.

We had made the mistake of looking at maps in terms of *rowboat* geography. We learned our mistake when the Axis took our own invention, the airplane, and taught us the grim fundamentals of *aviation* geography – first over Britain, then at Crete, and finally at Pearl Harbor.

Now we know that to win this global war and build a lasting peace, we must revise our geographical thinking. We are looking at our maps more intelligently, and we are drawing *new* maps which show us global geography more clearly. These new maps have shadows on them, cast by wings. And they show us the world as it really is, because of the plane – a clustering of Air-age nations which must forever more be close friends or close enemies.

To survive as a nation and to live in peace in such a world, we must completely understand the simple and important truths which our new maps so plainly tell us. This means we must *restudy* geography.

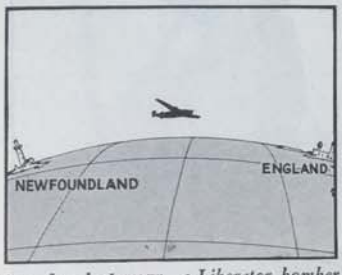
For only then can we fully understand why supremacy in the air is a "must" for America, both for winning the war and for securing the peace that will follow.

Polar azimuthal equidistant projection

**On a global projection** *of the earth, we see the nations in their true relationship. Alaska (A) is merely a way station on the route to Chungking (B) – and Greenland (C) an easy stopover on the flight to Moscow (D).*

Orthographic projection

**No longer** *can we think of Europe, Russia, or even China as remote bodies of land on "the other side" of the world.*




**One day last year,** *a Liberator bomber flew to London in 400 minutes. On that day, the Atlantic was no longer an ocean, but a millpond. Even this amazing record was beaten several weeks ago when another Liberator hopped across the "pond" in 372 minutes!*

## QUICK FACTS FOR AIR-MINDED READERS

Planes designed and built by Consolidated Vultee cover the entire range, from military basic trainers and light observation planes to the largest long-range bombers and transport planes.

• • •

**The Consolidated Vultee Liberator bomber has the greatest speed, bomb capacity, and flying range of any American 4-engine bomber now in mass production. It has a range of 4000 miles and a service ceiling of 35,000 feet.**

• • •

When Anthony Eden visited the U. S. recently, he flew over from London in the "Commando" – the same Liberator bomber in which Winston Churchill flew to Moscow and, later, to Casablanca and Turkey.

• • •

**FREE:** Consolidated Vultee is eager to make whatever contribution it can toward a clearer understanding of today's new global geography.

The well-known cartographer, Richard Edes Harrison, has worked with us in the preparation of a 32-page booklet entitled "MAPS–and how to understand them." This booklet is now available and will gladly be sent free on request. Simply fill out the coupon below.

## CONSOLIDATED VULTEE AIRCRAFT CORPORATION

San Diego, Cal. • Vultee Field, Cal.
Fort Worth, Texas • New Orleans, La.
Nashville, Tenn. • Wayne, Mich. • Allentown, Pa.
Tucson, Ariz. • Elizabeth City, N. C.
Louisville, Ky. • Miami, Fla.

*Member, Aircraft War Production Council*

Consolidated Vultee Aircraft Corp.
P. O. Box 157, New York, N. Y.

Please send me a free copy of the 32-page booklet, "MAPS – and how to understand them."

Name_____

Address_____

_____

*LIBERATOR 4-engine bomber — CORONADO, CATALINA, and CORREGIDOR patrol bombers — LIBERATOR EXPRESS 4-engine transport — VALIANT basic trainer — VENGEANCE dive bomber — SENTINEL "Flying Jeep" — RELIANT navigational trainer*

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# ARMY & NAVY

## SHIPS

### The Navy's Old Lady

No. 1 U.S. ship of the war is a slugging, hard-bitten, 20,000-ton aircraft carrier, the U.S.S. *Enterprise*.

Navy men call her "The Old Lady," although her age in service is barely five years. She has fought more major engagements, done more damage and raised more general hell than any other ship in the Pacific. Precisely because she has been so deadly successful, her country knows almost nothing about her. Less fortunate ships struck their blows gallantly, paid with their lives and eventually had their hour of fame when their stories were told.

But *Enterprise* fought, walked away upright and fought again. Until this week everything she did was a military secret. When she was damaged she covered up, backed off, got herself repaired and went looking for more trouble. She still is.

Last week the secrecy lifted slightly with a Navy announcement that *Enterprise* and her crew had been cited by President Roosevelt "for outstanding performance in action." This week the Navy followed through with an account of the carrier's exploits.

**One Failure.** On Pearl Harbor day she was the only U.S. carrier to get into action. She was headed home from a task-force mission when the stunning word came, and promptly launched planes to intercept the enemy raiders. She was not successful that time. But better luck was ahead, and *Enterprise* was seldom in port from then until after the victorious Solomons campaign.

Until this week few knew that *Enterprise* played an important part in the Doolittle raid on Tokyo. She met the carrier *Hornet* in the Western Pacific, and provided air cover for the task force's final approach to the Japanese mainland. *Hornet* had her flight deck cluttered with Doolittle's big B-25 bombers, and would have been unable to get her fighter planes up to fend off a sudden enemy air attack.

*Enterprise's* record shows clearly that she has been a tough ship, a lucky ship, a superbly handled ship, fortunate in her various commanders and in the high degree of teamwork achieved by her crew. One of her former captains is grey, smallish, soft-spoken Rear Admiral George D. Murray (now commandant at Pensacola), rated by officers who served with him as the ablest of carrier skippers.

Summing up, the Navy said *Enterprise* was notable because she:

▶ Was the first carrier to strike offensively at the enemy.

▶ Has wreaked damage on the enemy estimated at eight to ten times her original cost.*

▶ Has absorbed terrific punishment, thus refuting the notion that flat tops are hopelessly vulnerable.

**Two Successes.** During the fierce battle of the Santa Cruz Islands last October *Enterprise* was blasted by enemy bombs and menaced by torpedoes, but fought right through and destroyed at least 63 Jap aircraft—30 winged by her AA guns and 33 shot down by her planes. Her flyers also laid two 500-lb. bombs on a Jap carrier of the *Syokaku* class and 2,000 lb. of bombs on a battleship of the *Kongo* class. That was only one of her busy days.

Listing the carrier's "minimum" accomplishments, the Navy said she had:

▶ Hit enemy ships and shore establishments with at least 84,100 lb. of bombs.

▶ Scored eleven sure torpedo hits, plus one probable.

▶ Destroyed at least 140 Jap warplanes in air battle, plus an undetermined number on the ground.

▶ Sunk three subs, a patrol boat and (with planes from another carrier) sunk four aircraft carriers and three destroyers.

Her record also lists another battleship and a heavy cruiser "probably sunk," and two more battleships, a carrier, four cruisers and miscellaneous naval small fry damaged by direct hits. During all these operations *Enterprise* lost 85 planes but rescued many of the crews.

Less than two months after Pearl Harbor, *Enterprise* spearheaded the task force under Admiral William F. ("Bull") Halsey which smashed Jap bases in the Marshall and Gilbert Islands—thus carrying out the first U.S. offensive thrust. Within 34 days she followed up with raids on Wake and Marcus Islands.

**Three Victims.** One of her biggest successes came in the desperate Battle of Midway when her dive-bombers, torpedo planes and fighters roared in with four separate attacks on the big Jap invasion fleet. Eight bombs smashed into the enemy carrier *Kaga*, three more on the *Akagi*; additional hits in a later attack, sent both to the bottom. On the same day 17 dive-bombers helped spike the carrier *Soryu* with six hits and plumped two more on a battleship; the *Soryu* burned cheerily and slipped beneath the surface with the polite hissing noise characteristic of Japanese etiquette.

Another *Enterprise* "first" was her participation in the original attack on Guadalcanal, providing air cover for the first Marine landing parties. Seventeen days later she was back again to help when the Japs made their supreme bid to regain the island, sending a big task force with three or four carriers. *Enterprise*, another carrier and land-based Army and Marine bombers combined to turn the enemy back; aircraft from *Enterprise* shot down 30 Jap planes and sank a sub.

Next big action was at Santa Cruz, where *Enterprise* was badly damaged and

* $19,000,000-part of a $238,000,000 grant of PWA funds which Franklin Roosevelt wangled to strengthen the Navy back in 1933.

U. S. Navy Photo

U.S.S. "ENTERPRISE" *(from a plane about to land)*
*A PWA project paid off.*

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(Air Cargo Transport Corp?) Drake Air Corp Grand Central Bldg AIRWAYS

L. F. V. DRAKE
230 PARK AVENUE
NEW YORK

MURRAY HILL 4-6037

June 18, 1943.

Monroe Wheeler, Esq.,
Museum of Modern Art,
11 West 53rd Street,
New York, N.Y.

Dear Mr. Wheeler:

This picture has got the whole story of how precision bombing is done on one sheet. It is one of the illustrations of my forthcoming book. If you want to use it, it is yours.

Sincerely yours,

Francis Drake

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# THE MUSEUM OF MODERN ART

**Date** June 17, 1943

**To:** Mr. Wheeler

**Re:** Statistics - L.F.V. Drake

**From:** Mr. Drake

Mr. L.F.V. Drake today telephoned the following statistics regarding the cost of air support:

1,000 Flying Fortresses cost $300,000,000 and 62,000,000 man hours to manufacture

To operate them, 10,000 men are required in the air, and 100,000 in ground crews

To conduct a 6-hour bombing attack requires 1,000,000 gallons of gasoline
(A P-17 uses 1,000 gallons in 6 hours)

The gas consumption in combat is four times that required for cruising

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L. F. V. DRAKE
230 PARK AVENUE
NEW YORK

MURRAY HILL 4-6037

June 2, 1943.

Monroe Wheeler, Esq.,
The Museum of Modern Art,
11 West 53rd Street,
New York, N.Y.

Dear Mr. Wheeler:

Your letter of May 28th with enclosures arrived during Mr. Drake's absence from the city.

I expect Mr. Drake to return shortly and will immediately give him your letter at which time you can expect to hear from him direct.

Very truly yours,

L. B. Grannatt

L.B.Grannatt
Secretary to Mr. Drake.

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Rick Drake

Can we show some of Dimin outfits to Russia via the Pacific? — to Vladivostok? Nikolaevsk? Petropavlovsk?

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Attention: Mr Wheeler Type as Memo

These are the names sugges. by Bill Friedman as possible sources of subsidy:—

① Aeronautical Chamber of Commerce

② Lester Gardiner, Exec. VP
Institute of Aeronaut. Services

③ Henry Kaiser

④ ? Igor Sikorsky
Vought-Sikorsky Co.
E. Hart., Conn

Also request for film + other material on helicop-

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| SERIAL | | DEFERRED | |
| OVERNIGHT TELEGRAM | | NIGHT LETTER | |
| SPECIAL SERVICE | | SHIP RADIOGRAM | |

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# WESTERN UNION

1206

A. N. WILLIAMS, PRESIDENT
NEWCOMB CARLTON, CHAIRMAN OF THE BOARD
J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK

ACCOUNTING INFORMATION

TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

**WANT A REPLY?**
"Answer by WESTERN UNION" or similar phrases may be included without charge.

JUNE 10, 1943

MR. J. A. FERRIS
DIRECTOR, PUBLIC INFORMATION
NORTHWEST AIRLINES
ST. PAUL, MINNESOTA

PLANS FOR AIRWAYS TO PEACE COMPLETE. REGRET WE CANNOT ACCOMMODATE ANY FURTHER MATERIAL IN THIS EXHIBITION. GREATLY APPRECIATE YOUR OFFER BUT REGRET IT COMES TOO LATE. COULD YOU ADVISE WHO MADE REQUEST?

MONROE WHEELER
MUSEUM MODERN ART

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W. Keller

CLASS OF SERVICE

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# WESTERN UNION

1201

(57)

SYMBOLS

DL=Day Letter
NT=Overnight Telegram
LC=Deferred Cable
NLT=Cable Night Letter
Ship Radiogram

A. N. WILLIAMS, PRESIDENT — NEWCOMB CARLTON, CHAIRMAN OF THE BOARD — J. C. WILLEVER, FIRST VICE-PRESIDENT

The filing time shown in the date line on telegrams and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

NAB40 LG=WUX STPAUL MINN 10 1103A

1943 JUN 10 PM 1 04

MONROE WHEELER=

:MANAGER AERONAUTICAL EXHIBIT MUSEUM OF MODERN ART=

WE ARE PREPARED TO SET UP AERONAUTICAL EXHIBIT BY NWA ENGINEERS MUST HAVE SPECIFIC INFORMATION ON SIZE OF EXHIBIT THEY ALSO WANT TO KNOW IF IT WILL BE LIGHTED AND ANIMATED ALSO ASKING ABOUT MOUNTINGS PLEASE ADVISE BY DAY LETTER SO WE CAN GET MOVING=

J A FERRIS DIRECTOR PUBLIC INFORMATION DEPT
NORTHWEST AIRLINES INC=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

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| DAY LETTER | | URGENT RATE | |
| SERIAL | | DEFERRED | |
| OVERNIGHT TELEGRAM | | NIGHT LETTER | X |
| SPECIAL SERVICE | | SHIP RADIOGRAM | |

Patrons should check class of service desired; otherwise the message will be transmitted as a telegram or ordinary cablegram.

# WESTERN UNION

1206

A. N. WILLIAMS, PRESIDENT
NEWCOMB CARLTON, CHAIRMAN OF THE BOARD
J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK

ACCOUNTING INFORMATION

TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

**WANT A REPLY?**
"Answer by WESTERN UNION" or similar phrases may be included without charge.

JUNE 19, 1943

ADMIRAL G. BRYAN
HYDROGRAPHIC OFFICE
WASHINGTON, D. C.

WOULD GREATLY APPRECIATE YOUR SENDING ONE COPY OF A HYDROGRAPHIC OFFICE CHART OF THE MEDITERRANEAN AREA AND ONE OLD WEATHER CHART AS SAMPLES FOR INCLUSION IN OUR GLOBAL GEOGRAPHIC EXHIBITION AIRWAYS TO PEACE OPENING JULY 1.

MONROE WHEELER
DIRECTOR OF EXHIBITIONS
MUSEUM OF MODERN ART

RE:AIRWAYS TO PEACE

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Weber Costello

Charge to the account of _____ $_____

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|---|---|---|---|
| DOMESTIC | | CABLE | |
| TELEGRAM | | ORDINARY | |
| DAY LETTER | | URGENT RATE | |
| SERIAL | | DEFERRED | |
| OVERNIGHT TELEGRAM | | NIGHT LETTER | |
| SPECIAL SERVICE | | SHIP RADIOGRAM | |

Patrons should check class of service desired; otherwise the message will be transmitted as a telegram or ordinary cablegram.

# WESTERN UNION

1206

A. N. WILLIAMS, PRESIDENT
NEWCOMB CARLTON, CHAIRMAN OF THE BOARD
J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK

ACCOUNTING INFORMATION

TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

**WANT A REPLY?**
"Answer by WESTERN UNION" or similar phrases may be included without charge.

JUNE 16, 1943

MR. SCARBOROUGH
WEBER COSTELLO COMPANY
CHICAGO HEIGHTS
ILLINOIS

PLEASE SEND MAP T-1A, OUR ORDER 21752, IMMEDIATELY UNMOUNTED.

MONROE WHEELER
MUSEUM MODERN ART

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Machlett Lab. Supplies

220 E. 23

Please order

Charge to the account of _____ $_____

| CLASS OF SERVICE DESIRED | | | |
|---|---|---|---|
| DOMESTIC | | CABLE | |
| TELEGRAM | | ORDINARY | |
| DAY LETTER | | URGENT RATE | |
| SERIAL | | DEFERRED | |
| OVERNIGHT TELEGRAM | | NIGHT LETTER | X |
| SPECIAL SERVICE | | SHIP RADIOGRAM | |

Patrons should check class of service desired; otherwise the message will be transmitted as a telegram or ordinary cablegram.

# WESTERN UNION

1206

A. N. WILLIAMS, PRESIDENT
NEWCOMB CARLTON, CHAIRMAN OF THE BOARD
J. C. WILLEVER, FIRST VICE-PRESIDENT

CHECK

ACCOUNTING INFORMATION

TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

**WANT A REPLY?**
"Answer by WESTERN UNION" or similar phrases may be included without charge.

JUNE 17, 1943

TELEGRAM SENT TO WASHINGTON, D. C. BY CHARLES KELLER
URGING DELIVERY OF MERCATOR CYLINDER PROJECTION DISPLAY

AIRWAYS TO PEACE SHOW

LIFE TIME

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Machlett Lab. Supplies
220 E. 23

Purchase order -
1 50 litre flask
@ $16.00

Order 18336
May 18, 1943

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→ Mr. Keller

Lucchesi, Sarti & Co.
140 East 34

Purchase order: ~~Check~~
36" statue of Atlas with globe - @ $55.00

~~Check~~

Order 18334
May 18, 1943

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Drake - AIRWAYS

May 28, 1943.

Dear Mr. Drake:

I have been advised by the editors of FORTUNE Magazine to consult you regarding an exhibition of Air age geography which the Museum of Modern Art is opening next month. The exhibition will be a sequel to last summer's Road to Victory exhibition, which you will see illustrated in the enclosed booklet.

The purpose of the present show will be to explain air age geography to the layman and make clear to him how the power displayed in the Road to Victory must be used all over the earth. As you will see by the outline enclosed, sections four and five deal with the strategic areas and air routes of the war, and we would like to consult you for a few moments, at your earliest convenience, on this subject. Would it be possible for you to see me any time Tuesday next?

Thanking you in advance for the courtesy of your consideration, I am

Very sincerely yours,

Mr. L. F. V. Drake
230 Park Avenue
New York, N. Y.

2 enclosures
MW:lf

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Duell, Sloan and Pearce

AIRWAYS

August 18, 1943

Duell, Sloan and Pearce
270 Madison Avenue
New York 16, New York

Dear Miss Hanson:

Under separate cover we are returning the S. Paul Johnston material for Horizons Unlimited, which you so kindly lent to the Museum in connection with the preparation of our AIRWAYS TO PEACE exhibition. This material was extremely helpful to Mr. Wheeler, and he has asked me to tell you how deeply he appreciates all your thoughtful cooperation in the matter. The exhibition has been unusually successful, and its run has been extended to October thirty-first, at the request of educators who wish students to see it in the Fall.

With renewed thanks, I am

Sincerely yours,

(Mrs. C. S. Hartman)
Assistant to Mr. Wheeler

CSH:cv

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Bel Geddes

AIRWAYS to travel-

NORMAN BEL GEDDES & COMPANY

September 16, 1943.

Dear Miss Tanner:

Thank you very much for your kind letter of September 15 giving us Mr. Geddes' gracious permission to send his relief map of Europe to other cities with our Airways to Peace exhibition. Please convey to him our very sincere thanks.

Sincerely yours,

Miss Virginia N. Tanner
Norman Bel Geddes and Company
50 Rockefeller Plaza
New York 20, N. Y.

MW:lf

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Bel Geddes

AIRWAYS

To travel

OK.

**NORMAN BEL GEDDES & COMPANY**

50 ROCKEFELLER PLAZA NEW YORK, 20 TELEPHONE CIRCLE 5-8030 CABLE NORBELGED

September 15th, 1943.

Mr. Monroe Wheeler,
The Museum of Modern Art,
11 West 53rd Street,
New York, N. Y.

Dear Mr. Wheeler:

Mr. Geddes has asked me to thank you for your letter of September 9th, and to say that he will be delighted to have you send his relief map of Europe to other cities with your exhibition.

Very truly yours,

NORMAN BEL GEDDES & COMPANY

Virginia N. Tanner

Virginia N. Tanner
Public Relations

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Airways
RI Geddes

19

September 9, 1943

Mr. Norman Bel Geddes
50 Rockefeller Plaza
New York, New York

Dear Mr. Bel Geddes:

I wish to thank you formally for your very great kindness in lending to our current Airways to Peace exhibition your relief map of Europe which, as you know, occupies a very important place in the exhibition. It has been much admired and we are very happy to have had it.

The exhibition continues here through October and thereafter will be sent to other cities in the United States. The Government is now making arrangements to have the entire exhibition at the Commerce Building in Washington and I am writing to ask whether you would like us to send your map with the exhibition to other cities. We should be very glad to do this if you will grant permission.

With renewed thanks and kindest regards,

Very sincerely yours,

MW:hw

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Airways to Peace
Bel Geddes

July 13, 1943

Dear Mr. Wells:

We have on exhibition at the Museum Mr. Bel Geddes' Layered Relief Model of Europe from the English Channel to Switzerland which is included in our current exhibition "Airways to Peace". We would appreciate it if you could let us know whether you prefer to inquire this item or whether the Museum should do so, and if so, for what amount. As soon as we hear from you, we will send you a receipt for the Map.

Very truly yours,

Secretary to the Registrar

Mr. R. B. Wells
c/o Norman Bel Geddes
50 Rockefeller Plaza
New York 20, New York

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Bel Geddes
AIRWAYS

NORMAN BEL GEDDES & COMPANY INC
50 ROCKEFELLER PLAZA NEW YORK, 20 TELEPHONE CIRCLE 5-8030 CABLE NORBELGED

June 29th, 1943.

TO MUSEUM OF MODERN ART
53rd St. & Fifth Avenue
New York City

Attention: Mr. Wheeler

LAYERED MAP showing topographical features of the country so that aviators can more readily distinguish the terrain and anticipate the heights of vertical elevations:

SCALE: Vertical layers up to 100 feet - 1/16th of an inch contours
100 to 500 feet - 1/8th of an inch contours
500 feet up - 1/4 of an inch contours

SCALE: Horizontal - 1 inch equals 8-1/3 miles.

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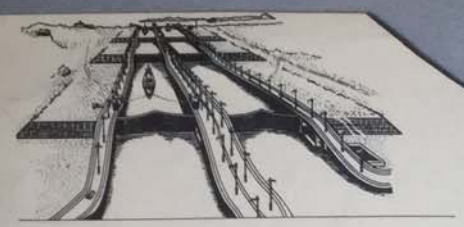
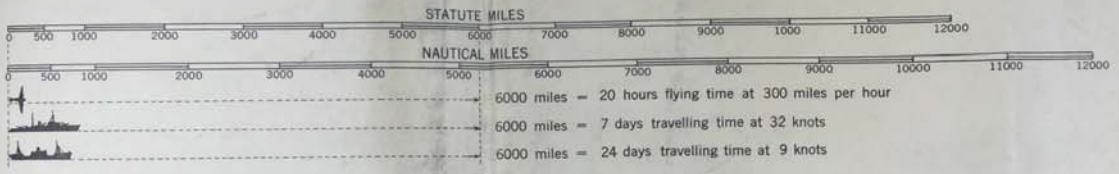


Scale along any straight line or part thereof drawn from center of map. (Washington D. C.)




# HAMMOND'S GLOBAL MAP FOR THE AIR AGE

## *A Great Circle Skyway Guide*

Mercator's Map is the flat image of a cylinder-like-world. Its Polar Regions are so scattered they are often disregarded. From habit of looking at Mercator's Projection we are accustomed to think of only East and West travel routes between cities in America, and cities in Europe or Asia. But several days of East and West traveling on a Mercator's map can be streamlined into a few hours by an airplane speeding along a great circle course, sometimes within the Arctic Circle. That's why we need a map designed for this Air Age, showing these increasingly important over-the-top-of-the-world-skyways, great circle courses and distances to all parts of the world.

The Air Age is forcing great changes in the lives of people all over the earth. Some are temporary; others will remain. The greatest permanent change will result from an increasing use of air as a realm for transportation. This medium is available alike to inland and coastal places everywhere. The airplane is neither continental nor maritime exclusively—it can follow great circle courses because its freedom of movement does away with surface barriers; it abolishes isolation.

The world should be regarded from the position of the observer. This map has the North American viewpoint: its mathematical center is Washington, D. C., a pivot point from which straight lines representing great circles can be drawn to any part of the world.

A map useful in solving long distance transportation problems is expected to show the nature of intervening territory between points of departure and destination. It is most desirable that the map be directional too: for how else could we know whether to head North, East, South or West in starting on a journey. If you command a long range transport plane assigned to deliver a cargo in Broome, Australia from Washington, D. C., you want to know the shortest, quickest route. A straight line drawn between these two places on the map will give you that information. On leaving Washington airport, you may be surprised to learn that you head *Northwest, and cross Canada to the Aleutian Islands. Guam is on your course, and our Navy realized this years ago when they improved the island. If any island stepping stones are unfriendly, alternate routes can be plotted. Great circles are today's war paths and will be tomorrow's trade routes because they show the shortest distance over which the fastest passage can be made between two places.

* The compass shows that on leaving Washington, D. C., the plane should be headed Northwest. Navigators must change direction frequently to stay on great circles. Note that in the vicinity of British Columbia the course becomes West. At Dutch Harbor, Alaska, the course cuts the latitude parallels at an angle indicating a South of West course.

Azimuthal Equidistant Projection

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Hammond Map-
AIRWAYS

June 15, 1943

Mr. Robert S. Hammond
President, Hammond Map Company
88 Lexington Avenue
New York, New York

Dear Mr. Hammond:

I am writing to ask for your collaboration on an exhibition entitled AIRWAYS TO PEACE which the Museum of Modern Art will open on the first of July. I enclose herewith an outline, and you will see that we shall need here and there various commercial maps to illustrate our points. Would the Hammond Map Company be willing to lend us for this exhibition (which will circulate afterward to other cities throughout the United States) certain maps and globes which will suit our purpose? We shall, of course, be glad to give full credit to you wherever your maps are used in the exhibition. As you perhaps know, the Museum is a non-profit, educational institution operating under the charter of the University of the State of New York.

May I thank you in advance for whatever consideration this request may merit.

Very sincerely yours,

MW:CH

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Harrison - AIRWAYS

10/28/43 A.L.P. to Ward

Harrison

Mr. Wheeler cleared leaves to go to Washington with A. to P. with Mr. Richard Edes Harrison -

Dear Mr. Har

Thank you so
Review of Li
to have it.

I am returni
issue of Sci
you while he
you want to

The Airways
through its
copies very

Thank you ag
Everyone ap

day
ghted

6, 1943
s from
know

went
ld have

ny matters.

Mr. Richard Edes Harrison
22 West 48 St.
New York, N. Y.

CH:lf
P.S. No word from the Mayor that I know of. I hear he has a frightful cold, but I hear it the long way around.

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Harrison -
AIRWAYS

August 12, 1943.

Dear Mr. Harrison:

Thank you so much for sending me a copy of the Saturday Review of Literature. It is excellent and I am delighted to have it.

I am returning, herewith, a page from the February 26, 1943 issue of Science Magazine. Mr. Wheeler borrowed this from you while he was working on Airways to Peace, and I know you want to have it back.

The Airways to Peace issue of the Museum's Bulletin went through its final press throes yesterday and we should have copies very soon.

Thank you again for all your cooperation in these many matters. Everyone appreciates deeply what you have done.

Sincerely yours,

Mr. Richard Edes Harrison
22 West 48 St.
New York, N. Y.

CH:lf
P.S. No word from the Mayor that I know of. I hear he has a frightful cold, but I hear it the long way around.

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Monroe Wheeler. HARRISON
Why don't you invite the mayor to see the show? But please get those 3 Conrad maps up first if it has not already been done
Rikky.

August 5, 1943

AIR-WAYS

The Hon. Fiorello H. LaGuardia
City Hall
New York City

Dear Mr. Mayor:

In the New York Times of Monday, August 2d, there appeared a short news item to the effect that beginning this fall Mercator maps will be replaced in the New York Public Schools by "flat 'globe' maps showing the continents in true spherical relationship to each other." It goes on to quote you as saying, "This map shows the world as it actually is."

Unfortunately both of these statements are contrary to cartographical fact. All maps without exception are distorted, world maps most of all. I am not surprised nor do I blame you, because even some professional geographers make the same error. Recently a group has been advocating the adoption of a North Pole-centered map to supplant Mercator. Now this is an excellent map but it is also distorted - in different areas. I approve of it as a supplement to Mercator but not to displace it. A common error on the available Pole-centered maps is to represent great circle routes as straight lines. This is not correct except in the case of due north-south routes. On long distances this leads to serious discrepancies in routes or distances. I think we owe it to our school children not to attempt to rectify one error with another equally bad.

Of course the map you have may not be centered on the Pole, but whatever projection it is, it cannot be as represented in the news item. There is a projection which would show great circles and distances correctly from New York City to any spot in the world, but it would be distorted for any other purpose. This is the azimuthal equidistant projection centered on New York City. It has been used in radio work but I do not know of any sufficiently large or accurate for school use.

I am enclosing marked copies of two recent publications (Saturday Review of Literature, August 7th; "Maps and How to Understand Them," Consolidated Vultee Aircraft Corp.) in which I have discussed the limitations of maps more fully. The Consolidated booklet was read and approved (with minor corrections) by Mr. O. M. Miller of the American Geographical Society, of New York. Mr. Miller is probably the foremost authority on projections in this country. I respectfully submit this material to your attention and place myself at your disposal if you desire further facts or elucidation of this important subject.

Very sincerely yours,

Fellow, American and Royal
Geographical Societies

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Harrison
AIRWAYS

July 12, 1943

Dear Ricky,

Attached hereto are the pictures taken at the opening of AIRWAYS TO PEACE for which you asked. As some of these have been released exclusively to certain magazines, please do not release them for publicity purposes without consulting the Museum's Publicity Director, Miss Sarah Newmeyer.

I have asked Mr. Childs of the Reciprocal Trade Corporation (CH 4-8148) to get in touch with you directly about the map of world air routes which he wishes to buy.

Ever yours,

Mr. Richard E. Harrison
22 West 48 Street
New York, New York

MW:CH

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Harrison
AIRWAYS

July 12, 1943

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Ever yours,

Mr. Richard E. Harrison
22 West 48 Street
New York, New York

MW:CH

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Harrison

AIRWAYS

January 16, 1943

Mr. Richard E. Harrison
22 West 48 Street
New York, New York

Dear Mr. Harrison:

I have been in further communication with the OWI regarding an exhibition of war geography upon which they wish us to collaborate, and in view of the fact that something along these lines is likely to materialize very soon, I do not think it advisable for us to undertake a separate exhibition of your maps now.

Perhaps you will be able to work with us on this other project, which will include your work in any case.

I feel, therefore, that I cannot ask you to hold up on our account the other arrangements that you have made.

Thank you very much for your kindness the other day in showing me your really remarkable achievements. We shall want to consult you about this new project in the very near future.

Sincerely yours,

MW:CH

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Hill & Knowlton

AIRWAYS

August 23, 1943

Gentlemen:

Under separate cover we have returned to you some material which your Mr. Dakin and Mr. Boochever very kindly lent to Mr. Wheeler during the preparation of our current exhibition, AIRWAYS TO PEACE. I trust that the package has reached you safely. Mr. Wheeler has asked me to tell you how much he appreciates Mr. Dakin and Mr. Boochever's very generous collaboration. The exhibition has been unusually successful, and will be continued until October 31.

With renewed thanks, I am

Very truly yours,

(Mrs. C. S. Hartman)
Assistant to Mr. Wheeler

Hill and Knowlton
Empire State Building
New York 1, New York

CH:mjm

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HILL AND KNOWLTON

EMPIRE STATE BUILDING
NEW YORK

GUILDHALL BUILDING
CLEVELAND

NEW YORK

July 19, 1943

Mr. Monroe Wheeler
Museum of Modern Art
11 West 53rd Street
New York, N. Y.

Dear Mr. Wheeler:

I am sending you by messenger the enlargement of the picture you requested. The caption reads as follows:

"FORT WORTH, Texas---Super transports such as this C-87 Liberator Express from Consolidated Vultee Aircraft Corporation's Fort Worth plant are carrying key personnel and vital cargo to all United Nations' war theaters. With a speed in excess of 300 miles per hour and range of 4,000 miles, the C-87 can carry the greatest human or cargo load (more than six tons) of any airplane now in mass production. These products of the world's longest mechanized straight assembly line have set new flight records with Lt. Gen. H.H. Arnold, Wendell Willkie and other notables as passengers."

I hope you will find this a worthy addition to your superb show.

Very sincerely yours,

Louis C. Boochever

LCB:ET

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Hill + Knowlton - AIRWAYS

HILL AND KNOWLTON

EMPIRE STATE BUILDING
NEW YORK

GUILDHALL BUILDING
CLEVELAND

NEW YORK

July 7, 1943

Mr. Charles Keller
Museum of Modern Art
11 West 53rd Street
New York, N. Y.

Dear Mr. Keller:

I sent to you this morning, through the courtesy of Mr. Charles Planck, the diagram of the Liberator instrument panel and control pedestal which serves to explain the photograph of the same subject which was recently furnished you at your request.

This material has now been cleared in Washington.

Sincerely yours,

Edwin F. Dakin

EFD:fw

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MR. KELLER

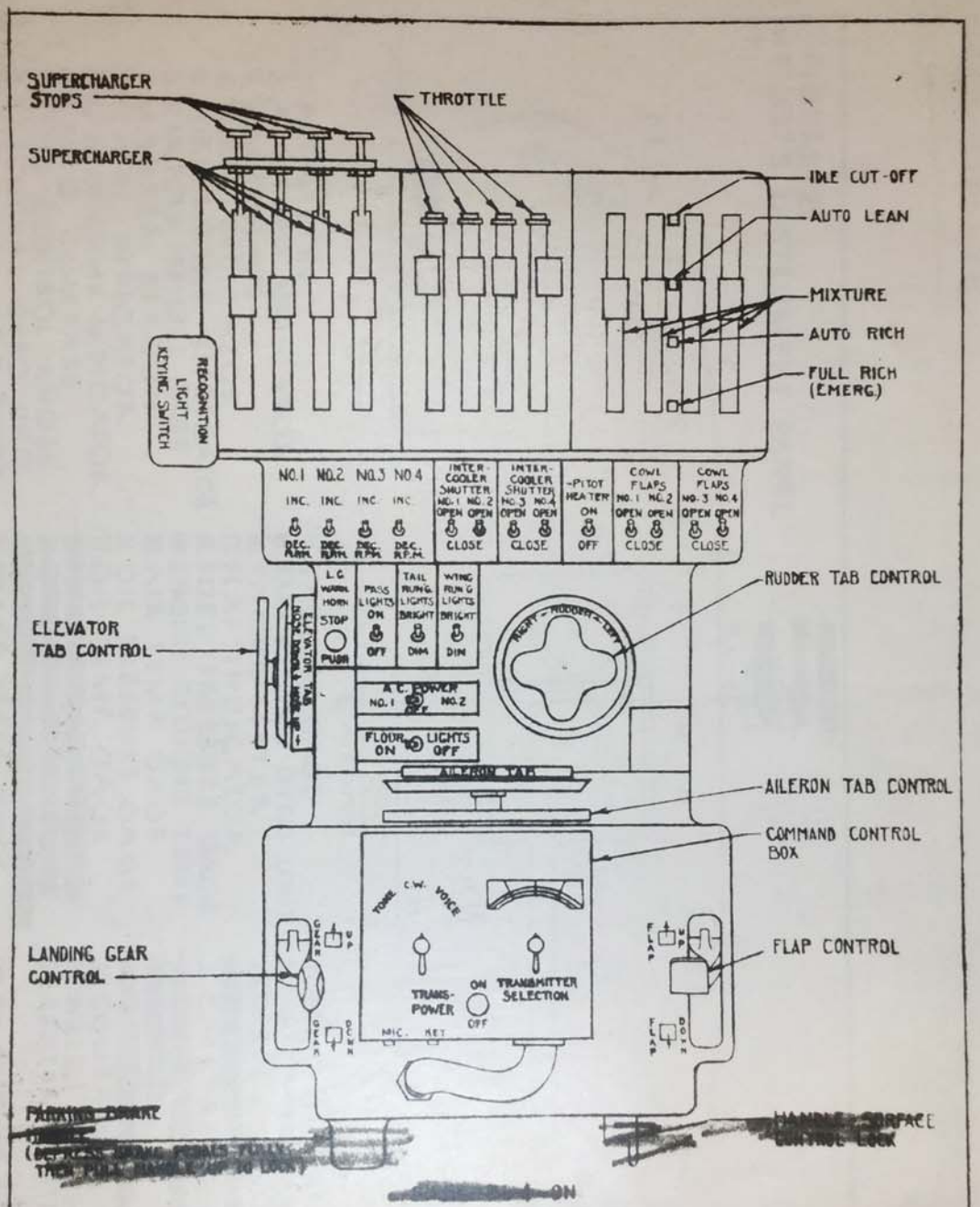


FIGURE 27
PILOT'S CONTROL PEDESTAL

LIBERATOR

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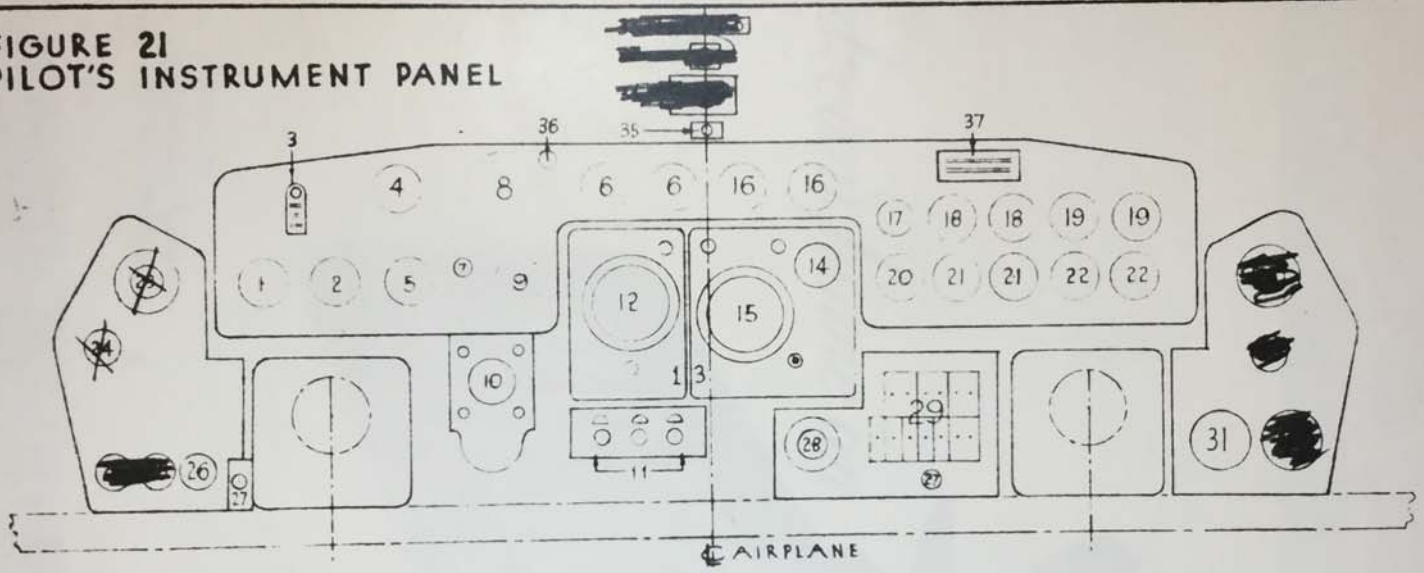
MR. KELLER

## FIGURE 21
## *PILOT'S INSTRUMENT PANEL




1. ALTIMETER
2. AIRSPEED INDICATOR
3. NAMEPLATE
4. TURN INDICATOR
5. TURN & BANK INDICATOR
6. MANIFOLD PRESSURE GAGE
7. MARKER BEACON
8. FLIGHT INDICATOR
9. RATE OF CLIMB INDICATOR
10. RADIO COMPASS
11. SPEED CONTROL KNOBS
12. DIRECTIONAL GYRO UNIT
13. MK III SPERRY GYRO PILOT
14. VACUUM GAGE
15. BANK & CLIMB GYRO UNIT
16. TACHOMETER
17. FLAP INDICATOR
18. FUEL PRESSURE GAGE
19. ENGINE CYLINDER TEMP.
20. AIR TEMP. GAGE
21. OIL PRESSURE GAGE
22. OIL TEMP. GAGE
[redacted]
24. [redacted]
[redacted]
26. BRAKE PRESS. GAGE
27. DEFROSTER KNOBS
28. ANTI-ICER PRESS. GAGE
29. ENGINE CONTROL SWITCHES
[redacted]
31. CARBURETOR DE-ICER
[redacted]
35. COMPASS LT. RHEOSTAT
36. 'WHEELS LOCKED DOWN' LT.
37. HEATER CAUTION PANEL

*ON SHIPS NO. 36 & UPWARD.

LIBERATOR

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# U-BOAT WAR

## Hitler's hope for victory

Hitler can still win this war—with submarines. While America has been performing a miracle in building cargo ships to carry our striking strength to the war fronts, Germany has been performing a less publicized, but effective, miracle by keeping pace with its U-boat program.

The Nazi undersea fleet, now estimated to have reached a strength of 700, is sinking our cargo ships almost as fast as we build them. More than that, it is sinking our goods and men with the ships.

The battle for Tunisia is being fought in the Atlantic; the Allied plan to invade Europe is being countered there. A glance at this map of the Atlantic will show that preliminary phases of the war in Russia and the defense of Asia Minor are decided at sea. U-boats are even cutting us off from raw materials in Latin America.

Hitler has the initiative in the Atlantic. From bases all along the coast of Europe—many if not all of them bomb-proofed as illustrated in the sketch at top left—he can keep at sea at all times one third of his submarines. (Not all of the known U-boat bases are shown, and it is almost certain that others are unknown.)

### We've Got To Beat the Subs—but How?

Today, the greatest concentration of U-boats is athwart the supply lines from America and England to North Africa. It is here that we must win the first battle of our second front. To date, we have used three methods to combat the U-boat menace.

The first is the convoy system—fleets of cargo ships protected by fighting escorts equipped to hunt and blast submarines.

*But we lack sufficient escort ships.*

The second, remarkably effective along America's eastern coast, is the use of anti-submarine patrols—surface and air—which, when strong enough, can make the waters they guard too hot for the Nazis.

*But we can't patrol extended sea lines.*

The third, against which the concrete-roofed U-boat pens are a partial protection, is the use of air power to bomb submarine bases, assembly points and parts factories. How effective it has been we don't know. The Germans aren't telling.

*All we know is it hasn't been enough.*

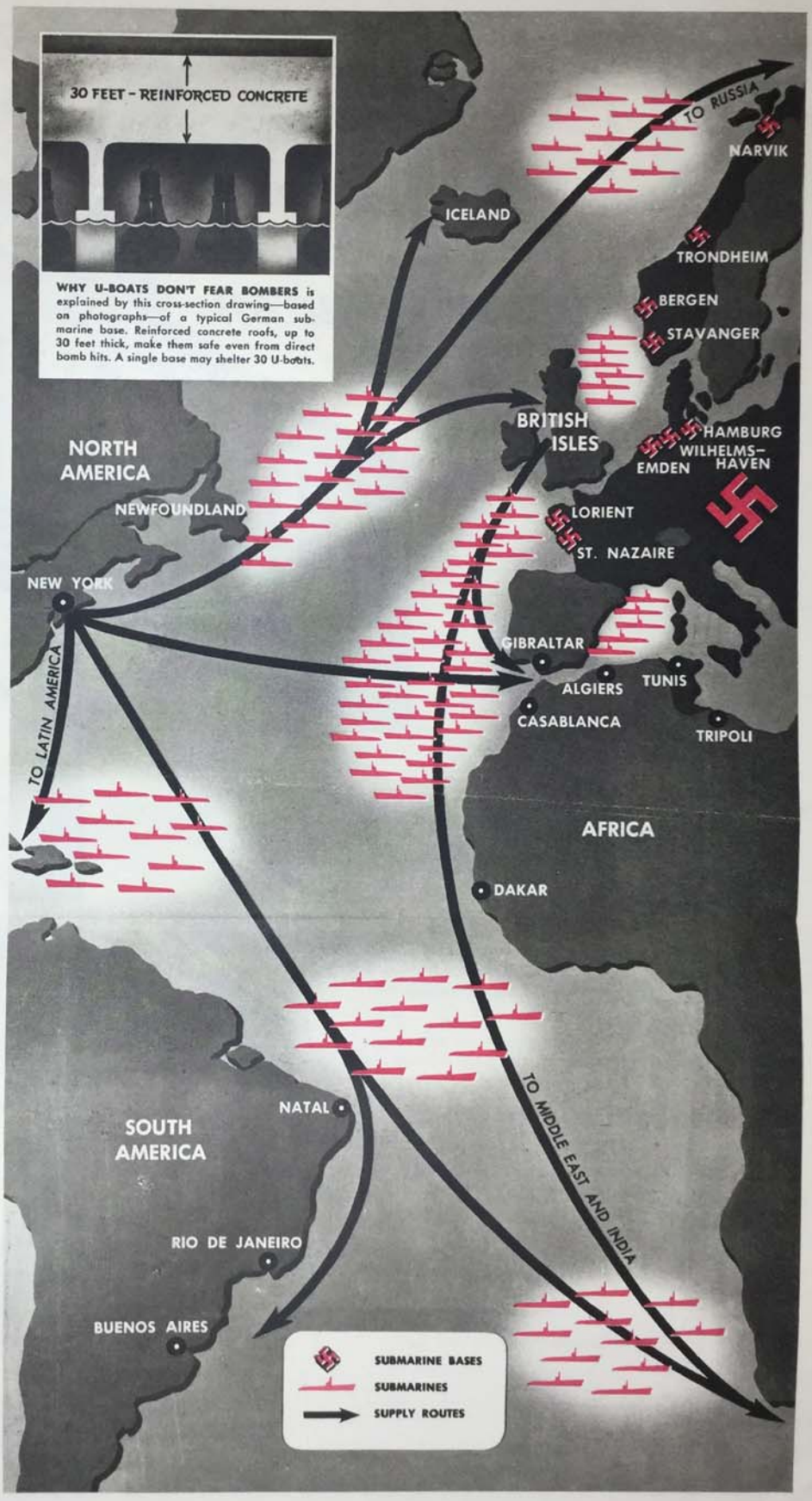
In the first World War a tremendous net of mines was laid across the North Sea. It worked. Similar nets, or patrols, or both, across the Bay of Biscay and Norway's fjords might give us victory again.

Another still untried method involves use of land and air routes and only the shortest, most easily protected sea hauls.

### Drowned Tanks Win No Wars

We are wasting too much, in lives and matériel, sending ships laden with guns, tanks and fighter planes to sea only to have them reach the bottom rather than the front.

It is high time we tried some new method of winning the war against the U-boats—or made one of the present methods work. Hitler has the offensive in the Atlantic now. This war won't be won on the defensive. We must take the offensive—and win.






END

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MacLeish

AIRWAYS

THE LIBRARIAN OF CONGRESS

WASHINGTON

May 31, 1943

Dear Monroe:

As perhaps you don't know, I am going to be in New York on Thursday for the Trustees meeting. If we fail to meet in Washington on Wednesday, which may be a bit hard, suppose we talk after the Trustees meeting in New York.

Faithfully yours,

Archibald MacLeish

Mr. Monroe Wheeler
The Museum of Modern Art
11 West 53rd Street
New York City

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Mrs. Muller Library

# PHOTOGRAPH REQUISITION

To PHOTO SALES DEPT.

From Mr. Wheeler NW

Date September 23, 1943

Department Exhibitions and Publications

For Miss Muller

Copy for Plates

## PRINTS

Please supply ..... (Quantity)

glossy ..... size .....

..... .....

..... .....

Date of completion .....

## NEW PHOTOGRAPHS

Please have LENS CRAFT (Photographer)

make 1 8X10 copy negative of camel end xxx plane montage

take ..... (Number of shots)

Date of completion Prints received 9/27/43

| ARTIST or SUBJECT | NEGATIVE NUMBER | QUANTITY |
|---|---|---|
| | | |

Forwarded to ..... Amount ..... Date Billed .....

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Mr Wheeler

SPECIAL SERVICE OFFICE
AAF PILOT SCHOOL (SPECIALIZED 2-ENGINE)
Laughlin Army Air Field

23A:elb

Del Rio, Texas
18 August 1943

Museum of Modern Art.
11 West 53 Street.
New York City, New York.
ATTENTION: Mr. J.T. Soby.

Dear Sir:

Please inform us if it will be possible to secure a print of "Airways to Peace", to be shown at the Post Theatre of this field.

We have facilities for either 16 mm or 35 mm projection.

Thanking you very Sincerely,

Robert H. Isaacson
ROBERT H. ISAACSON
2nd Lt., Air Corps

Ask Miss Tannenbaum will call back will find out about film taken

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AIRWAYS

HILL AND KNOWLTON

EMPIRE STATE BUILDING
NEW YORK

GUILDHALL BUILDING
CLEVELAND

NEW YORK

June 24, 1943

Mr. Monroe Wheeler
Director of Exhibitions and Publications
The Museum of Modern Art
11 West 53rd Street
New York, N. Y.

Dear Mr. Wheeler:

Thank you for your letter of June 22nd together with the outline of your exhibition of air-age geography.

It is a most interesting project and I am glad to have the information in case I hear from Mr. Girdler.

Very sincerely yours,

John W. Hill

JWH:ET

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AIRWAYS

HILL AND KNOWLTON

EMPIRE STATE BUILDING
NEW YORK

GUILDHALL BUILDING
CLEVELAND

NEW YORK

June 21, 1943

Museum of Modern Art
11 West 53rd Street
New York, N. Y.

Attn: Mr. Keller

Dear Mr. Keller:

Enclosed is the negative of the instrument board of a Liberator, which I have obtained from the Consolidated Vultee plant at Fort Worth at your request.

A diagram explaining what the various instruments do has been sent to Washington for clearance with the proper authorities there and as soon as that information is released, I shall forward it to you likewise.

Meanwhile, I hope that this sharp negative of the instrument board will enable your own artist to get started on the job you have in mind.

Sincerely yours,

Edwin E. Dahlin

EED:fw
Enc. Negative No. D-31

W 17-4922

President, Hill + Knowlton: John W. Hill

T. M. Linder + [illegible] of [illegible] San Diego

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HILL & KNOWLTON

A to P

HILL AND KNOWLTON

EMPIRE STATE BUILDING
NEW YORK

GUILDHALL BUILDING
CLEVELAND

NEW YORK
May 27, 1943

Vic. Emanuel
Consol. Vultee

Mr. Charles Keller
Museum of Modern Art
11 West 53rd Street
New York, N. Y.

Dear Mr. Keller:

Enclosed is the three-view line drawing of the Liberator I promised to send you for use in drawing your mural. You will find the wing span, height and length figures on the back of the drawing.

Sincerely yours,

Edwin F. Daggin

EFD/a
Enclosure - 1 line drawing

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Holt - Knoblauch
A to P

HILL AND KNOWLTON

EMPIRE STATE BUILDING
NEW YORK

GUILDHALL BUILDING
CLEVELAND

NEW YORK
May 25, 1943

Mr. Charles Keller
Museum of Modern Art
11 West 53 Street
New York, N. Y.

Dear Mr. Keller:

Mrs. Thorndyke has asked me to send you pictures of the Liberator which would guide you in drawing a mural for your next month's show. I have selected pictures that show the nose, as Mrs. Thorndyke requested, and one of them is perhaps useful in showing you the scale because of the human figures involved. The close-up of the nose also has a human figure in it, to give the scale. If there is anything else you need for the work, please call me at WI 7-4922.

110 ft. wing span

If an actual small model of the Liberator would be helpful in the undertaking, we could perhaps obtain one.

Sincerely,

Edwin F. Dakin

EFD/a
Enclosures

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AIRWAYS

Internal News

August 24, 1943

International News Photos
235 East 45 Street
New York, New York

Gentlemen:

Under separate cover we are returning to you two photographs which Mr. Wheeler considered for possible use in the current AIRWAYS TO PEACE exhibition, but which he was unable to use. He has asked me to thank you, however, for your assistance and cooperation in the matter.

Very truly yours,

(Mrs. C. S. Hartman)
Assistant to Mr Wheeler

CCH:cv

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Mrs. Kaltenborn

AIRWAYS

July 12, 1943

Mrs. H. V. Kaltenborn
167 East 64 Street
New York, New York

Dear Mrs. Kaltenborn:

I thought you might like to have this very good picture of Mr. Kaltenborn and Mr. Willkie. It was taken at the opening of the AIRWAYS TO PEACE exhibition. It was delightful to have you both with us, and we are very grateful indeed for your interest in the exhibition, which is proving exceedingly popular.

With best wishes, I am

Sincerely yours,

KW:CH

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LAUGHLIN ARMY AIR FIELD

AIRWAYS

October 18, 1943

Dear Sir:

I regret very much that your inquiry about Airways to Peace was mislaid and has only now come to my attention. Unfortunately, Airways to Peace is an exhibition, not a moving picture. A newsreel including shots from it was made by March of Time but is not being distributed by the Museum.

With many thanks for your interest in the exhibition, which will continue through October 31st, I am

Very truly yours,

Mrs. C. S. Hartman
Assistant to Mr. Wheeler

Lieutenant Robert H. Isaacson
Special Service Office
AAF Pilot School
Laughlin Army Air Field
Del Rio, Texas

CSH:jcc

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MacMcBARREN

AIRWAYS

May 27, 1943

Dear Archie,

I am sending you herewith my revised outline for our Airways to Peace exhibition. I shall greatly appreciate any suggestions you may have. I am sorry that a meeting with some geographers who had been hard to get hold of prevented me from seeing you at the last meeting of the Trustees. I am, however, planning to be in Washington next Wednesday, and I should like to talk this over with you if you can give me a few moments any time during the afternoon.

Ever yours,

Mr. Archibald MacLeish
The Library of Congress
Washington, D.C.

MW:CH
Enclosure

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McCARREN

A-k P. k Wash-

19

United States Senate

COMMITTEE ON APPROPRIATIONS

February 2, 1944

Mr. Monroe Wheeler, Director
Museum of Modern Art
11 West 53rd Street

The Hon. Pat McCarran
United States Senate
Washington, D.C.

My dear Senator:

I am very sorry indeed that there has been a delay in answering your very kind letter of January 4th. Mr. Wheeler has been enaged for some time on the assembling of an exhibition to open here in the near future. This work has kept him away from the Museum and for that reason his correspondence has been postponed. He has, however, referred your letter to Miss Elodie Courter, director of our department of Circulating Exhibitions, who will let you know the route planned for the Airways to Peace exhibition.

Mr. Wheeler was delighted with your comments on the exhibition as it appeared in Washington and will write you himself as soon as he is back in the office again.

I do hope you will forgive us.

Very sincerely yours,

Assistant to Mr. Wheeler

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Miss Courter

CARTER GLASS, VA., CHAIRMAN
KENNETH MCKELLAR, TENN.
CARL HAYDEN, ARIZ.
ELMER THOMAS, OKLA.
MILLARD E. TYDINGS, MD.
RICHARD B. RUSSELL, GA.
PAT MCCARRAN, NEV.
JOHN H. OVERTON, LA.
JOHN H. BANKHEAD, ALA.
JOSEPH C. O'MAHONEY, WYO.
HARRY S. TRUMAN, MO.
THEODORE FRANCIS GREEN, R. I.
FRANCIS MALONEY, CONN.
DENNIS CHAVEZ, N. MEX.
JAMES M. MEAD, N. Y.
BURNET R. MAYBANK, S. C.

GERALD P. NYE, N. DAK.
STYLES BRIDGES, N. H.
HENRY CABOT LODGE, JR., MASS.
RUFUS C. HOLMAN, OREG.
WALLACE H. WHITE, JR., MAINE
CHAN GURNEY, S. DAK.
C. WAYLAND BROOKS, ILL.
CLYDE M. REED, KANS.
HAROLD H. BURTON, OHIO

EVERARD H. SMITH, CLERK
JOHN W. R. SMITH, ASST. CLERK

United States Senate

COMMITTEE ON APPROPRIATIONS

January 31, 1944

Mr. Monroe Wheeler, Director
Museum of Modern Art
11 West 53rd Street
New York, New York

Dear Mr. Wheeler:

Under date of January 4th I wrote you with respect to the exhibit relating to aviation which was recently presented in the Department of Commerce auditorium.

Understanding that this exhibit was being sent on a tour of the United States, I am very much interested in having the exhibit shown in Reno, Nevada.

I will appreciate your advice and suggestions in the premises, at your first opportunity.

Kind regards.

Sincerely,

Pat McCarran

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A to P.

# PHOTOGRAPH REQUISITION

To PHOTO SALES DEPT. Date December 9, 1943

From Mr. Wheeler MW Department Exhibitions

For Mr. Richard C. Walker Pan American to pay for them
Pan American Airways System Room 4520
135 East 42nd Street
New Yor, New York

PRINTS

Please supply 4 prints each (Quantity)

glossy Yes size

Date of completion As soon as possible

NEW PHOTOGRAPHS

Please have (Photographer)

take (Number of shots)

Date of completion

| ARTIST or SUBJECT | NEGATIVE NUMBER | QUANTITY |
|---|---|---|
| AIRWAYS TO PEACE EXHIBITION | | |
| Cutaway clipper | | 4 |
| Timetable of the Future | | 4 |
| Photograph sequence which incorporates a Pan American plane. | | 4 |
| Mr. Walker would like four prints of any other shot which shows Pan American planes or other material | | |

Forwarded to Amount Date Billed

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Pan American

AIRWAYS

19

# THE MUSEUM OF MODERN ART

**Date** October 22, 1943

**To:** Mr. Vitullo

**Re:** Attached

**From:** Mr. Wheeler

Dear Frank,

We have to prepare for Pan American Airways a montage of the clippings in which their name is mentioned in connection with AIRWAYS TO PEACE. Miss Newmeyer has assembled a few. I don't think this would take you more than half an hour. It would not have to be done very carefully, but I should like to have it at your earliest convenience. If you need any help with it, let me know.

MW:CH

(Helen Ward)
Assistant to Mr. Wheeler

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Pan American

AIRWAYS

19

September 14, 1943

Mr. William Van Dusen
Director of Public Relations
Pan American Airways System
135 East 42nd Street
New York, New York

Dear Mr. Van Dusen:

Mr. Wheeler has asked me to return to you various photographs which you very kindly lent him during the preparation of our Airways to Peace exhibition.

These photographs have been very useful indeed and we are most grateful for your cooperation.

Very sincerely yours,

(Helen Ward)
Assistant to Mr. Wheeler

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Pan Amer. cán

AIRWAYS

Miss Rudell — Russo

Pan-American Airways

MOMA-7-100
Ext. 369

Miss Lourenzo of Pan Am taking care

Want to order
500 -

suggest printing - see Miss Rousmaniere taking care!

Miss Townsend re negative

Time Table of Future - "with cover in corner"

August 18, 1943

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yours,

(Mrs. C.S. Hartman)
Assistant to Mr. Wheeler

CCH:cv

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Pan Amer. cán

AIRWAYS

August 18, 1943

Mr. William Van Dusen
Director of Public Relations
Pan American Airways System
135 East 42 Street
New York, New York

Dear Mr. Van Dusen:

Mr. Wheeler has been in Chicago the past week, but before he left he asked me to have returned to you some material which you very kindly lent him during the preparation of our AIRWAYS TO PEACE exhibition. This material was very helpful to Mr. Wheeler, and he asked me to thank you once more for your very generous cooperation. I trust that the package will reach you promptly.

Very truly yours,

(Mrs. C.S. Hartman)
Assistant to Mr. Wheeler

CCH:cv

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Pan American
AIRWAYS

PAA **PAN AMERICAN AIRWAYS SYSTEM**

GENERAL OFFICES, 135 EAST 42ND STREET, NEW YORK, N.Y.

OFFICE OF
WILLIAM VAN DUSEN
DIRECTOR OF PUBLIC RELATIONS

August 4, 1943

Mr. Monroe Wheeler
Museum of Modern Art
11 West 53rd Street
New York, N.Y.

Dear Mr. Wheeler:

Confirming our telephoned conversation of this afternoon, the correct description of the photograph we sent you is a PAA navigator taking a "fix" with a bubble octant from the astro hatch of a Clipper.

Sincerely,

Audrey Davenport

Audrey Davenport

Van Dusen

July 26, 1943

ograph you
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elations

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Pan American
AIRWAYS

PAN AMERICAN AIRWAYS SYSTEM

July 26, 1943

Dear Mr. Francis:

I acknowledge with many thanks the photograph you sent in your letter of July 19. Will you please inform us as to the correct caption describing the instrument. With many thanks, I am

Sincerely yours,

Mr. Devon Francis
Assistant to Director of Public Relations
Pan American Airways System
135 East 42nd Street
New York 17, N. Y.

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PAA PAN AMERICAN AIRWAYS SYSTEM

GENERAL OFFICES, 135 EAST 42ND STREET, NEW YORK, N. Y.

OFFICE OF
WILLIAM VAN DUSEN
DIRECTOR OF PUBLIC RELATIONS

May 1 9, 1943 3

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**MEMORANDUM**
STD. FORM 9-1A

DATE Jun 29

TO Miss Munz
Advertising
LOCATION

RE THE ATTACHED, PLEASE

- ☐ NOTE AND RETURN
- ☐ GIVE ME YOUR OPINION
- ☐ HANDLE
- ☐ REPLY
- ☐ AUTHORIZE
- ☐ DECIDE

REMARKS You may keep this material. Hope it is what you have in mind.

Enid Grote
SIGNATURE
4411
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PAA PAN AMERICAN AIRWAYS SYSTEM

GENERAL OFFICES, 135 EAST 42ND STREET, NEW YORK, N. Y.

OFFICE OF
WILLIAM VAN DUSEN
DIRECTOR OF PUBLIC RELATIONS

July 19, 1943

Mr. Monroe Wheeler
Museum of Modern Art
11 West 53rd Street
New York, N. Y.

Dear Mr. Wheeler:

Here is the long-awaited picture you requested. Sorry you had to wait so long for it, and I hope it meets your needs.

Sincerely,

Devon Francis JD

Devon Francis
Assistant to Director
Public Relations

JD
Encl.

jm51243

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PAN AMERICAN AIRWAYS SYSTEM
135 East 42nd Street
New York City

May 12, 1943 For use May 20, 1943

---

# CLIPPERS OF PAN AMERICAN AIRWAYS COMPLETE FOUR YEARS OF ATLANTIC FLYING

Four years ago today (May 20, 1939) the first of a fleet of giant 42-ton Boeing Clippers of Pan American Airways took off from New York bound for Europe on an historic flight that marked the opening of the first regularly-scheduled air transport service across the North Atlantic.

In the four years that have followed the Flying Clippers (now in war paint) have flown more than 6,862,000 miles over the "blue ribbon" transoceanic route. They have carried more than 44,000 ~~28,500~~ passengers in the course of 1400 crossings.

Since America's entrance into the war, the trans-Atlantic Clippers have flown well over 1700 tons of urgently-needed express across the ocean.

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jm51243

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PAN AMERICAN AIRWAYS SYSTEM
135 East 42nd Street
New York City

May 12, 1943 For use May 20, 1943

---

CAPTIONS FOR ATTACHED SET OF PHOTOGRAPHS SHOWING

HISTORICAL DEVELOPMENT OF FLYING CLIPPERS

Picture No.

1. FOKKER F 7. The plane with which regular service was inaugurated on the first of Pan American Airways routes. In 1927, This plane made the first scheduled flight over the 90 mile airline between Key West and Havana. Progenitor of Pan American's Clipper family was the F-7 tri-motored landplane developed by Anthony Fokker. In 1927 it was the only plane that could maintain flight on two of its three engines. Equipped with 3 Wright Whirlwind 220 h.p. engines, the F-7 could lift a gross weight of 9,700 lbs. at a speed of 90 m.p.h., could carry mail and 8 passengers.

2. THE SIKORSKY S-36. Igor Sikorsky's S-36 amphibian, was the world's first practical amphibian transport. In 1927, Pan American found in it an ideal point from which to start development. It carried eight passengers. Wingspread, 72 ft.; length 34 ft. Engines: two Wright Whirlwinds of 200 h.p.each. Weight: Empty, 3,500 lbs; loaded, 6,000 lbs. Its cruising speed ranged around 100 m.p.h. This plane was first used in 1927.

3. SIKORSKY S-38. A considerably improved and aerodynamically version than the S-36 was the Sikorsky S-38, when placed in service. In addition to considerable mail load, it carried 9 passengers over a range of 600 miles. Two 420 h.p. Pratt & Whitney Wasps gave it a cruising speed of 110 m.p.h. Weight empty, 6,500 lbs. Wingspread, 71 feet, 8 inches. Length 40 feet, 3 inches. First used in 1928.

4. CONSOLIDATED COMMODORE. This was the first American flying boat designed for transport use. Used by PAA between 1930-36 across the Caribbean and until 1939 along the Brazilian coast, they are today being used as training ships at Miami. They cruise at about 100 m.p.h. and with 640 gal. fuel capacity fly up to 600 miles.

5. SIKORSKY S-41. A big step forward produced the Sikorsky S-41. With a 33% increase in weight over the S-38, capacity was nearly doubled to 15 passengers. With two 575 h.p. Pratt & Whitney engines, the S-41 weight was 8,100 lbs. when empty, 13,800 lbs. when fully loaded. Its wingspread was 78 ft., 9 in.; its length, 45 ft., 2 in. Cruising speed was 115 m.p.h. First used in 1931.

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6. SIKORSKY S-40. Sikorsky fulfilled Pan American specifications for a really big ocean-going aircraft with the S-40--the first four engined Clipper. The S-40 mounted four 575 h.p. Pratt & Whitney engines; cruised at 115 m.p.h.; and carried 31 passengers. Its length was 76 ft., 8 in.; its wingspread 114 ft. Empty it weighed 21,000 lbs. Loaded 34,000 lbs. First used in 1932.

7. SIKORSKY S-42. The Sikorsky S-42 was the first plane launched in America for regular service over full trans-oceanic ranges. It could carry 32 passengers and big loads of other cargo over a 1,200 mile range. It cruised at 160 m.p.h. with four Pratt & Whitney 700 h.p. Wasps. It weighed 19,764 lbs. empty; 38,000 lbs. fully loaded. Length, 67 ft., 8 in.; Wingspread 114 ft. First used in 1934.

8. MARTIN M-130. The Martin-built M-130 boats of the China Clipper class were launched for service across the Pacific. With 10 passengers and full loads of mail & express, it had a range of 3,200 miles. On lesser distances it can carry 48 passengers. Cruising speed, 163 m.p.h.; loaded weight, 53,000 lbs.; empty weight, 23,100. Length, 90 ft., 10 in. Wingspread 130 ft. First used in 1934.

9. DOUGLAS DC-3. The Pan American-Grace Airways (Panagra) DC-3 followed the general characteristics of the prototype of this best known of America's commercial transports. With a fuel capacity of 820 gallons, this plane has a maximum range of 1170 miles at 10,000 feet. Although engines were optional, Curtiss, or Pratt & Whitney, Panagra's DC-3's are powered by two 1200 h.p. PW-Twin row S1C3G engines. Empty weight of the plane is 15,750 lbs., gross weight 24,000 lbs., useful load 9155 lbs. There are 21 seats. Cruising speed is 180 miles per hour; wingspread is 95 ft. and length 64 ft., 5 1/2 inches. DC-2's and/or DC-3's are used at present on Pan American-Grace Airways, China Nat'l.Aviation Corp., Compania Mexicana de Aviacion, etc., affiliated with Pan American Airways. DC-2 first used by Pan American January 22, 1935. DC-3, October 1, 1937.

10. SIKORSKY, S-43. In 1936 Sikorsky came out with a new amphibian which weighed 19,500 lbs.; could carry a useful load of 6,930 lbs., 15 passengers, plus a crew of 3. Its twin Pratt & Whitney Hornets give this amphibian a cruising speed of 166 m.p.h. Wingspread 86 ft.; length 51.2 feet. The S-43 is known as the "Baby Clipper."

11. BOEING B-314. The Boeing-built 314, Pan American's great new Atlantic type Clipper stands out as the culmination of a decade of step-by-step development and progress. For 3,200 miles, this type Clipper can carry some 34 passengers, plus tons of other cargo. Four Wright Cyclones of 1,500 h.p. each give a cruising speed of 165 m.p.h. Weight loaded: 82,000 lbs. Length: 109 ft., Wingspread: 152 ft. First used in 1939.

12. THE BOEING B-307. In 1940, Pan American Airways received the great Boeing B-307.landplane, forerunner of the long-range, high-altitude transports of the future. It can carry 33 passengers, a ton of cargo and mail for more than 2,500 miles at 240 m.p.h. Gross weight 45,000 lbs.; length 74 ft., 4 in.; wingspread 107 ft., 3 in. Equipped with super-charged pressurized cabins.

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Pan American

AIRWAYS

PAN AMERICAN AIRWAYS, INC.

TRAFFIC-ADV. DEPT., 135 EAST 42ND ST., NEW YORK

108

June 29

Commonwealth Storage & Van Co.
532 W. 34 St., N.Y.C.

ALSO SUPPLEMENTARY ORDER NO. 241

Your truck

Please deliver to:-

Mr. Monroe Wheeler
c/o Museum of Modern Art
11 West 53rd St.
New York City

Display No. 52 - (B-314 cut-away model)

EXPLANATION OF USE:- Request Mrs. R. C. Walker

CHARGE P.A.A. ACCOUNT:- 2-A

RECEIVING NOTICE

HUBERT C. WATSON Asst. Adv. Mgr.

Hubert C. Watson

seeks to make familiar to the layman.

Thanking you in advance for the courtesy of your consideration, I am

Sincerely yours,

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Pan American

AIRWAYS

May 28, 1943

Mr. Samuel F. Pryor, Jr.
Pan American Airlines
135 East 42 Street
New York, New York

Dear Mr. Pryor:

I enclose herewith an outline of the exhibition entitled Airways to Peace which the Museum of Modern Art is opening on June 29. This exhibition is a sequel to the Road to Victory exhibition which we held last year, the success of which has astonished us all. Five versions of it are now touring the world, and, as you may recall, the newspapers of the entire country gave the exhibition the most thorough coverage. This new show promises to be even greater in popularity, and we feel that it is important that the captions be written by someone as well known as Carl Sandburg, but associated with the new global concept. This person, we all feel, should be Wendell Willkie. As Mr. Juan Trippe and Pan American Airlines are assisting us with the exhibition, and we know you are a close friend of Mr. Willkie, whom we do not know, I am writing to ask whether you will not be kind enough to ask him if he would like to write the captions. Only a dozen or so paragraphs would be required, and we feel that by writing them he would be rendering a great service in popularizing the essential knowledge of the air world which the exhibition seeks to make familiar to the layman.

Thanking you in advance for the courtesy of your consideration, I am

Sincerely yours,

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Pan American

AIRWAYS

May 7, 1943

Mr. Juan T. Trippe
President, Pan American Airways System
135 East 42 Street
New York, New York

Dear Mr. Trippe:

On behalf of the Trustees of the Museum of Modern Art I wish to thank you for the generous collaboration which you are extending to the air-age geography exhibition which the Museum will open at the end of June and continue until October 17. I want to thank you also for speaking to Mr. Frederick B. Rentschler of United Aircraft and to Mr. J. B. Smith of Curtiss-Wright. Neither of these companies has as yet joined in the project, but Colonel Christie of United Aircraft seems very enthusiastic about it. Mr. Walker thought that Sperry Gyroscope Company might be interested, and I believe that Mr. Lord spoke to you about calling Mr. Morgan in this regard.

I am sending you herewith copies of two of our recent publications along the lines of hemisphere cultural relations which I think will interest you--Brazil Builds and Latin-American Art in the Museum's Collection.

With kind regards, I am

Sincerely yours,

MW:CH

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RAND McNally

A to P.

19

September 22, 1943

Mr. George F. Barnes, Vice President
Rand McNally and Company
536 South Clark Street
Chicago, Illinois

Dear Mr. Barnes:

Thank you very much for your kind letter of September 20 regarding the AIRWAYS TO PEACE show. It will continue here until the first of November and it is scheduled to appear at the Commerce Building in Washington under the auspices of the Civil Aeronautics Authority during the month of December. Thereafter a smaller version will travel to other cities, but the exact schedule for 1944 has not been settled. It has not been scheduled for any Chicago showing as yet. We should be glad to inform you later if arrangements are made to send it there.

I inclose herewith a copy of the AIRWAYS TO PEACE Bulletin. Additional copies may be obtained from our Publications department at $ .15 each.

We are exceedingly grateful for your kind remarks about the exhibition. It has been wonderfully successful and the New York Board of Education is planning to bring school children above the seventh grade to see it during October.

With renewed thanks for the fine assistance received from your company in the preparation of the exhibition, I am,

Sincerely yours,

MW:hw
Enclosure

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ESTABLISHED 1856 SEP 22 1943 INCORPORATED 1873

# RAND McNALLY & COMPANY

MAP ENGRAVERS PUBLISHERS

536 SOUTH CLARK STREET
CHICAGO

TELEPHONE
WABASH 0363

September 20, 1943

The Museum of Modern Art
11 West 53rd Street
New York 19, New York

Dear Sirs:

Today we had the opportunity to examine a recent bulletin you issued entitled AIRWAYS TO PEACE. It pertains to your exhibition of geography for the future. Everyone in our organization is greatly interested in this exhibit and all wish to see it. Have you a schedule showing the time and place of the exhibits to be held throughout the United States? If so, we shall greatly appreciate it if you will send this schedule to us. Particularly are we interested in knowing when the exhibit will be held in Chicago and at what address.

You deserve rich commendation for initiating and carrying forward so timely a project. It should prove to be of real service in making the people of our country air-minded.

Rec'd 9?

Sincerely yours

Rand McNally & Company

Geo. F. Barnes
Vice President

GFB:HH

P. S. May we have a copy of your AIRWAYS TO PEACE bulletin?

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Rand McNally

MW

# RAND McNALLY & COMPANY

CHICAGO · NEW YORK · WASHINGTON · SAN FRANCISCO · LOS ANGELES

MAP ENGRAVERS PUBLISHERS

Mr. Whelan

Pls note + return to DD

NEW YORK

July 27th 1943

Miss Dorothy H. Dudley, Registrar
The Museum of Modern Art
11 West 53rd Street
New York, N.Y.

July 27, 1943

Mr. Harold E. Group
Rand McNally and Company
111 Eighth Avenue
New York, New York

Dear Mr. Group:

Miss Dudley has shown me your letter regarding the photographing, sketching or reproduction of the maps and globes which have been so generously contributed by Rand McNally and Company to our current AIRWAYS TO PEACE exhibition. This provision governing our exhibition material applies only to works of art such as painting, sculpture etc., and we shall, of course, do all that we can to see that none of your copyrights is infringed upon. With many thanks for the gracious collaboration which your Company has extended to us in the preparation of this exhibition, I am

Very sincerely yours,

Most cordially,

Harold E. Group

Harold E. Group

MW:CH

THE RAND McNALLY MAP STORE · TWIST YOUR GLOBES · CHICAGO · NEW YORK

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Miss Dudley

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# RAND McNALLY & COMPANY

CHICAGO · NEW YORK · WASHINGTON · SAN FRANCISCO · LOS ANGELES

MAP ENGRAVERS PUBLISHERS

111 EIGHTH AVENUE
NEW YORK

TELEPHONE
CHELSEA 3-4100

Mr. Wheeler
Pls note & return to DD

July 23rd
1943

Miss Dorothy H. Dudley, Registrar
The Museum of Modern Art
11 West 53rd Street
New York, N.Y.

Dear Miss Dudley:

As per your request we enclose herewith our receipt of delivery for the items which we originally sent to you but which were not used in the Airways to Peace Exhibit.

We note on your original statement listing the material which you did keep that you have rubber stamped on that particular form an understanding that this may be photographed, sketched and/or reproduced. You will I know realize that anything in maps or globes are covered by rigid copyright and consequently could not be sketched or reproduced without specific permission for each specific item. There will probably be no occasion where this would come up, but I thought we better call it to your attention so that should any such thing happen you would take the proper methods to clear it.

Appreciaiting the opportunity of participating with you in this splendid exhibit, and thanking you for your kind courtesies, I am

Most cordially,

Harold E. Group

Harold E. Group

HEG:MB

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MAP ENGRAVERS PUBLISHERS

111 EIGHTH AVENUE
NEW YORK

TELEPHONE
CHELSEA 3-4100

AIRWAYS

June 22nd
1 9 4 3

Mr. Charles Keller
Museum of Modern Art
11 West 53rd Street
New York, N.Y.

Dear Mr. Keller:

As per our telephone conversation this morning I am enclosing herewith a tear sheet from our Commercial Atlas which shows the air-line distances between forty-five world cities. The largest standing form in which we have this chart is on the enclosed sheet but we could blow it up to most any size if you thought such a chart would be of value to your exhibit.

After you have had the opportunity of looking this over and consulting with your associates I would be pleased to hear from you concerning it as soon as possible, for if you want a blow-up of this chart it would have to be done in our Chicago plant and would take a few days.

I have already directed our Chicago offices to send to you the wall maps of the world and the eight geographical relations maps which should reach you before the end of the week. I am also getting the globe-making exhibit together and will phone you giving you the exact size before the end of the day.

Appreciating the courtesies extended to both Mr. Bay and myself, and with my kindest regards, I beg to remain

Most cordially,

Harold E. Group

Harold E. Group
General Sales Manager
SYSTEMS DIVISION

HEG:MB

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# RAND McNALLY & COMPANY

MAP ENGRAVERS PUBLISHERS

111 EIGHTH AVENUE
NEW YORK

June 17
1943

Mr. Charles Keller
Museum of Modern Art
11 West 54th Street
New York City

Dear Mr. Keller:

I am pleased to enclose herewith the mileage tape which I spoke to you about for measuring distances on our 16" Globe. I particularly call to your attention the fact that only one side of this tape is applicable to a 16" Globe, the other side being used for a 12" Globe. I might also add that our 16" Globe is scaled to 500 miles to the inch in the event that you want to do any micrometer measuring.

I will look forward with pleasure to seeing you and Mr. Wheeler tomorrow at which time I expect Mr. Bay of our Washington office to be in the city.

Very truly yours,

Harold E. Group

Harold E. Group
General Sales Manager

HEG/tmc
enc.

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Rand McNally
AIRWAYS

June 15, 1943

Mr. Andrew McNally
536 South Clark Street
Chicago, Illinois

Dear Mr. McNally:

I am writing to ask for your collaboration on an exhibition entitled AIRWAYS TO PEACE which the Museum of Modern Art will open on the first of July. I enclose herewith an outline, and you will see that we shall need here and there various commercial maps to illustrate our points. Would the Rand McNally Company be willing to lend us for this exhibition (which will circulate afterward to other cities throughout the United States) certain maps and globes which will suit our purpose? We shall, of course, be glad to give full credit to you wherever your maps are used in the exhibition. As you perhaps know, the Museum is a non-profit, educational institution operating under the charter of the University of the State of New York.

May I thank you in advance for whatever consideration this request may merit.

Very sincerely yours,

MW:CH

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U.S. NAVY DEPT - Bryan - Hydrographic Office Navy

AIRWAYS

IN REPLY ADDRESS NOT THE ADDRESSEE BUT TO THE LETTER, BUT TO HYDROGRAPHIC OFFICE NAVY DEPARTMENT WASHINGTON, D. C.

REFER TO No. Op-20-[illegible]

HYDROGRAPHIC OFFICE

WASHINGTON, D. C.

21 June 1943

July 9, 1943

Sir:

In reply to your wire of 17 June 1943 requesting two old charts to [illegible] "Airways to Peace" exhibition, there [illegible] under separate cover this date one copy each of [illegible], 6300 "Mediterranean Sea", 1400 "Pilot Chart of the Atlantic" and 9-1262 "Air Routes of the World". All these charts are of the latest editions.

The Office [illegible] your interest in this matter and extends [illegible] exhibition.

Rear Admiral G. S. Bryan
Hydrographic Office
Navy Department
Washington, D. C.

Dear Admiral Bryan:

Thank you very much indeed for your kind cooperation in connection with the charts of "Mediterranean Sea," "Pilot Chart of the North Atlantic," and "Air Routes of the World," for our exhibition, AIRWAYS TO PEACE. The exhibition opened July first and has already elicited the greatest interest and approval from the press and the public. It will continue through October seventeenth, and if you should be in New York during the next few weeks, it would give me much pleasure to show you AIRWAYS TO PEACE personally.

With renewed thanks for your collaboration, I am

Very sincerely yours,

(Ret.)

Mr. Monroe Wheeler,
Director of Exhibition,
Museum of Modern Art,
11 West 53rd Street,
New York, New York

MW:CH

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IN REPLY ADDRESS NOT THE SIGNER OF THIS LETTER, BUT
HYDROGRAPHIC OFFICE
NAVY DEPARTMENT
WASHINGTON, D. C.

REFER TO No. Op-28-A1-CTC
L11-4(455585)

HYDROGRAPHIC OFFICE
WASHINGTON, D. C.

21 June 1943

Sir:

In reply to your wire of 19 June 1943 requesting two old charts to be displayed in your "Airways to Peace" exhibition, there is being forwarded under separate cover this date one copy each of H.O. charts, 4300 "Mediterranean Sea", 1400 "Pilot Chart of the North Atlantic" and V-1262 "Air Routes of the World". All these charts are of the latest editions.

The Office is pleased to cooperate with you in this matter and extends its best wishes for a successful exhibition.

Very truly yours,

G.S. Bryan
Rear Admiral, U.S. Navy (Ret.)
Hydrographer

Mr. Monroe Wheeler,
Director of Exhibition,
Museum of Modern Art,
11 West 53rd Street,
New York, New York

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US

OFFICE OF WAR INFORMATION

This Report on Air Transport Is

# ADVANCE RELEASE

For Monday Morning Papers

June 7, 1943

returned to pictures 9/14/43

United States Government Printing Office • Washington : 1943

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OFFICE OF WAR INFORMATION

# AMERICAN AIR TRANSPORT

The Office of War Information today issued a report covering all phases of American air transport at the present time. Among the facts brought out in the OWI report are the following:

1. The Army Air Force Air Transport Command alone is larger than all air transport organizations, civilian and military, in existence all over the world before the war.

2. The Naval Air Transport Service and the commercial air lines are also carrying great quantities of cargo and great numbers of personnel, chiefly of a military nature, and all operations are steadily expanding. The number and length of air routes flown increase constantly.

3. These achievements are being made in passenger and bomber planes, many of both the older and the newer models of which have been converted for cargo-carrying needs. Not a single plane originally conceived solely to carry cargo is in service in the Western Hemisphere at the present time, although several are in the process of design and manufacture.

4. The Army and Navy air transport services have been greatly aided in their work by the past activities, and by the personnel, of the commercial air lines.

5. This great wartime expansion of air transport is being accompanied by a vast, world-wide development of air ways, communications, and airports which will be available to serve civilian air transport needs after the war.

6. During 1943 the total production of the American aviation industry—cargo and combat planes together—will reach the total of $20,100,000,000, a fourth of our war budget for the year and almost a seventh of the estimated national income. This is in contrast with the automobile industry, which at its peak in 1941 reached only to $3,700,000,000. About two and a half million trained workers are now turning out combat and cargo planes, and almost all airplane plants are capable of total conversion to the production of civil aircraft.

7. Nevertheless, the Civil Aeronautics Administration warns against extravagant claims on the subject of future peacetime air transport. High cost per ton-mile (not a prime consideration in military operations) and immense problems of refueling are deterrent factors, and

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it is unlikely that the "airplane will drive other forms of transportation out of business," as some aviation enthusiasts are inclined to prophesy.

The OWI report was prepared in consultation with the Civil Aeronautics Administration, the Civil Aeronautics Board, the War Production Board, the Air Transport Command, the Naval Air Transport Service, and other public and private organizations.

### Picture of Wartime Air Transport

Perhaps the scope and the regularity of air transport today, most of it devoted of necessity to the needs of war, are best illustrated by the recent but already celebrated complain of a young Air Transport Command pilot in Washington: "My laundry's in India—I can't get it till next week." A pilot on the Lisbon-New York run recently flew the Atlantic four times within three days. Another pilot recently crossed the ocean twelve times in thirteen days, making one round-trip in less than twenty-four hours. At ATC flying fields, self-assured youthful veterans of the Ferrying Division deliver to still more youthful beginners lectures studded with the names of distant cities and island bases, and with details concerning landmarks, airports, weather, communications, and other navigation aids. Together, the Army and the Navy air transport services are now averaging several hundred trans-Atlantic flights a week alone, and the number is steadily increasing.

The measure of the value of wartime air transport lies not only in the bulk carried but also in the rapidity with which the stripped, camouflaged planes can complete each mission and be ready to start another. Large objects like light tanks and jeeps, for example, are transported across the ocean by air only in cases of emergency, and even in combat areas they are seldom loaded into planes. About the bulkiest objects commonly carried by air are airplane engines; these and plane parts of all kinds form some of the most frequent air cargoes at the present time. Speed is the keynote. An Air Transport Command plane recently flew from Australia to California in the record flying time of 33 hrs. 27 minutes. Medical supplies and blood plasma, things that are needed urgently, are flown to their destinations as fast as they can be got there. A complete hospital was flown to Alaska in 36 hours.

Planes which fly needed cargoes out to combat areas and elsewhere return loaded whenever possible, often with strategic materials used in our war plants for the manufacture of goods which will be flown out in turn.

Block mica has been flown in from India. Planes have brought back platinum from the Persian gulf, beryl ore, quartz crystals,

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industrial diamonds, and mica from South Africa. Crude rubber has been air-freighted from Brazil, balsa wood from Central America. Twenty tons of rubber seeds were ferried from Liberia to the Western Hemisphere. Insecticides made from Brazilian roots are flown to various bases. A certain type of Fiji Islands beetle was flown to Honduras to check a root weevil attacking hemp.

Tonnages involved are often large for air freight. In eight weeks, 32 tons of bristles for the Navy, 70 tons of silk for parachutes, 47 tons of tin, and 70 tons of tungsten were moved from China to India. On another occasion, 98 tons of tungsten were flown out in ten days.

Recently planes returning from cargo-carrying flights to the Bahamas have been bringing back numbers of agricultural workers to be employed on American farms.

Planes returning from combat zones also bring back human cargo. Wounded enlisted men and officers, cases which call for treatment that is available only here at home, are evacuated in transport planes converted into flying hospitals. A number of serious cases recently reached Bolling Field, Washington, from India in 5 days—a distance of over 10,000 miles. On the planes on such flights are air evacuation nurses—graduates of the school of Air Evacuation Nurses at Bowman Field, Louisville, and also a medical sergeant with the rank of staff sergeant. All transport planes are being equipped to carry standard stretchers for the evacuation of wounded. Up to thirty may be carried in a plane, depending on its size; often they are brought directly from the battlefield in smaller planes and moved to a big plane at a base.

Battle-damaged submarines in distant waters receive repair parts by air and are in action again in a few days instead of being idle a month. Auxiliary fuel tanks are flown to fighter planes, which immediately begin to cover larger areas than previously possible. Every day for many months transport planes have flown supplies to Guadalcanal from Pacific bases. Many Guadalcanal wounded were evacuated by air.

## American Transport Planes

The accompanying list of the chief models of transport aircraft now in service indicates the extent to which America is making use of her available planes for the purposes of wartime air transport. Beginning the war without a single plane specifically designed for the carrying of air cargo, and with the first such planes still in the experimental stage at the present time, the impressive air cargo transport records being made by the Army, the Navy, and the commercial airlines are being made in passenger and bomber planes, remodeled or adapted for their new work.

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This means, of course, that present-day cargo transportation is being accomplished with a degree of efficiency considerably below that which would conceivably characterize planes specifically built for cargo purposes. B–24's, for example, converted Liberator bombers, are doing excellent service as cargo planes; but these bombers are so constructed as to require that their loads be carried in a concentrated location. Lack of available space for loading within balance limitations both fore and aft of the center of gravity greatly limit their cargo load capacity, and the weights and balance officers who supervise their loading have to exercise great care in distributing weight, particularly toward the tail. Planes originally designed for passenger transportation, too, even the newest models, such as the C–54 and the C–46, while they have greater capacity and space than bombers, are still far from ideal for the cargo-carrying work which they are performing so faithfully. Loading facilities, doors, and cargo hold-down facilities are afterthoughts. They are frequently at locations that interfere with maintenance, and in other instances are too high for truck platform loading and inefficient as to structural weight.

Present models of flying boats are particularly ill-suited to the carrying of bulky cargo, due to the small size of their hatches and the division of the plane into compartments by bulkheads which for structural reasons cannot be removed.

Furthermore, engine choice, fuel capacity, landing speed, and other specifications of all these war cargo planes are aimed at general all-round utility rather than designed for the greatest economical efficiency for a particular route.

In general, it may be said that a plane primarily designed to carry cargo could presumably be converted with comparative ease and without too great loss in efficiency for passenger use with the addition of seats, toilet facilities, and the like; or it could easily be converted to a bomber or flying fortress plane through the installation of guns and armor. The converse, however, is far from true. At present American air transport needs are being filled by operations that show considerable ingenuity but which cannot be called efficient from any modern requirement of cargo-carrying economics.

Nevertheless, makeshift as the fleet is for transport purposes, America has assembled what is by far the greatest air transport fleet in the world today. This country is fortunate in having had such a high development of air-line planes and operations at the beginning of the war.

## Air-Lines and Other Civilian Flying

During 1941, their last normal year of operations, American commercial air lines carried 4,060,500 passengers, an increase of 45,000 percent over the approximately 8,700 carried in 1927. Between these

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same years, air mail increased from 1,270,300 pounds to 44,595,300 pounds, and air express and freight from 45,860 pounds to 22,315,000 pounds. In 1941 domestic air-line routes totaled about 30,000 miles.

Before Pearl Harbor, a maximum of 434 planes was being operated commercially within and beyond the continental limits of the United States by the air lines. They were divided as follows:

| | | | |
|---|---|---|---|
| Domestic | 358 | Hawaii | 6 |
| Transoceanic | 10 | Alaska | 7 |
| To Latin America | 53 | | |

On January 1, 1943, this number had been reduced to 256 (of which 166 were flying domestically), and that remains approximately the number being flown commercially by the air lines at the present time. The rest have been taken over by the armed services, either outright or to be operated for them by the air lines under contract. Most of them have been stripped of their soundproofing and their upholstered chairs to make room for cargo, and equipped with folding metal "bucket seats" along the sides for the transport of paratroops and other combat units. In some, large doors have been cut for the loading of bulky freight, such as airplane engines and jeeps. Camouflaged in tones of olive drab or blue, they are being forced somewhat more than when they were in air line passenger service—not only because they are carrying heavier pay loads but because with normal fuel consumption an airplane covered with paint loses up to twelve miles an hour of the speed it flew when its gleaming aluminum was kept waxed and polished. All over the world these ex-air-lines planes, along with many other transport planes built since the outbreak of the war, are being used for the transport of paratroops and other combat units, for glider towing, as ambulance planes, for the transport of staff, prisoners, mail, and important cargo of all kinds. Personnel transported in them are not as comfortable as air lines passengers, and on night flights they and the flight orderlies rest as best they can on pads on the bucket seats, on the floor, or on top of crates and boxes.

The drastic reduction in the number of airplanes available for commercial use in domestic service made it necessary to exercise, for the first time, a control over schedules. No schedule is continued in operation unless it can be shown to be essential for war-transportation purposes, and the "Service Pattern" (the number of schedules to be operated on each authorized route, with stops to be made) set up by the Civil Aeronautics Board at the request of the Army is constantly revised. The 49-percent cut in air-line flight equipment has resulted in only a 29-percent cut in the number of schedules flown.

The planes still operated commercially by the air lines are carrying only slightly fewer passengers than were carried by the whole fleet before the war, and more mail and express. In October 1942, air-

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cargo express was up 123 percent from the same month in the previous year. These achievements have been made possible by greatly improved maintenance facilities and by increased utilization and efficiency, including quicker turn-arounds. In November 1941, for example, the average daily mileage of a domestic air-lines plane was 1,070 miles; as of March 1943, it was 1,625 miles, and the figure is increasing. Recently, however, the air lines stated that if they are to continue to carry the increasing quantities of air mail, passengers, and air express they will require more planes, and the Army, after consultation with the CAB and the Post Office Department, has agreed to release some.

Flying is the only form of passenger travel at present selling tickets on a straight priorities basis. Members of the armed forces and government officials traveling on government business come first. Then, to the remaining extent of capacity, space is sold to other passengers. Except on the busiest routes, especially to and from Washington, space is usually obtainable, although not always for the particular flight desired. Sleeping accommodations have been removed from those domestic air-line planes which formerly had them.

At present, three all-cargo commercial flights are operated by United States air lines on regular schedule—New York to Miami, New York to Salt Lake City, and from the Canal Zone to Lima, Peru, and thence on to Buenos Aires, the first regular cargo flight under the American flag in the international field. These operations are being performed in passenger planes converted to transport use; no planes originally conceived solely for the carrying of air cargo are yet in regular service in the Western Hemisphere. This is true even in Bolivia, Colombia and Central America, where inadequate rail transport resulting from difficult terrain has brought about what is probably the highest development of commercial air cargo transport in the world.

Most of the 25,000 planes owned by private American flyers at the time of Pearl Harbor have by now, either been absorbed in the Civil Aeronautics Administration's War Training Service (formerly the Civilian Pilot Training Program), or have been purchased by the Army, or are being operated by their owners or by other civilian flyers in the Civil Air Patrol (recently transferred from the Office of Civilian Defense to the Army). A certain number of industrial corporations, engaged in essential war production, own and operate their own planes. There is very little other private flying nowadays. In those areas where it is still permitted, a private flyer must obtain a clearance from the clearance officer of the flying field from which he takes off. No flights may be made from uncertificated airports, such as flying fields on farms or private estates. In vital defense

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areas private flying is permitted only upon clearance by the area Fighter Command.

### The Air Transport Command

Of the almost two hundred transport airplanes taken over from the commercial air lines by the armed services, many are being used by the Troop Carrier Command of the Army Air Force, whose function is the tactical delivery of troops and supplies into actual combat zones; others are used by the Air Transport Command, which engages in much more far-reaching domestic and international transportation, both of personnel and cargo.

The Air Transport Command (ATC), although it did not receive the majority of the planes taken over from the air lines, has been assigned by far the largest proportion of the transport airplanes produced in the United States since the outbreak of the war—planes manufactured under contract to the War Department and under the supervision of the Matériel Command. Like the ex-air lines planes, most of these are equipped not with comfortable accommodations but with sterner fittings for the transport of military freight and passengers. All are painted olive drab or otherwise camouflaged, and bear the global insignia of the ATC. The ATC is at present performing scheduled world-wide operations that far exceed all previous air transportation of personnel and cargo as to both route-miles flown and loads carried.

The function of the ATC may be said to be threefold:

1. Its Ferrying Division delivers all combat aircraft from factories to tactical air-force units wherever needed, both within the United States and overseas, including planes being delivered to our Allies under Lend-Lease. Planes to be ferried are carefully serviced in ATC hangars or by the Air Service Command (the maintenance, service, and supply agency of the Air Force) before taking off. The Ferrying Division includes the Women's Auxiliary Ferrying Squadron (WAFS), which performs domestic ferrying operations.

2. In this country, with the cooperation of commercial air lines under contract to the War Department, the ATC conducts a Transition Transport Training Program, in which Army pilots, graduates of various flying schools maintained by the Flying Training Command, are put through a course in specialized (Transition) training for the operation of various types of transport planes.

3. The ATC establishes and maintains air routes and bases wherever necessary. It is the War Department agency for the transportation by air of cargo, personnel, and mail both within the United States and abroad.

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Air cargo is prepared for ATC transport by the Air Service Command, which repacks manufacturers' and other goods so as to conserve weight and space, marks each object with a color indicating destination—which may be anywhere from Anchorage to Karachi—and holds cargo ready for loading in warehouses on ATC flying fields. The number of such fields scattered all over the globe must remain a secret of war, as must the number of planes operated by the ATC. The fleet is operating over more than 90,000 miles of transport routes, which are being extended as fighting-front requirements expand. Over a number of the world's air routes the ATC has established the first regular, scheduled service.

Among the routes established by the ATC are the North Atlantic route from the northeastern United States to the United Kingdom, the route from the southeastern United States across the South Atlantic to North Africa, another trans-African route to the Middle East, a route from San Francisco to Hawaii and down the chain of Pacific Islands to Australia, and routes to Latin America and Alaska. Military air transport in northwestern Canada has largely been undertaken by ATC.

Because planes originally conceived solely for the carrying of air cargo are not yet in service, the ATC is doing its work in converted passenger planes and converted bombers. Its principal planes (described in the accompanying catalogue) are the C–53, C–47, C–46, C–54, and C–87, with the C–60, C–49, C–48, and converted B–24 (C–87) also in use. Some are operated by Army pilots; others by air-line personnel, who wear the uniform of the ATC but with special insignia denoting rank—the captain of a plane, who wears four bars, being the highest ranking officer in this branch of the service. Numerous personnel of the air lines have been taken over by the ATC and other commands, not only as pilots but for other operations.

To points within the Western Hemisphere alone the ATC is flying more than one million pounds of cargo each week, and if the war continues into 1944, its routes will probably be ten times as long as the combined routes of all the world's pre-war air lines. The ATC does as much of its flying at home as abroad. Over 50 percent of all material destined for air shipment overseas is moved by air from inland United States bases to other points within the country for transshipment. Also, considerable cargo is carried domestically by the Air Transport Command—flown to army bases of all types throughout the country.

For the month of February 1943, losses in the ATC were only four-hundredths of one percent, and they have never risen above one percent. In February, not a single plane was lost as the result of enemy action on the long Pacific route, "although"—to quote Major

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General Harold L. George—"there have been several attempts to interfere."

### The Naval Air Transport Service

Approximately parallel to the operations of the Air Transport Command, although on a smaller scale and without the Ferrying Service, are those of the Naval Air Transport Service (NATS), which is operating several hundred planes, including many flying boats, over 50,000 route miles.

Navy transport planes are being flown either by former air lines pilots or by graduates of Naval Aviation schools trained in transport flying. Like the Army, the Navy has absorbed much ex-air-line personnel, many of whom are performing their same duties in the same places—but for the Navy and in Navy uniform.

Aircraft types used by the Naval Air Transport Service include the Douglas DC–3 in the form of the R4D–1 and the R4D–3, corresponding to the Army C–47 and C–53; the Consolidated Coronado converted for use as a transport and designated PB2Y–3R; the Martin Mariner converted to a transport and known as PBM–3R; the Douglas DC–4 Skymaster, designated as R5D; the Lockheed Lodestar (R50), and others. The most marked difference between the Army and Navy Transport Services is in the Navy's use of flying boats for cargo and personnel transport—including the evacuation of wounded in amphibious warfare. The use of flying boats has been almost entirely relinquished by the Army.

The NATS operates in three main divisions: Atlantic, West Coast, and Pacific. The Atlantic command, with headquarters at Patuxent River, Maryland, consists of squadrons serving the Atlantic coasts and islands of North, Central and South America, from Argentia, Newfoundland, down through various bases in the continental United States to Guantanamo, San Juan, Antigua, Santa Lucia (Trinidad), Natal and Rio de Janeiro, as well as to Portland Bight (Jamaica) and Coco Solo in the Canal Zone. The Atlantic Command also extends across the ocean to Europe and South Africa. From headquarters at Alameda, California, squadrons of the West Coast Command operate schedules for the transcontinental service and also serve western Canada and Alaska, flying specially equipped and winterized planes. Pearl Harbor is the headquarters of the Pacific Command, operating schedules in the Pacific Ocean area, primarily southwest through the Pacific Islands to Australia, with at least daily service to all points.

As contrasted with the Air Transport Command, the vast majority of the operations of the Naval Air Transport Service take place between a point within the continental United States and an overseas destination.

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To coordinate activities between the two services, and to avoid unnecessary duplication of operations, a joint Army-Navy Air Transport Committee meets regularly in Washington. There are three representatives of the Army, three of the Navy, and the chairman of the Civil Aeronautics Board. The ATC and the NATS constantly transport each other's personnel and cargo as space allows.

The Marine Corps does not operate a separate air-transport service, although its squadrons do include a number of transport planes, active particularly in the Pacific. The Coast Guard does not include air-transport operations among its various aviation activities.

## The Future of Air Transport

### 1. THE EXPECTATIONS

In 1938 the total production of the aviation industry—cargo and combat planes together—amounted to a mere $280,000,000. It soared to a $1,800,000,000 in 1941 and in 1942 made another huge jump to $6,400,000,000, second only to the steel industry. During the present year, according to the latest WPB figures, it will be three times as large. It will reach the colossal total of $20,100,000,000, a fourth of our war budget for the year and almost a seventh of our estimated national income. Automobile production, which so profoundly influenced every part of America and all of its institutions, traditional points of view, industrial technology, marketing practices, and general cultural patterns, reached at its all-time peak in 1941 merely $3,700,000,000. President Roosevelt recently stated that on the basis of unit weight, aircraft production for 1944 is expected to be 55 percent larger than the enormous 1943 production. About two and a half million trained workers are now turning out our cargo and combat planes, and almost all of our plants are capable of total conversion to the production of civil aircraft.

As to numbers of American transport planes, no definite figures can be given at the present time because of wartime restrictions. But it may be said that more than one-fourth of all twin-engined and 4-engined aircraft manufactured in 1943 will be transports, and that if all the cargo planes expected to be delivered to the armed services in 1943 could be imagined as assembled in a single area, and all taking off simultaneously for the same overseas destination, each of them carrying fuel for a 2,000-mile flight, they could have on board a total of over 20,000 tons of cargo.

An additional factor bearing upon the future of American air transport is the number of persons who will be air-minded after the war, including probably the majority of over 3,000,000 men who will be in the air forces by the end of this year as trained pilots, navigators, radiomen, airport engineers, traffic controllers, and the like. Also

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to be considered are the numbers of military planes which after the war will, presumably, be available for conversion to transport use if such conversion is not, by that time, considered uneconomical because of bombers' notoriously restricted cargo capacity and expensive maintenance.

These, then, are some of the reasons why the Civil Aeronautics Administration soberly contemplates that before 1950 the United States may well have half a million private, commercial, and military planes in active service. This may seem like a lot, but in planning future airways services CAA considers that it must count on that number. The National Resources Planning Board estimates that "within the next decade or two, air travel in the United States will assume approximately 70% of present-day Pullman rail travel, or about 6 billion revenue passenger-miles," which means the transportation of approximately 20,000,000 passengers a year. The Civil Aeronautics Board expects this figure to be reached by 1946, and that by the same year transoceanic and international air passenger traffic under the American flag will increase 6 times and mail and express traffic at least 8 times over that carried during the year ending April 30, 1942. The Planning Board also estimates that all long-haul first-class mail will go by air, and that there will be regular air freight lines, with feeder air lines to smaller cities and pick-up service in the villages.

Post-war flights (by shortest routes) between Washington, D. C., and other cities of the world will be possible on the following schedules:

Less than 7 hours to Mexico City.
Less than 8 hours to Panama City.
8 or 9 hours to Seattle.
10 or 11 hours to Paris or London.
16 hours to Moscow, Rio de Janeiro, or Istanbul.
18 hours to Cairo or Buenos Aires.
22 hours to Tokio.
24 hours to Shanghai or New Delhi.
26 hours to Chungking or Cape of Good Hope.

The following are some of the expectations concerning air transport:

*Planes.*—By 1945 it is expected that transport planes in the 100,000- to 120,000-lb. class will be flying in quantity. On trips the length of New York to Chicago, such airplanes would carry 15 tons at 250 miles an hour. This is a capacity of 3,750 ton miles—about ten times as much as the DC–3. Among planes at present flying, the Curtiss C–46 is credited with having done much to convince aeronautical engineers of the higher efficiency of larger planes, which can carry a higher percentage of load for the same proportion of horsepower. A powerful trend for commercial transport, therefore, will be toward these larger planes. It is expected that both two-engine and four-or-more-engine types will continue to be built—the former for economy, for use on shorter hops, as the present C–46; the latter, like the C–54,

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with what is at present, at least, considered to be their greater safety factor, for longer and transoceanic work. (The ATC, however, now uses the C–46 for transoceanic flights.) A multi-engine plane has a greater "one-engine-out" horsepower; if one of four engines goes out, one-quarter, not one-half of the total horsepower is lost. Because the material is critical and because of various developments that are still in the experimental stage, it is not expected that any important production of cargo planes using magnesium can take place for at least two, and possibly three years. Such construction is, however, potentially sound and in long-range consideration may be important.

As to the place of flying boats in the future of air transport, varying opinions exist even within the Navy itself, where most of those already built are in service. Due to their present slow speed and difficulty in handling, there is wide objection to their use, particularly since swifter land planes are now commonly flown over water, and airports to receive them exist almost everywhere. But improved handling devices, already designed, would aid greatly in moving flying boats more expeditiously from water to land for docking purposes, and speed increase would be facilitated by the construction of sheltered, canal-like water runways, which would enable flying boats to rid themselves of some of the heavy equipment now carried for landings in comparatively rough water. At certain locations, it may well be impossible to build land runways of the great length required by some of the incoming models of land planes; in such cases flying boats landing on water runways might offer a solution. Furthermore, in time of war, water surfaces are not vulnerable to bomb damage.

As already mentioned, the cut-up interior of present-day flying boats makes them unsuitable for the transport of bulky cargo; new designs are called for.

Although in smaller models the construction of flying boats' landing gear makes them heavier than land planes of the same size class, the opposite is the case on larger models. Landing-gear weight does not increase proportionately with the size of a flying boat, and large flying boats have greater cargo capacity than land planes of the same empty weight.

*Gliders.*—If the maximum load that a cargo plane can fly with is limited by the plane's structural strength or cubic capacity, added carrying capacity can very well be supplied by the use of a glider in tow. Although gliders are advantageous in special cases and particularly in military use, their use is less important over long ranges in cargo carrying on large scale. They are useful when an airplane wishes to drop a load without landing, and they can be picked up by planes in flight. In wartime they are good for one-way trips—landing in rough places and staying there. Although glider enthusiasts expect

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wide post-war use of this craft for freight- and passenger-carrying purposes, the entire aviation industry is by no means in agreement. Two companies have already fixed applications with the CAB for cargo-carrying air service which will utilize glider towing by aircraft.

*Pick-up.*—The nonstop pick-up system, for the collection and delivery by air of mail and light express in small cities and communities without adequate airport facilities, is in use at the present time, under government contract, on five routes totaling about 1,400 miles a day, in New York, Pennsylvania, Delaware, Kentucky, Ohio and West Virginia. The operating center is Pittsburgh. The pick-up system is operated by releasing packages and picking them up by means of a lowered cable operated on a reel inside the airplane.

There are now 25 applications for the establishment of similar services before the Civil Aeronautics Board, covering all parts of the country, with considerable added expansion expected.

*Helicopters.*—Three applications for Helicopter service have already been filed with the Civil Aeronautics Board; one, from an air-line company, requested "Helicopter service to carry air mail and express to and from the roof tops of over 400 post offices and railroad stations in the six New England states and New York." Helicopters—or some form of rotating wing aircraft—are generally considered one of the coming types of craft for the post-war private use market.

*Lighter-than-air craft.*—There is no production in this country at the present time of lighter-than-air craft of large-load-carrying rigid design such as the Zeppelins, the Akron, or the Macon. The possibilities of stimulating their production involve extensive problems, at least under present conditions. According to their record, their ton-mile capacity per pound of critical material used is not impressive, although their long-range ability must still be considered of interest in special cases.

### 2. LIMITING FACTORS

Other statements concerning the future possibilities of air transport, more far reaching than the official expectations and less firmly based on actual conditions, are frequently made in newspapers and magazines. "The United States should immediately undertake to provide an air fleet designed to carry the bulk of the nation's and the world's cargoes." "The airplane will be completely accepted as the only suitable means of intercontinental travel. It will drive other forms of transportation out of business."

Such is a frequent type of statement by aviation enthusiasts, and it is best answered, perhaps, in the words of C. I. Stanton, Civil Aeronautics Administrator: "It is perfectly obvious that in the not too distant future high-value cargo of all kinds will be commonly transported by air both domestically and overseas; planes will carry

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passengers, mail, express, and freight in ever-growing quantities. But why stretch the facts? Why claim that air transportation will be the *only* form of transportation? Far from bringing about a decrease in surface traffic, expanded air traffic will increase it, for the fuel to keep the planes in the air will have to be hauled by surface craft."

More is required for a successful air transport system than merely the planes and pilots which America will have available in such great quantities after the war.

Availability and expense of fuel are limiting factors in air transport today, and will continue to be so as long as airplanes fly on gasoline. Original investment costs are also still relatively high. Present planes and planes being developed along the lines of present types are not ideally adapted to carry heavy freight long distances. Flights technically possible are often, as a matter of actual performance, still out of the question because of want of navigation facilities along the way or lack of adequate airports and repair shops, as well as refueling facilities.

On an air map, for example, the route from Chicago to Calcutta might ideally be across the Arctic Ocean and the North Pole. Such a route would be much shorter than the old shipping route via the Atlantic, the Mediterranean, and the Indian Ocean. But the absence of navigation aides and refueling facilities along the way forms a serious deterrent. From time to time, round-the-world commercial air routes will probably bear some relation to populated areas. Certainly if a world-wide air transport system is to develop, gasoline tanks will have to be more thickly scattered around the world than at present.

Gasoline is heavy. On long-range flights, the weight of a plane's fuel may well surpass the weight of its engines. And if a plane flies to an area which is without oil resources, fuel for its return flight has to be got there somehow.

"A Clipper can carry 8½ tons of freight from New York to England if it refuels in Newfoundland," Mr. Stanton says, "whereas a 10,000-ton surface freighter can carry from six to eight thousand tons of cargo, together with fuel and stores for the round trip. Therefore a good many hundred Clipper trips would be needed to carry the tonnage which one 10,000-ton water-borne freighter can handle on one voyage. Furthermore, 8,500 tons of gasoline would have to be got to England to fuel these hundreds of Clipper trips back to Newfoundland, and 10,500 tons would have to be got to Newfoundland to fuel them between Newfoundland and England and Newfoundland and New York. Thus more than two surface freighter loads of gasoline must be carried to Newfoundland and England to permit the air delivery of a cargo which one freighter could carry across. This more than

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doubles the surface vessel cargo tonnage requirements. The more planes that fly, the more ships will have to sail."

Furthermore, plane rates per mile are still considerably higher than those offered by truck, railroad, and steamship. "For various perishable products," Mr. Stanton says, "and for many products of a high per-unit value such as films, radios, precious metals, and women's clothes, speed of delivery may well pay for itself. But for heavy products, including raw materials, speed is less important than steady, voluminous flow. Even if air cargo costs could be cut from the present average of 40 cents a mile to 10 cents, they would still be enormously higher than those of the railroads and steamships, which express their costs per ton-mile in mills, not cents. It is only logical to expect that the plane will greatly supplement—but that it will not supplant—other means of transport."

The time and expense required in the development of each new model must also be taken into account in any consideration of present-day aircraft. The remark so often heard in aviation circles—"by the time an airplane is perfected, it's obsolete"—testifies to the rate of change in everything pertaining to flying today.

## The CAB and the CAA

Federal responsibility for civilian flying is divided between the Civil Aeronautics Board and the Civil Aeronautics Administration, which together form the Civil Aeronautics Authority.

The Civil Aeronautics Board (CAB) is an independent quasi-judicial body of five members appointed by the President for six-year terms, serving under a Chairman and Vice Chairman. The Board is the Federal agency charged with the economic and safety regulation of all United States civil aviation; it lays down all major policies concerning the development of civilian flying; and it grants certificates of public convenience and necessity to the air lines, which authorize them to operate over certain routes. The Board establishes the rate of pay for mail carried by the air lines, exercises control over passenger fares, promulgates the Civil Air Regulations and sets operational standards for American civil airplanes and pilots. Its Safety Bureau investigates all civil aircraft accidents for the purpose of ascertaining the probable causes and preventing their recurrence by appropriate action and regulation.

The Civil Aeronautics Administration (CAA), on the other hand, is not a policy-making, but an operating agency, with four main divisions: Federal Airways, Airports, Safety Regulation (enforcing CAB standards), and the War Training Service. It tests, and issues certificates to all civil airmen—not only pilots, but mechanics, radio operators, traffic controllers, meteorologists and other aviation

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specialists. It checks the designs of all planes before they are put into commercial use, makes flight tests of representative models, patrols the airways and acts as a consultant in the development of an adequate nation-wide system of airports. In general, the CAA is authorized "to encourage and foster the development of civil aeronautics and commerce in the United States and abroad."

Neither the CAA nor the CAB has authority over military planes or over military fliers except when they are using the Federal Airways or other CAA air facilities.

### Airways and Navigation Facilities

By now there are probably comparatively few people who believe that air-line pilots flying passengers and cargo on schedule simply climb into their planes, take off as they wish to, follow any route they choose, and land at their destination by simply coming down when they get there. Actually, of course, before taking off, the air-line transport pilot checks weather data and files a flight plan in which proposed route, altitude, and speed are specified and which is cleared by the proper airways traffic controls. In peacetime such procedure was not necessary for the nonscheduled commercial operator or the private flyer, so long as kept off the Federal airways. But these operations are now under severe restrictions dictated by reasons of military security.

Today, practically every flight by a transport plane is as controlled as the run of a railroad train. Rights-of-way—the airways—are marked by radio beams and visual aids; "Keep to the right" is the rule of the airway as of the road; there is two-way radio communication with airports and control centers along the airways; at any time the pilot can "ask for the weather" from any radio station along the airway. (Today weather information is supplied in code, for reasons of military secrecy.) Radio range markers, operating by remote control and serving the airports as well as the airways, are constantly sending out the directional beams by which the pilot keeps himself on his course. A pilot may never see the ground from the time of his take-off at point of departure until he lets down through the clouds or fog over the airport at which he is to make his next landing; and yet, aided by the navigation facilities of the airways, he knows at all times exactly where he is.

A civil airway is the navigable air above a strip of the earth's surface between designated points—a strip set by CAA regulation at a width of 20 miles but during the present emergency cut to ten. The reason for this is the presence of Army, Navy, and other training fields located on or near airways. Hundreds of their short flights were constantly impinging upon small portions of the 20-mile-wide

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strips, and it was felt that to file and clear individual flight plans for each of these flights would place an excessive burden on each training operation. Instead, the airways were narrowed. The Services have agreed to keep all training planes outside of the airways, except when necessary for landing and take-off purposes and for cross-country flights, when the pilots will observe regular CAA procedures. This narrowing of the airways also provides more space for the establishment of military danger areas, such as gunnery ranges, without encroachment on the airways.

At present, all navigable air above 17,000 feet altitude is reserved for military traffic, and there are certain air space reservations, established by Presidential proclamation, that must be detoured—as for example over defense plants and Navy yards. The CAA designates airways by naming definite points, such as radio range stations, and extending the center line of the airway through the center of the points specified. Airways are direct routes (as the crow flies) except for bends to take in centers of population. All large population centers are located on one or more of the civil airways. For this reason, the airways often follow the routes of railroads and highways, though in the case of the Alcan Highway across Canada to Alaska, it is the highway that follows the previously established airway. One of the future developments visualized by CAA is the bypassing of metropolitan centers, so that through air traffic will be able to avoid congestion over airports.

The civil airways of the United States now total over 35,000 miles, an increase of more than 700% since 1927 and almost 100% since 1932. A number of new airways have been established since the war primarily to meet Army and Navy requirements, both within the United States and leading to and from many of our insular possessions and bases.

Along the Federal Airways system within the continental United States the CAA is today operating 311 lighted intermediate (emergency landing) fields, 142 flashing beacons, and 2,098 rotating beacons. At the request of the armed forces, instrument landing systems—for use in fog and other bad weather—are being installed in more than 100 fields throughout the country. The first fully developed instrument landing system was put into operation in 1940 at Indianapolis, where it was developed at the CAA Experimental Station.

For the benefit of all airmen, the CAA maintains and operates 408 intermediate-frequency radio range and marker stations, 197 ultra-high frequency radio fan markers, and 72 ultra-high frequency radio range stations (which are expected to be increased to 143 during 1943). Also in the airways system are 446 weather-reporting stations, joined by a 54,000-mile teletype circuit for quick reporting of

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meteorological conditions from coast to coast. Traffic from point to point along the airways is directed from 23 control centers, located at major airports strategically chosen so as to cover the entire U. S. The control centers use a 10,400-mile teletype circuit and a 35,745-mile interphone circuit to check and clear movements of swiftly traveling aircraft along the airways. Lastly, at 74 designated fields, which include all principal air terminals in the country, the CAA operates airport control towers. This number is being increased, at the request of the military, to 120 or more this year. American aviation has come a long way from the first night transcontinental mail flight in 1921, made without benefit of airway aids, the pilots being guided along part of the route by bonfires set by obliging farmers.

In 1942 there were 6 million controlled—"flight plan"—aircraft movements along the airways, and for 1943 the estimate is 13 to 14 million, 95% of them military or semi-military. This is a contrast from 1938, when approximately 300,000 movements of aircraft were handled by the CAA traffic control centers. (By 1950, CAA expects 60,000,000 aircraft movements over the airways.) With so many planes in the air, it is obvious that definite, pre-determined flight paths and procedures are vital to safety and efficiency.

Planes flying the airways report their location at official reporting points—over radio stations along the airways and over each point marking the intersection of two or more airways. These reporting points are never more than 100 miles apart. Flight progress boards are maintained at the control centers, showing the location of all planes flying on schedule in the area. According to Civil Air Regulations, eastbound and northbound planes maintain odd thousand-foot levels in the air, and westbound and southbound planes even thousand-foot levels.

A plane arriving over an airport at which it wishes to land, follows instructions sent out by radio from the airport control tower which tell the pilot when he may begin to decrease his altitude. Sometimes his plane—along with others arriving over the airport at the same time—is obliged to keep circling in the air in a "stack" at designated altitudes, for extended periods, until gradually the lower altitudes and finally the landing area become free of traffic and he is allowed to come in.

The most striking example of development of American air transportation due to the war is the Alaskan system, which since 1941 has been vastly improved and extended until today Alaska has as fine a system of airways and airports as any section of the United States. The Civil Aeronautics Board in December of 1942 granted operating certificates to 21 Alaskan air carriers, formally authorizing the existing pattern of air service and for the first time bringing these operations

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within the economic provisions of the Civil Aeronautics Act. The Board authorized charter trips by any of the 21 certificated carriers to any point in Alaska, thus providing air service which reaches into every section of Alaska. The Canadian system of airways across the border is closely integrated and coordinated with the United States and the Alaskan system, so that the three virtually constitute a single continental system north of the Rio Grande, the only one of its kind and the largest and most efficient in the world. It is the only airways system in the world set up to handle properly mass traffic with maximum safety, and it presents a contrast to the pre-war European airways systems, where types of control were not uniform but varied from country to country.

Flights ranging beyond the American-Canadian-Alaskan network of airways must of course be accomplished with considerably less accurate guidance, although present-day aids in transoceanic flying—including the use of improved compasses and direction finders in the airplane, capable of picking up radio signals over long distances—are extensive indeed as compared with facilities existing even as recently as the outbreak of the war. Even today, however, transoceanic flyers frequently resort to celestial navigation for their guidance, a combination of two or more means of navigation being desirable from the standpoint of safety.

The Federal Airways Service is now operating six intercontinental superradio stations capable of communicating with aircraft at any point on the globe. These stations are at New York, New Orleans, San Francisco, Seattle, Honolulu, and Anchorage and have been of inestimable value to the armed forces, placing the United States several years ahead of any other country in the world in the development of intercontinental airways. They are used solely for the war effort, to provide weather and navigation information. In their combined range, they blanket the world, providing communication between this country and a plane in flight anywhere on the globe. They are operated by CAA, with the Army providing security in the coding and decoding of messages. CAA radio engineers are now cooperating with the armed forces in establishing a vast network of airway communications systems in the North Atlantic area, in South America, Africa, Europe, Asia, and Australia. Due to the rapid development of facilities everywhere, the world routes flown by our aircraft are at present in a constant state of change.

The immediate post-war problem of the airways, as seen by CAA, will be to rebuild the entire domestic airways system by substituting ultra-high frequency for the old standard intermediate frequencies ranging between 200 and 400 kc. Ultra-high frequency will eliminate static and provide a visual as well as an aural course, if not omni-directional courses. Among the innovations will be: two voice chan-

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nels on every radio range station, the employment of ultra-high frequency for traffic control, ultra-high frequency localizers for all important airports, with glide path, and ultra-high frequency markers to permit the pilot to land under instrument conditions.

New electronic control devices, including radar, will also play a large part in post-war aviation.

### Airports

Exclusive of certain military airdromes, there will be about 865 major airports in the United States by the end of 1943, all of them with paved runways of 3,500 feet or more, capable of handling the largest craft. Less than 100 such fields existed in 1940. In addition to these, there are well over 2,000 lesser fields.

With few exceptions, all major civilian airports belong to municipalities and other political subdivisions, which operate the fields as public facilities except insofar as their use is restricted at the present time by Army and Navy requirements, which are provided for by contract.

Most airports are constructed with the aid of Federal funds, under specifications drawn up by the CAA. For the fiscal years 1941–43 Congress has appropriated $399,333,050 for the National Defense Airport Development Program. Such development is limited to sites within the United States and its possessions, designated by the Army and the Navy as essential to national defense and the successful prosecution of the war.

Within the past few years, numerous new airports for the use of military transport and combat planes have, of course, been constructed with American and Allied funds throughout the United Nations. After the war many of these fields will be available for civilian air transport use.

### Pilots

The CAA's Civilian Pilot Training Program, inaugurated late in 1938, which through instruction in universities and at flying fields enabled young Americans to secure civilian pilot licenses of various grades, is now known as the CAA War Training Service and forms a prelude to regular Army and Navy combat flight training. It has absorbed many civilian pilots as instructors. Many of the pilots flying both air-line and military transport planes today are graduates of the Civilian Pilot Training Program.

There are four main categories of civilian pilot certificates: student, private, commercial, and air-line transport. A commercial pilot, who is licensed to carry freight and passengers on a chartered but only on a nonscheduled basis, must be 18, a citizen, literate, must measure up

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to certain minimum physical requirements, must pass a written examination on the theory and practice of flight and maintenance of craft and engine, and must have logged at least 200 hours of solo flight. An *air-line* transport pilot must be at least 23, a citizen and a high school graduate or its equivalent, as judged by the CAA, in general experience and aeronautical experience, knowledge, and skill. He must pass a written examination in all phases of the practice and theory of flight, navigation, meteorology, and operation of the Federal Airways. He must have a commercial pilot's rating and have logged at least 1,200 hours of solo flight within the past eight years—at least 500 of them on cross-country flights. He must pass a flight test on take-offs, turns, landings, and certain routine maneuvers, as well as in tuning and use of radio for communication with the ground and following the directional beams of radio range stations.

As contrasted with less than 25,000 in 1938, there were 100,787 licensed pilots in the country at the end of 1941, the last date for which figures are available. Of these, 15,142 possessed commercial certificates and 1,587 air-line transport certificates.

Today, the number of pilots in the United States is a military secret. The Army and Navy have both absorbed many of the commercial and air-line transport pilots and, in addition, train their own pilots for transport and other flying without awarding certificates. After the war, the number of hours put in by these military pilots on transport craft in the Army and Navy will be accepted by CAA as qualification for obtaining either commercial or air-line transport certificate. In all branches of the services, there is a serious deficiency of men with experience as measured by hours of flying time.

Civil air regulations permit air-lines pilots to fly a maximum of 100 hours a month, 1,200 hours a year, for the duration of the war—an increase of 200 hours a year over the pre-war limitation. The Air Lines Pilots' Association is an affiliate of the American Federation of Labor, as are the Flight Radio Officers' Association and the Air Line Flight Engineers' Association.

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## A CATALOGUE OF AMERICAN TRANSPORT AIRCRAFT

This list of the chief models of transport aircraft now in service has been compiled for the purpose of showing to what extent America is making use of her available planes for the purposes of wartime air transport.

In the following descriptions, it should be borne in mind that due to constant changes being made in the aircraft structure for various transport uses, as for example the addition of winterizing equipment and life rafts, all figures concerning weight can be only approximate. Average cruising speeds, computed on around 60 percent or less of horsepower of the engine, can also be only approximate; they depend on altitude, range to be covered, grade of fuel used, weather conditions to be met, and the like.

The engines of all the planes in the list are radial air cooled, due to the preponderance of this development in the United States.

The letter C, in Army designations, signifies cargo. In Navy designations, J signifies General Utility Transport; R, multi-engine; PB, patrol bomber.

The weight of one gallon of gasoline is approximately 6 pounds.

Certain details of performance on some planes have of necessity been omitted because they come within the realm of secret military information.

Except where otherwise specified, all planes in the list are built of aluminum alloy in the standard American production type of construction.

### The Chief Air-Lines Planes

Douglas DC–3—"The workhorse of the air lines." No models delivered commercially after January 1943; now being turned out in large quantities in military models only, with variations as follows:

Army C–47, "Skytrain," with large door for loading of cargo, metal floor, and reinforced landing gear.

Army C–53, "Skytrooper," with wood floor, benches for troops, and tow cleat on tail for glider towing.

Navy designations of the same plane are R4D–1, 3, 4, and 5, according to details in structure.

General specifications:

Two 1,200-hp. engines.

Standard gross weight for commercial operations 25,200 lbs., but the C–47 is frequently flown at 29,000 lbs. Empty, 17,000 to 18,000 lbs. according to equipment.

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Normal fuel capacity, 822 gals.

Average cruising speed, 170–180 miles.

Average cargo load, 4,500 to 5,000 lbs. on 1,000-mile flight.

This plane has a normal limiting range, without refueling, of not over 1,500 miles. It is seldom used for round-trip transoceanic work, and is flown across the ocean chiefly when being delivered abroad or on island routes with minimum nonstop distances. However, the normal fuel capacity can be almost doubled by the installation of additional tanks in the fuselage for overwater long-range flights. Thus heavily loaded chiefly with fuel, the plane can have a range of 3,000 miles, and has frequently flown from Hamilton Field, California, to Hickam Field, Honolulu—in some instances at an initial gross weight of 31,000 lbs.

First used as a passenger plane on the air lines in 1936, to carry from 21 to 24 passengers and a crew of three, this plane rapidly became the most popular American transport in the air. Passenger comfort, good-sized cargo and mail space, price, size, speed, and finally reliability, due to extensive development and use have all been factors in its widespread popularity. This plane formed the bulk of the planes taken over from the air lines, and 203 are still operating commercially. The DC–3 has flown more air line passenger-miles than any other model in the United States. Some in existence have accumulated up to 22,000 flying hours and many are at present being used 12 hours (not, of course, continuous) out of the 24.

For military personnel and cargo transport it is being used in greater numbers than any other model. It was used in the evacuation of Burma and Hongkong, carrying as many as 74 light passengers at a time. (Troop-carrying capacity of the C–53 is normally 28, plus crew of 4.) It flew American and British paratroops the 1,500 miles from England to North Africa. Generalissmo Chiang Kai-shek is supposed to have said, "Give me a hundred DC–3's and the Japanese can have the Burma Road." The C–47 will hold two jeeps, or three airplane engines in boxes.

Now this plane is being used for comparatively short-range operations—for carrying paratroops and air-borne infantry, for glider towing, command use, and shorter and front-line cargo deliveries. For more extensive operations it is rapidly being replaced by the longer-range and larger C–46, which at 1,500-mile range will carry almost twice as much cargo.

Boeing 314 Flying Boat—"Clipper." Several of these planes are being operated on schedule by a commercial air line on routes between the United States, Hawaii, the British Isles, and Africa. It was in a Boeing 314 that President Roosevelt made the over-water hops of his trip to Africa.

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General specifications:

Four 1,600 hp. engines of the Wright R–2600 model.

Standard gross weight, 84,000 lbs., in commercial operations, but has been used up to 88,000 lbs., with heavy cargo. Normal commercial "useful load" of 38,000 lbs., i. e., cargo (including passengers), fuel, and crew.

Average cruising speed, 143 statute miles.

Normal fuel capacity, 5,448 gals.

In service since 1939, the Boeing 314 is still the largest airplane in general use, and carries the largest passenger loads the longest distances. Licensed to carry 74 passengers and 15 crew, the Clipper did so on short hops only (as from New York to Bermuda); on transoceanic trips it averaged half as many, plus cargo and mail. Passenger capacity is of course determined by range; the plane has flown up to 58 passengers across the ocean. It is capable of flying nonstop from New York to Foynes, Ireland, and has done so on occasion. But such flights are uneconomical for any plane; the large quantities of fuel required greatly reduce the passenger, mail, and cargo load. Refueling stops are therefore made at intermediate points.

Of the nine compartments in this plane, two are still equipped with six berths apiece, but seven have been stripped of a total of about a ton of sound proofing and passenger seats and berths to make room for light cargo and mail. As with all flying boats, the size of the Boeing 314's doors and openings does not permit the loading of cargo as bulky as jeeps or airplane engines.

Lockheed 18—"Lodestar." Army designations C–56A, B, C, D; C–59; C–60, and C–60A; C–66. Navy R50–1, 2, 3, 4.

Another popular air lines plane, smaller and faster than the DC–3. Together with the well-known Hudson and Ventura bombers, it stems from an earlier Lockheed 14, previously used by the air lines and in extensive private flying, but now superseded by the Lodestar. First used in 1940, thirteen are still in commercial operation.

General specifications:

Two 1,200-hp. engines.

Standard gross weight, 18,500 lbs. but being used up to 21,500. Empty weight, 12,075 lbs.

Average cruising speed, 180 miles.

Normal fuel capacity, 644 gals.

Built to carry 14 passengers and 3 crew, the "Lodestar" is used by the armed services for personnel transport and small cargo-carrying jobs, but is being replaced by larger planes. It is used transoceanically only on the short-hop, island stepping-stone routes.

Boeing 307—"Stratoliner," C–75. The first airplane to introduce a pressurized cabin in actual use in air transportation. Pressurizing comes into use at altitudes of 8,000 feet. The ratio of the air in the

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pressurized cabin to the outside air increases proportionately with altitude. In flights up to 15,000 feet, air pressure equal to that at 8,000-foot altitude is maintained in the cabin; up to 20,000 feet, equal to 10,000-foot altitude; above 20,000, a pressure differential of 2.5 pounds per square inch.

General specifications:

Four 1,100-hp. engines.

Standard gross weight, 45,000 lbs. Empty, 29,000. Cargo capacity about 8,000 lbs. on 1,000-mile flight.

Normal fuel capacity, 1,700 gals.

Average cruising speed, 185 miles.

First used in 1940, with a capacity of 33 passengers and 5 crew, this plane was formerly used considerably in establishing ATC services over routes to Africa and India. Three are being operated commercially by an air line in the Caribbean area and others are being flown under Army contract air-line services. The plane is no longer being built, and in the ATC is being replaced by the C–54A, more efficient as a cargo plane.

Vought-Sikorsky VS–44A—"Flying Ace." A flying boat with longer range than the Boeing 314 and with faster cruising speed on short range.

General specifications:

Four 1,300-hp. engines.

Standard gross weight, 59,225 lbs.

Normal fuel capacity, 3,820 gals.

Average cruising speed, 142 statute miles on long-distance flights.

This plane first came into service in 1942 to carry 28 passengers and 11 crew overseas or 44 passengers and 8 crew on short flights. Like the Clippers, and for the same reason, the Flying Aces are preferably refueled at an intermediate point when flying between the United States and the British Isles.

### Older Model Airlines Planes

Sikorsky Flying Boats—"Clippers." S–42B, 4-engine; and S–43 (Amphibian; Navy JRS–1), 2-engine. Both these planes, as well as the Consolidated "Catalina" flying boat mentioned below, are being flown by an airline under contract to the Rubber Development Corporation, a subsidiary of the RFC operating under directive of the Office of the Rubber Director, to take personnel and critical materials to the Amazon Valley and to bring out personnel, rubber, and other materials. The S–43 is also being flown in Hawaii.

Martin 130 Flying Boat—"China Clipper" type. Three of these planes were built in 1935 and pioneered in scheduled trans-Pacific operations. One is still flying between Honolulu and San Francisco.

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4-engine. Standard gross weight, 52,000 lbs. 4,077 gals. normal fuel capacity. Average cruising speed, 130 statute miles.

Boeing 247 series. Begun in 1933, all older models of this plane were converted to the type of the 247–D, begun in 1934. This was the first of the modern, low-wing, all-metal transport airplanes. Designated by the Army as C–73, it is used in the ATC's Transition Transport Training Program. 2 engines. Standard gross weight, 14,000 lbs. 273 gals. normal fuel capacity. Average cruising speed, 165 miles.

Lockheed 10 series. Several versions of this plane, beginning in 1934, led up to the Lockheed 10–E, built in 1935, with space for 10 passengers and 2 crew. Army C–36, but not in extensive use. 2 engines. 10,500 lbs. standard gross weight. 250 gals. normal fuel capacity. Average cruising speed, 150 miles.

Douglas DC–2. The forerunner of the DC–3, first built in 1934 and now used here and there by the ATC, under designations C–32A, C–33, and C–34 for training purposes. 19,000 lbs. standard gross weight. 510 gals. normal fuel capacity.

### Bombers

Some bomber planes are being used for transport purposes without being altered in any way. Bombers which are being ferried abroad for foreign service, for example, carry personnel and sometimes strategic cargo with them on the trip; and then, after arrival, go into combat service.

Several types of bomber, however, are being used regularly in transport service, either in models which have been converted individually for transport work by being stripped of some of their armor or in models manufactured in converted design specifically for transport purposes. Converted bombers usually carry auxiliary gas tanks in their bomb bays.

Chief among the bombers being manufactured in converted design are—

Consolidated C–87—"Liberator Express." The transport version of the B–24 "Liberator Bomber," being manufactured as a transport plane on a separate production line. Navy PB4Y–1.

General specifications:

Four 1,200-hp. Pratt and Whitney R–1830 engines.

Standard gross weight, 29 tons.

Average cruising speed as transport, 191 miles.

Normal fuel capacity, 2,650 gals.

Average cargo capacity, 10,000 lbs. on 1,000-mile flights; 6,000 lbs. on longest transoceanic ranges.

With its high wing, its enlarged sidedoor, and tricycle landing gear, the C–87 is an easy ship to load, but like all bombers its volume of

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cubic capacity for freight is small. It will hold 20 passengers and 5 crew; no jeeps. With added gas tanks the plane has a 3,000-mile range and is in constant transoceanic use, including company ferry operations in the Pacific. At present more C–87's are being used by the ATC than any other four-engine plane, but it is being superseded by the C–54A, which has better cargo facilities and more efficient performance.

It was in a C–87 that Wendell Willkie made his round-the-world flight. It is a fast plane and holds several records.

Consolidated "Coronado" Flying Boat. A big patrol bomber, now being converted in quantity on Consolidated's production line for Navy transport duties. Navy designation as bomber PB2Y–3; as transport, PB2Y–3R. Along with the PBM–3R (below), it will be the Navy's principal transport plane. Its equipment includes a large cargo door, cargo flooring, and cargo handling facilities. Four 1,200-hp. Pratt and Whitney R–1830 engines. Standard gross weight, 66,000 lbs., with cargo capacity of 20,000 lbs. on a 1,000-mile flight. Average cruising speed, 170 miles.

Martin "Mariner" Flying Boat. Another Navy patrol bomber, being converted for transport use under designation PBM–3R. Two 1,700-hp. Wright R–2600 engines, 24 tons gross weight. Average cruising speed, 150 miles; 3,000-mile range.

One plane of this model has been loaned by the Navy to the Defense Plant Corporation, which has used it during the past year for the transport of vital cargo between Miami and Cuba.

Consolidated "Catalina" Flying Boat. Another, smaller, Navy patrol bomber and glider tower, PBY–5; in amphibian model, PBY–5A. A number of both models have been modified for cargo-carrying duties. Like the Sikorsky Flying Boats, the "Catalina" is being used for the Rubber Development Corporation in the Amazon Valley. Two 1,200-hp. engines. Empty weight, 17,500 lbs; cargo capacity up to 15,000 lbs.; 3,000-mile range in military operations.

### Two Newer Airplanes, Designed for Commercial Passenger Operation, but Diverted to Military use Before Ever Being Used Commercially

Douglas DC–4—"Skymaster." Army designation C–54 as passenger transport; C–54A as cargo carrier. Navy, R5D.

Introduced in 1942, this big ship, more than twice the size of the DC–3, was designed to carry 42 passengers in commercial operations up to 1,000 miles, and now constantly carries 26 overseas. It will carry 54 hospital litters, or a light tank, or a heavy truck and has an interior hoist for loading purposes.

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General specifications:

Four 1,350-hp. engines.

Standard gross weight 65,000 lbs. (12,500 pay load) as C–54; 66,000 lbs. (14,000 lbs. cargo capacity) as C–54A.

Average cruising speed up to 200 miles.

Fuel capacity, 3,700 gals. with four fuselage tanks.

The DC–4 is considered to be the most efficient plane for over 1,500-mile and transoceanic operations. It is supplanting the C–87 as a long-range cargo and passenger carrier.

Curtiss-Wright—"Commando." Army C–46. Originally designed as Model CW–20 to carry 30 passengers and 4 crew, and first operated in 1941 on British government airways, the C–46 is now considered the most efficient two-engine cargo carrier for hops under 1,500 miles. It carries 40 paratroops, or several jeeps, or two light tanks of 4,000 lbs. each. It can carry a loading ramp and hoisting gear and is fitted with a glider-towing cleat.

General specifications:

Two 2,000-hp. Pratt and Whitney R–2800 engines.

Standard gross weight, 48,000 lbs.; up to 50,000 lbs. for emergencies. Empty weight, 27,598 lbs. Pay load, 10,000 lbs. on 1,000-mile flight.

Normal fuel capacity, 1,000 gals.

The C–46, the largest of the two-engine land transports, is rapidly replacing the DC–3 as a cargo carrier.

## Planes at Present Under Development

### A. Three planes already being flight tested

Curtiss-Wright—"Caravan." C–76. The first plane to be designed primarily as a short-route cargo carrier. Constructed entirely of plywood, of which it employs 50,000 sq. ft., the C–76 is being built in large part under subcontract with a Virginia plastics firm, a piano company in Ohio, and a Kentucky plant which has been manufacturing tobacco hogsheads, Army bunks, and bodies for trucks and station wagons. This plane has tricycle landing gear, and the floor of the cargo hold is only 36 inches off the ground. It loads both at the nose and at the side, has an interior track hoist, and is fitted to tow gliders. Speed is sacrificed for loading ease, for slow landing, and for short field operations.

General specifications:

Two engines. Standard gross weight, 35,000 lbs. Empty, 20,000 lbs. Maximum fuel capacity, 600 gals. Average cruising speed, 160 miles.

Lockheed "Constellation." C–69. This plane has been designed to fill the need for a long-range passenger transport plane with a pres-

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surized cabin, to fly in the substratosphere at altitudes above 20,000 feet.

General specifications:

Four 2,200-hp. Wright R–3350 engines.

Standard gross weight, 73,500 lbs.

Fuel capacity, 4,800 gals.

Average cruising speed 255 miles at sea level, increasing to 300 at 19,000 ft.

The "Constellation," with its heavy weight empty, is not intended for cargo carrying, but is the newest development for post-war commercial passenger use, at present being tested as a troop carrier. Increased speed and economy result from flying "above the weather"; and at full power, at altitudes up to 30,000 and 35,000 ft., the "Constellation" is designed to carry 55 passengers at a higher speed than is reached by a Jap Zero pursuit ship. It is designed to be able to operate at 25,000 feet with three of its engines, if necessary, and at 16,500 feet with only two. Cabin pressure is kept as at 8,000 ft.

The "Constellation" is the largest American land transport yet built, with a wing spread of 123 feet and length of 95. (DC–3 wing spread 95 feet, length 64½ feet.) The wing of the "Constellation" was developed as a result of tests on the wing of the Lockheed "Lightning" military pursuit ship—the distinctive plane with twin tail booms.

Martin "Mars" Flying Boat.—Navy JRM–1. Probably the largest aircraft in existence, the "Mars" was originally built as a Navy patrol bomber, but has been converted for cargo use, with a loading track and large hatches. It has four Wright 18-cylinder engines of over 2,000-hp. each, 3-blade propellers, 140,000 lbs. gross weight. Fuel capacity is "about a tank-car load"; wing span, 200 feet; length, 117 feet 3 inches.

### B. THREE PLANES NOT YET AT THE FLIGHT-TEST STATE

Waco C–62. All wood. Two engines. 33,500 lbs. gross weight.

Fairchild C–82. A part-metal, 50,000-lb. cargo plane with a rear door that can be lowered as a ramp and with an interior hoist.

Kaiser-Hughes HK–1 Flying Boat. A giant, all-plywood ship, 400,000 lbs. gross weight, being built primarily for cargo carrying. Static testing of some sections has begun. Eight engines, 8,000 gals. fuel capacity, 120,000 lbs. cargo capacity. Average cruising speed, 174 miles. By far the largest aircraft actually under construction, with a 320-foot wing spread and a 218-foot length, the HK–1 is being built under contract to the Defense Plant Corporation, a subsidiary of the RFC.

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June 4, 1943.

Dear Roy:

Thank you for writing me about our air age geography show. We have now decided to call it Airways to Peace.

I am so sorry that you do not think you can collaborate with us on this exhibition, for it would have been most profitable and enjoyable if you could have worked with us on it.

I am sorry I missed you when you were here the other day. I do hope you will look me up when you come again.

Our plans for the O.W.I. Magazine Cover exhibition are coming along nicely. I am delighted to know that you can help us with this, and I shall look forward to seeing your collection of photographs.

With best regards, I am

Sincerely,

Mr. Roy Stryker, Chief
Division of Photography
News Bureau
1405 Auditors Bldg.
Washington, D. C.

MW:lf

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O.W.I.-(Stryker)

A1A1-/A45

OFFICE OF WAR INFORMATION

WASHINGTON

1405 Auditors Building

May 22, 1943

Mr. Munroe Wheeler
The Museum of Modern Art
11 West 53rd St.
New York City

Dear Munroe:

I have just about given up on the "global warfare" show, at least for a while. We have had about all we can do getting out the "Nature of the Enemy" show, and the job we have been helping the National Council of American-Soviet Friendship with. It is going to take us into June before we can complete these two jobs.

Dorothy Ducas told me about your wanting fifty to sixty pictures to be enlarged for your show in September on "Women in Industry." We will be able to give you plenty of help on this and I will start to get you a collection together now.

Sincerely yours,

Roy

Roy E. Stryker, Chief
Division of Photography
News Bureau

Encs.

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O.W.I. Kerr

AIRWAYS

Mr. Chester Kerr
Chief of Book Division
Office of War Information
Washington, D.C.

May 1, 1943

Dear Mr. Kerr:

I am writing at the suggestion of Gardner Cowles, Jr., regarding your cooperation on an exhibition of air-age geography which the Museum of Modern Art is preparing to open at the end of June. This exhibition is a sequel to the celebrated Road to Victory show illustrated in the enclosed Bulletin. OWI, you will remember, financed multiple versions of this exhibition for circulation in this country and in England, where it has been phenomenally successful. The global geography show will likewise travel to other cities and will be an educational display of far-reaching effect.

I enclose herewith an outline of the exhibition, and call your attention particularly to Section V. It is our belief that it will serve as excellent advance publicity for your great new Citizen's Atlas. We should like to include any of your Atlas maps which are ready by the date of our opening, June 29. In this connection Mr. Cowles has recently written me as follows:

"We are, of course, going ahead with the Citizen's War Atlas and if the Museum puts on the exhibition, it should, as you suggest, make a very interesting and helpful tie-up. Mr. Chester Kerr, head of our Book Division, is in charge of the preparation of the Atlas and I am sure he would be happy to give you any of the material which is being developed."

All of us naturally feel that the maps which OWI is preparing will be far superior to anything we could do in the short time available. We could, of course, if you wish, withhold them from the press until the Atlas comes out in August.

If you approve of this collaboration and would like to have your maps represented in this exhibition, will you be good enough to let me know so that we may see the material as soon as possible? You realize of course that the Museum is a non-profit educational institution operating under the charter of the State of New York.

Sincerely yours,

P.S. We shall, of course, submit the final scenario for the exhibition to Professor Sprout and to you.

MW:fp
Encs.

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O.W.I. 2/21 - Cowles

AIRWAYS

OFFICE OF WAR INFORMATION

Gardner Cowles, jr.

Director of
Domestic Operations

April 21, 1943

Mr. Gardner Cowles, Jr.
Director of Domestic Operations
Office of War Information
Washington, D. C.

Dear Mr. Cowles:

We all feel that the Global Geography Exhibition is so necessary that I am sure we shall be able to proceed with it even though we cannot count upon the active collaboration of the Office of War Information. We shall make every effort to have the exhibition serve as a useful tie-up with the OWI's Citizens War Atlas, and I am following your suggestion to communicate with Mr. Chester Kerr in this regard. I hope you will be able to attend the opening of the exhibition on June 29th, for it was really conceived in your office in our first conversation with you and Jack Fleming and Roy Stryker.

I have been seeing Miss Dorothy Ducas regarding this Museum's collaboration in the Women War Workers Campaign, and we have agreed to make awards to the best magazine covers produced by the nation's periodicals in September.

Please let us know when we can collaborate in any way.

Very sincerely yours,

MW:lj

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O.W.I.
AIRWAYS

OFFICE OF WAR INFORMATION

WASHINGTON

Gardner Cowles, jr.

Director of
Domestic Operations

April 12, 1943

Mr. Monroe Wheeler
Director of Exhibitions and Publications
The Museum of Modern Art
New York, New York

Dear Mr. Wheeler:

I was glad to learn in your letter of March 31 that the Trustees of the Museum are enthusiastic about the idea of an exhibition on global war. I regret, however, that OWI will not be in a position to contribute to the show.

We have given the matter very careful study and have come reluctantly to the conclusion that with our limited personnel and funds, and with the increasing demands upon us, we cannot commit ourselves to participation in the project.

We are, of course, going ahead with the Citizens War Atlas and if the Museum puts on the exhibition, it should, as you suggest, make a very interesting and helpful tie-up. Mr. Chester Kerr, head of our Book Division, is in charge of the preparation of the Atlas and I am sure he would be happy to give you any of the material which is being developed.

Sincerely yours,

Gardner Cowles jr

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OWI. AIRWAYS

# THE MUSEUM OF MODERN ART

**Date** April 6, 1943

**To:**

**Re:** Global War

**From:** Mr. Wheeler

LUNCHEON WITH FRANCIS H. BRENNAN, EMIL LOWENSTEIN AND BETTY CHAMBERLAIN

Brennan began by telling me that OWI Graphics have been turned over to Lt. Commander Price Gilbert, Vice-President and Advertising Manager of the Coca Cola Company.

Regarding the global war show, Brennan suggested that we make every effort to obtain for the exhibition the President's own globe, which was especially prepared for him at great cost by OWI. It is a sphere about forty inches in diameter which rolls about in a cradle on ball bearings. The Army Air Force owns a duplicate of it. Brennan said we could get further information about it from Mr. Edward Dodd of Dodd, Mead, who was then with OWI but has since resigned.

Brennan said that the design of the joint chief of staff's map room, the only available photographs of which appeared recently in Life, was done by Henry Dreyfuss. Brennan further suggested that a section of the exhibition ought to be devoted to Weather Central, the new weather bureau set up by General "Hap" Arnold. He said we should consult the aviation issue of Fortune, issued about two years ago; an issue which appeared about two months ago on Latin-American aviation; the April issue of Fortune; and an article written by Albert (Bill) Firth.

MW:CH

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Stryker

AIRWAYS

April 1, 1943

Mr. Roy Stryker
Room 2304, Auditors Building
14th Street & Independence Avenue, S.W.
Washington, D. C.

Dear Roy:

I am enclosing a slightly revised outline of the summer show. Since I saw you the other day, I have seen some of Mr. Lowenstein's maps and I think he is doing a magnificent job. They will be by far the most intelligible global maps that have been used, and his use of the 10-20-30-40° projections is going to go a long way toward clarifying the layman's idea of these problems.

I have just written a letter to Gardner Cowles asking him to confirm for us your collaboration on the exhibition. As I told you, we would like to have you provide the enlargements for Section V of the enclosed outline and we shall also need the cooperation of Professor Sprout and Mr. Lowenstein on the various map sections. If we can obtain this collaboration from you, there is no doubt that we will go ahead with our exhibition at once, but the time has come when we must know whether we can definitely count on this assistance or not. From all indications, the shows both here at the Museum and in Rockefeller Plaza are going to have reverberations of tremendous importance.

Please keep me posted regarding any developments at your end.

Ever yours,

MW:lj
Encl.

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OWI, Cowles
AIR 1/1/45

March 31, 1943

Mr. Gardner Cowles, Jr.
Director of Domestic Operations
Office of War Information
Washington, D.C.

Dear Mr. Cowles:

Ever since our first talk about the global war show, the idea has elicited the most enthusiastic response from everyone who has heard of it. Our Trustees have now authorized us to make it the subject of our major summer exhibition, opening early in June, and to collaborate with you, when you are ready, on a similar display of a more elementary character in Rockefeller Center.

The Museum exhibition would be a complete, graphic and three-dimensional presentation. Its purpose, both when seen at the Museum and when interpreted by the press, would be to appeal to the more thoughtful and influential public, whereas the show in Rockefeller Center should be a basic and concentrated one calculated to make a simple, indelible impression in a short time.

I enclose herewith an outline of the Museum exhibition, and I am writing now to ask whether it will be possible for you to collaborate with us in two ways: first, by arranging for Roy Stryker to provide the same collaboration as he gave us last year for "Road to Victory"--in other words, provide photographic enlargements for Section V of the exhibition; and second, by arranging for us to have the assistance of Professor Harold Sprout, Mr. Francis H. Brennan and Mr. Emil Lowenstein. Mr. Fleming has already given us the revised prospectus for the Citizen's Atlas, and we shall need only Professor Sprout's general advice, and Mr. Brennan's and Mr. Lowenstein's help with the actual maps. The plan is that the Museum exhibition would serve as advance publicity for your Citizen's Atlas, whereas the Rockefeller Center show would coincide with the actual date of publication.

Won't you let me know definitely as soon as you can whether it will be possible for OWI to cooperate with the Museum in the manner outlined above?

Sincerely yours,

MW:CH

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OWI, AIRWAYS

March 31, 1943

Dear Hank,

I have been talking with Mike Cowles and Jack Fleming about a big show on global war which they want us to do as a sequel to our last year's Road to Victory exhibition, traveling versions of which have been subsidized by OWI. We have got to the point now where we shall need your collaboration and that of Mr. Lowenstein in the matter of the maps, and I should like to get your ideas on the subject as soon as possible. What about lunching with me on Friday at one o'clock?

Ever yours,

Mr. Francis H. Brennan
Chief, Graphics Division
Office of War Information
250 West 57 Street
New York, New York

MW:CH

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S Stryker O.W.I.

AIRWAYS

March 15, 1943

Mr. Roy Stryker
Chief, Division of Photography
Bureau of Publications and
Graphics
Office of War Information
2304 Auditors Building
Washington, D.C.

Dear Roy,

The idea of having this Summer--as a sequel to the Road to Victory exhibition--a show of world geography and ecology has elicited such enthusiastic endorsement in all quarters that we have definitely decided to proceed with it as fast as possible, with whatever help you and others who think it important are willing to give us. As you know, I have been on the sicklist, but I am now entirely restored and ready to devote all my time to this show.

The main point of the exhibition would be to show how and why the fighting power of this country is being used all over the face of the earth. This entails an elementary explanation of the relation of man to his planet, of how conditions of life change with latitude, and to what extent they are dependent upon natural resources and transportation. The exhibition would start with the illustration of these factors and a brief resume of man's geography as recorded by his maps, from earliest times to the present. In introducing today's maps, we would show to what extent the airplane is responsible for them. Then the general maps would be broken down into maps devoted to the strategic areas outlined in the civilians' geography that you are preparing, and in relation to these maps of strategic areas, we would show photo-murals--of photographs which I hope you may be able to select and provide--depicting, as dramatically as possible, the life of our fighters in each theater of operations. Then there would follow a geographical resume which would state the problem which the eventual peace must solve, of the world as a single community, no part of which, thanks to the airplane, is separated from any other part by more than a few hours.

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I shall be in Washington next Saturday, the twentieth, and wonder whether you can give me fifteen minutes to go over some of the aspects of our collaboration?

Sincerely yours,

MW:CH

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Mr. Roy Stryker--2--March 15, 1943

I shall be in Washington next Saturday, the twentieth, and wonder whether you can give me fifteen minutes to go over some of the aspects of our collaboration?

Sincerely yours,

MW:CH

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Stryker
owl.
AIRWAYS

OFFICE OF WAR INFORMATION

WASHINGTON

Room 2304 Auditors Building

February 22, 1943

Mr. Munroe Wheeler
The Museum of Modern Art
11 West 53rd St.
New York City

Dear Mr. Wheeler:

I received a copy of your brochure on modern architecture. The card said "with the compliments of the Museum of Modern Art", and gave no name, but I am going to thank you for it anyway. It was a very nice job. I hope you do more of this kind of thing.

Nothing more definite has happened on our global show, but it isn't dead by a long ways. It is still boiling, but we have no specific assignment as yet. Will get in touch with you as soon as I have something definite about it.

Sincerely yours,

Roy

Roy E. Stryker, Chief
Division of Photography
Bureau of Publications
and Graphics

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Global War

OFFICE OF WAR INFORMATION

WASHINGTON

January 26, 1943

Mr. Monroe Wheeler
The Museum of Modern Art
11 West 53d Street
New York, N. Y.

Dear Mr. Wheeler:

I'm sorry to have delayed so long in answering your letter of January 7. I have sent the copies of your letter on to Mr. Cowles and to Roy Stryker but we haven't had an opportunity to discuss your suggestions. As soon as we can get our heads above water I hope to be able to give you a reasonably intelligent reply. We may face budgetary difficulties but at the moment I hope for the best.

Sincerely,

John R. Fleming

John R. Fleming
Chief, Bureau of Publications
and Graphics

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who does what in the armed service.

OWI

RE 7500. EXT. 5381.

32 - 8'x4' panels

WWII garden

OFFICE OF WAR INFORMATION
WASHINGTON

January 7, 1943.

Dear Mr. Fleming:

Thank you so much for sending me the prospectus for Professor Sprout's War Atlas. I have gone over it very carefully and feel that if we are to make a complete graphic presentation of this subject, which seems to me tremendously worth doing, we shall need more flexible accommodations than we shall find in Rockefeller Plaza. We could, however, install in the Plaza a very impressive elementary display which would convey the new global concept to the casual visitor. This could consist of one or more great spheres or hemispheres, preferably revolving, supplemented by text and photographs which would tell the story.

The more I think about imbuing a hundred million people with the global concept the more convinced I am that you have got to get away from maps on flat surfaces. It seems to me therefore that it would be of the greatest importance to have a thorough three-dimensional presentation available to the public at the time Sprout's book appears.

The show in Rockefeller Plaza should be a basic and simple one, which would leave a precise, indelible impression. But in that sort of outdoor exhibition I think it would be unwise to attempt to deal with all the strategic areas mentioned in Sprout's book. All this, however, could be extremely well done in a three-dimensional display in the Museum of Modern Art which could be supplemented with animated movie maps and various other devices which could not be shown out of doors.

Would you let me know therefore whether you think we might collaborate on two separate exhibitions, one elementary which the simplest mind could grasp, and another more elaborate one to be shown at the Museum of Modern Art which would appeal to a more educated and therefore more influential public both when seen at the Museum and interpreted by the press. I should be glad to come to Washington to discuss this further with you at your convenience, or if you are coming to New York I shall be delighted to see you here.

Sincerely yours,

Mr. John R. Fleming, Chief
Bureau of Publications and Graphics
Office of War Information
Washington, D. C.

P.S. For your convenience I am enclosing copies of this letter which you may wish to give to Mr. Cowles and Roy Stryker.

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OFFICE OF WAR INFORMATION

WASHINGTON

December 28, 1942

Mr. Monroe Wheeler
Director of the Museum of
Modern Art
11 West 53rd Street
New York, New York

Dear Mr. Wheeler:

I have just received a Revised Prospectus For A War Atlas which we discussed in Mike Cowles' office the other day. I think this gives a pretty good idea of the projected book. I will be glad to hear your opinion on it, as a possibility for a show, after you have had a chance to examine it.

Sincerely,

John R. Fleming

John R. Fleming, Chief
Bureau of Publications
and Graphics

Enclosure

N.W. Ayer
73 Avenue Bryere, N.Y.C.

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# REVISED PROSPECTUS FOR A WAR ATLAS

C O P Y

prepared by
Harold Sprout
at the request of
The Office of War Information

## Plan of the Book:

The directive from the Office of War Information suggested that the book be built around the strategic regions listed in President Roosevelt's radio address of September 7, 1942. These were Europe, the Mediterranean, Russia, and the Pacific Ocean. This regional break-down, slightly expanded to meet the requirements of reasonably complete coverage, has been followed in this prospectus. In addition, introductory and concluding sections have been added to correlate each region with the war as a global whole, and to establish the book's American frame of reference.

Specially drawn maps and accompanying explanatory text will constitute the principal vehicles of expression. In addition, it is suggested that pictures would help immensely in building up a realistic impression of such items as jungle and desert battlefields, the terrain traversed by the Burma Road, the Russian steppe country, etc.

## Introduction:

Item 1. America's Place on the Globe: Two world maps, each with the United States in the center: the first on the conventional mercator projection, the second on one of the simulated global projections centered at Chicago, St. Louis, or some other point in the continental interior of the United States. Explanatory text to show: (1) the uses of different map projections; (2) the importance of maps simulating global sections; and (3) the geographical relation of the United States to Europe, Africa, South America, Australia, Asia, and the countries of North America.

## Europe and the Atlantic Ocean:

Item 2. Atlantic Battleground: Map comparable to the "Atlantic Arena" map published by Fortune, to show the true shape and size of the Atlantic Ocean, with text to explain the military importance of this ocean, as a whole and in its constituent parts, both to the Axis and to the United Nations.

Item 3. The Blockade of Axis Europe: Map to show how the United Nations, by virtue of geographical position and superior sea and air power, have been able to cut off the Axis countries from oversea food and raw materials. Text to emphasize the greater difficulties encountered in this war as compared to the last, and to evaluate the comparative vulnerability of Europe to blockade in the two wars.

Item 4. The Battle for the Atlantic: Map and text to depict the Axis war on shipping and to show, in the abstract, the problems of anti-submarine defense as they have arisen in this war.

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Item 5. Germany's Conquest of Europe: Map and text to show the geographical logic of the German time-table of conquest, from the remilitarization of the Rhineland in 1936 to the invasion of Russia in 1941, with emphasis on how each step prepared the way geographically for the next.

Item 6. The Battle for Britain: Map and text to show what was at stake in the air war over the British Isles, 1940-41; how defeat would have opened the way for German invasion of England, and why the Luftwaffe's failure was one of the turning points in the war.

Item 7. Wings over Europe: Map and text to show the air offensive from England; its aims, and its relation to the land and sea fronts.

Item 8. Hitler's "Maginot Line": Map and text to show the German defensive preparations for an Anglo-American counter-offensive against the Continent from the British Isles.

Item 9. Scandinavia, Hitler's Vulnerable Northern Flank: Map and text to show the vulnerability of Germany to attack from the north, and the inherent weakness of this Nazi frontier.

The Mediterranean and its Borderlands:

Item 10: The Mediterranean World: Map to show the shape and area of the region extending from west Africa to Iran. Geographically, Morocco, most of Arabia, Iraq, and Iran lie outside the Mediterranean basin. Strategically, however, they may be considered part of a single region. Emphasis on terrain, distances, deserts, waterways, etc.

Item 11: Mussolini's Imperial Pipe-Dream: Map and text to show the Fascist blueprint of empire, and the extent to which it was temporarily realized.

Item 12. France in the Mediterranean: Map and text to show why the Mediterranean world has bulked so large in French statecraft.

Item 13. England's Mediterranean "Lifeline": Map and text to show the importance of England's short-cut to the Middle East, India, and the Far East.

Item 14. "Berlin to Bagdad": Map and text to show the southeastward drive of German imperialism, and its threat to Russia and to the British Empire.

Item 15. The Struggle for North Africa: Map and text to show what is at stake in the North African campaigns, the broad outlines of Axis strategy, the counter-strategy of the United Nations, and the over-all consequences of complete reoccupation of the North African coast.

Item 16. Spotlight on the Dark Continent: Map showing Africa as a whole, with topography, rivers, air routes, etc. Text to describe German blueprint for an African empire, and the role Africa is playing in our own war effort.

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Item ~~18~~ 17. The Invasion Coast of South Europe: Map and text to show the topographical and other geographical features of southern France, Italy, and the Balkan peninsula, and vulnerability of Italy to air attack promised by Mr. Churchill.

The Russian Front:

Item ~~19~~ 18. Russia Prepares for German Attack: Map and text to show why Russia reoccupied the Baltic States, pushed back the Finnish frontier, and built new industrial centers in the far interior.

4 Item ~~20~~ 19. What Hitler Wanted in Russia: Text with or without graphic illustration, showing, so far as can be determined, the aims of German campaign in Russia.

Item 21. Trading Space for Time: Map to show the function of space and weather in Russian strategy, with text explaining the map and discussing the effects of the Russian retreats on Russian military potential.

Item ~~22~~ 21. The Flood Tide of Conquest: Map showing the farthest German penetration into Russia, and text interpreting the consequences of this advance.

Item ~~23~~ 22. The Reconquest of Russian Space: Map showing the obvious and publicly-discussed strategical factors underlying any Russian counter-offensive, with emphasis upon the increasing difficulty which the Germans are experiencing in holding the Russian front in the face of air and land attacks from the British Isles and North Africa.

Item ~~24~~ 23. Supply to Russia: Virtually a global map necessary to show the various supply routes into Russia, with analysis of the problems ~~involved~~ involved in the use of each.

The Pacific Ocean and Far East:

5 Item ~~25~~ 24. Japan's "Co-Prosperity" Empire in the Far East: Map and text to show geographical and economic bases of Japanese imperialism.

Item ~~26~~ 25. The Defense of Soviet Asia: Map and text to show how Russia has built a powerful Far Eastern stronghold, largely self-sufficient and presenting a formidable counter-offensive threat in case of Japanese attack.

Item ~~27~~ 26. The Defense of China: Map and text to show how China too has traded space for time, with attention to the function of topography, climate, etc., in Chinese resistance and the potentialities of China as a base from which to launch a counter-offensive.

6 Item ~~28~~ 27. Guns for the Armies of China: Map and text to show the problems involved in sending military aid to China, with emphasis on the importance of reopening the Burma Road.

7 Item ~~29~~ 28. India and the Indian Ocean: Map and text to show the importance of India and Indian Ocean shipping lanes in defeat of Japan.

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Item ~~30~~ 29. Japan's Conquests in the Pacific: Large map showing farthest Japanese advance, and a number of smaller maps showing respectively the American, British, and Dutch possessions which Japan occupied.

8 Item ~~31~~ 32. Pacific Battleground: Map of the whole Pacific basin, showing immense distances, and the consequent logistical problems involved in carrying out a trans-pacific counter-offensive against Japan.

Item ~~32~~ 31. Retreat and Advance in the Southwestern Pacific: Map of the region as a whole, and smaller maps of Australia, New Zealand, and Solomon Islands sector, with text showing logistical, medical, and other problems encountered in that sector.

Item ~~33~~ 33. "Remember Pearl Harbor": Map and text to show the supreme importance of the far-flung island defense area in the central Pacific, and its value in any counter-offensive campaign.

9 Item ~~34~~ 34. The Alaskan Bridge to Asia: Map and text to show the importance of Alaska and the Aleutian Islands, and the problems involved in defense of this area, and in its use as base for counter-offensive.

Global War.

Item ~~35~~ 34. Sea Power vs. Land Power: Map showing overland transport and sea routes, with text discussing German geopolitical doctrine on this point, and showing effects of changes in weapons, etc.

Item ~~36~~ 35. Air Power in Today's War: Chiefly text, with or without supplementary graphic illustration, to show the different roles which aviation is playing in this war, both as an independent arm, as a military adjunct to sea and land power, and as a means of transport.

Item ~~37~~ 36. The Advantage of Position: Map and text showing value of central position depends on over-all situation, especially on who holds strategical initiative.

Item ~~38~~ 37. "The Arsenal of Democracy": Map and text to show how the United States provides for the United Nations a secure an immensely productive base, and how the United Nations together hold virtually all the critically important strategical positions upon the globe.

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Willis - Yale Club -

May 27, 1943

Mr. P. P. Willis
Yale Club
Vanderbilt Avenue and 44 Street
New York, New York

Dear Mr. Willis:

I am very grateful for your referring us to Mr. H. M. Spencer of the Commercial Department of Rand McNally, and for sending us a list of his maps. We are getting in touch with him. I enclose herewith my revised outline of our exhibition, and any suggestions which you have will be most welcome.

With kind regards, I am

Very sincerely yours,

MW:CH

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Yale Club
Vanderbilt Avenue and Forty-fourth Street
New York

May 21, 1943

Mr. Monroe Wheeler
The Museum of Modern Art New York
11 West 53rd Street
New York, N. Y.

My dear Mr. Wheeler:

Thanks for your favor of the 20th. I am leaving town Saturday or Sunday to be away a few days.

Would appreciate your letting me know when you can, so I can arrange to be sure to be here when your outline is ready.

Regards,

PPWillis

PPWillis
gm

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The New
POLAR PROJECTION
GLOBAL WORLD CHART

May 20, 1943.

Dear Mr. Willis:

Many thanks for your kind note of the 12th offering to help on our air age geography show. I expect to have a definite outline of it next week and shall call on you for the privilege of going over it with you.

Sincerely yours,

Mr. Monroe Wheeler
The Museum of Modern Art
11 West 53rd Street
New York, N. Y.

Dear Mr. Wheeler:

Thanks for your courteous favor of May 10. I take it that you have found another sponsor for your exhibit.

Had a chat with Mr. [illegible] this matter yesterday, and he [illegible] that if American Airlines, through me, can help you in any way, we all want to do so.

Mr. P. P. Willis
The Yale Club
44 St., Vanderbilt Ave.
New York, N. Y.

MW:lf

Very truly yours,

PPWillis
gm

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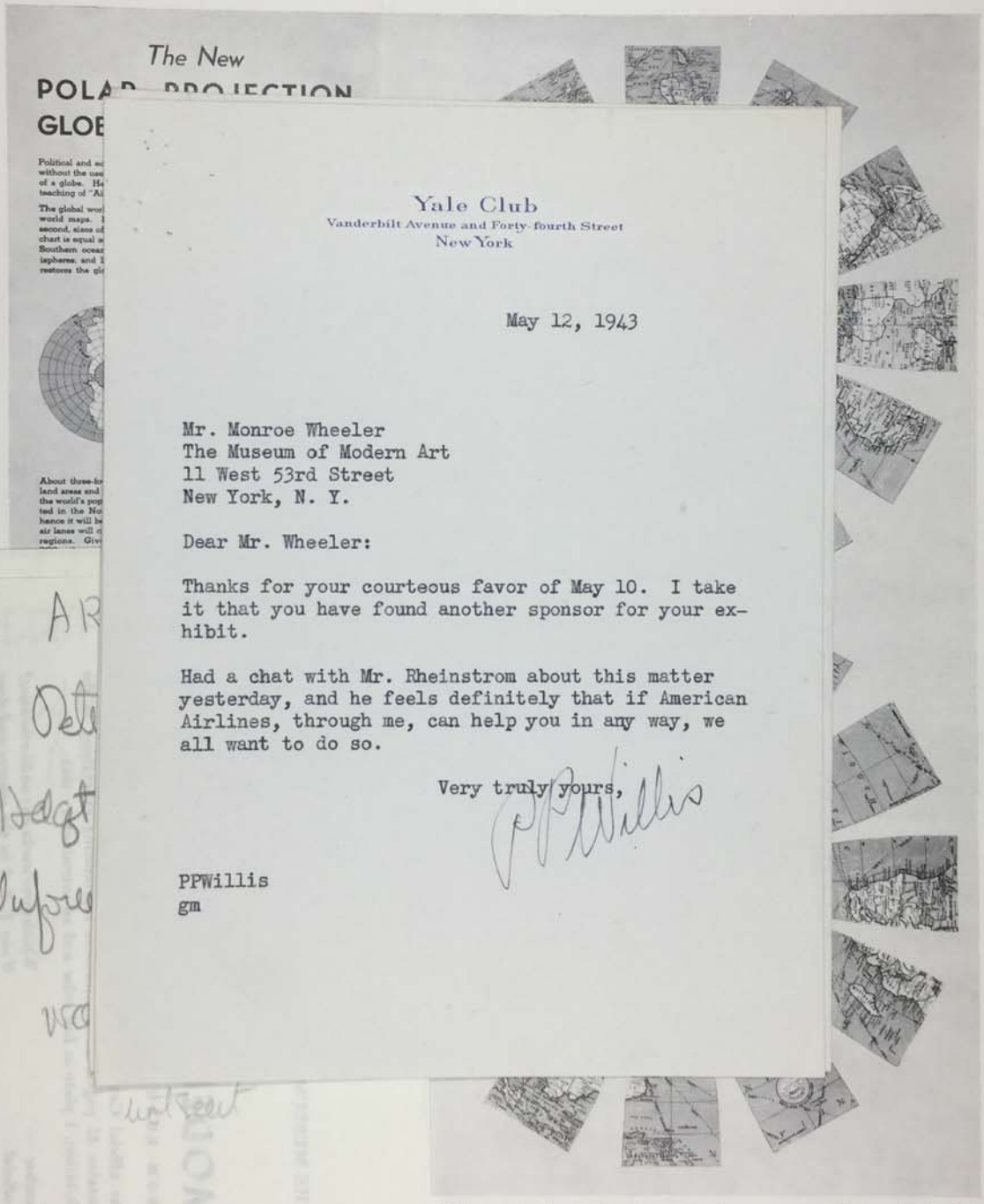


Yale Club
Vanderbilt Avenue and Forty-fourth Street
New York

May 12, 1943

Mr. Monroe Wheeler
The Museum of Modern Art
11 West 53rd Street
New York, N. Y.

Dear Mr. Wheeler:

Thanks for your courteous favor of May 10. I take it that you have found another sponsor for your exhibit.

Had a chat with Mr. Rheinstrom about this matter yesterday, and he feels definitely that if American Airlines, through me, can help you in any way, we all want to do so.

Very truly yours,

PPWillis

PPWillis
gm

of the actual chart. The chart measures 36 by 45 inches
a beautiful and contrasting colors)

SEE OTHER SIDE

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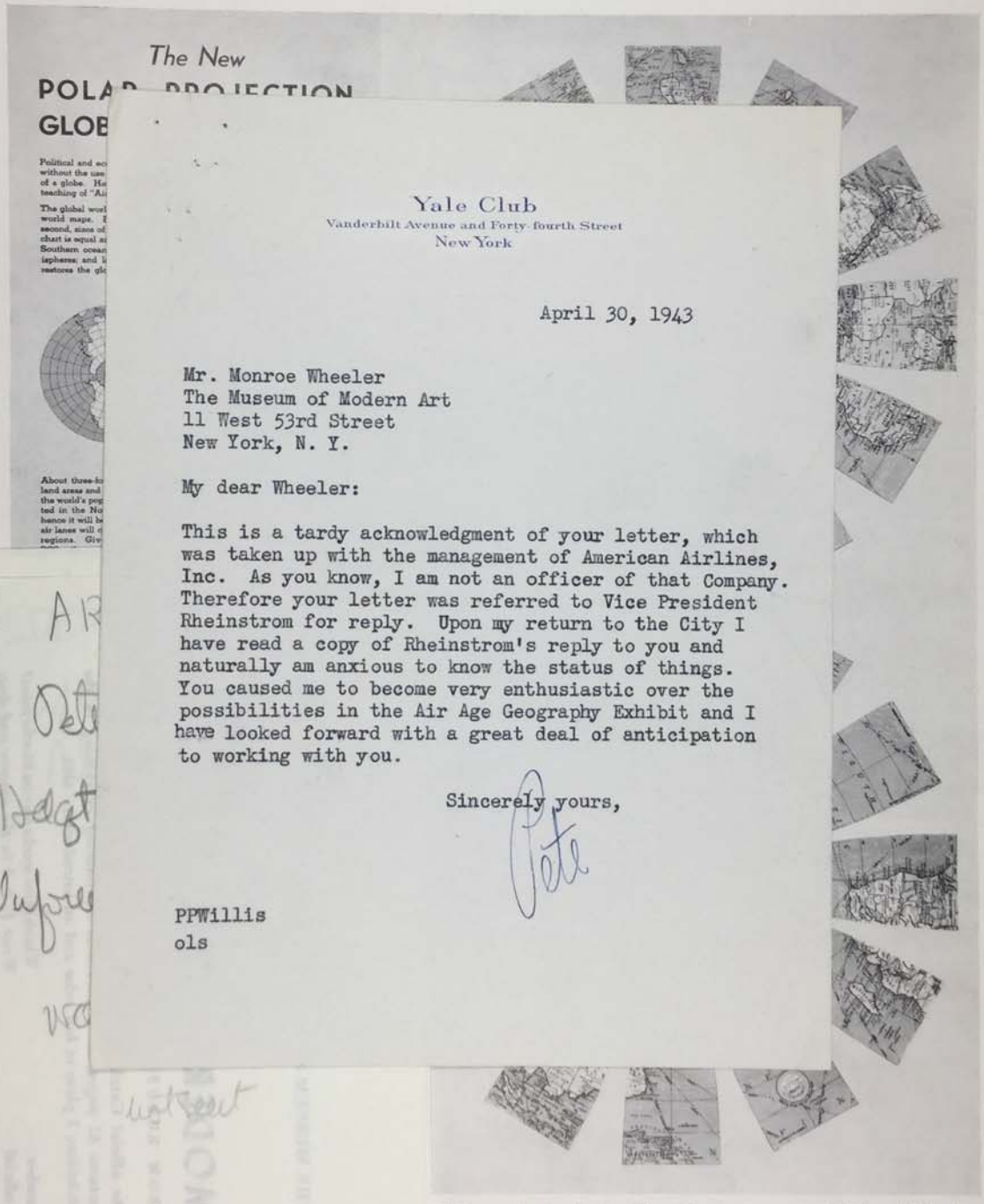


Yale Club
Vanderbilt Avenue and Forty-fourth Street
New York

April 30, 1943

Mr. Monroe Wheeler
The Museum of Modern Art
11 West 53rd Street
New York, N. Y.

My dear Wheeler:

This is a tardy acknowledgment of your letter, which was taken up with the management of American Airlines, Inc. As you know, I am not an officer of that Company. Therefore your letter was referred to Vice President Rheinstrom for reply. Upon my return to the City I have read a copy of Rheinstrom's reply to you and naturally am anxious to know the status of things. You caused me to become very enthusiastic over the possibilities in the Air Age Geography Exhibit and I have looked forward with a great deal of anticipation to working with you.

Sincerely yours,

Pete

PPWillis
ols

of the actual chart. The chart measures 36 by 45 inches
beautiful and contrasting colors)

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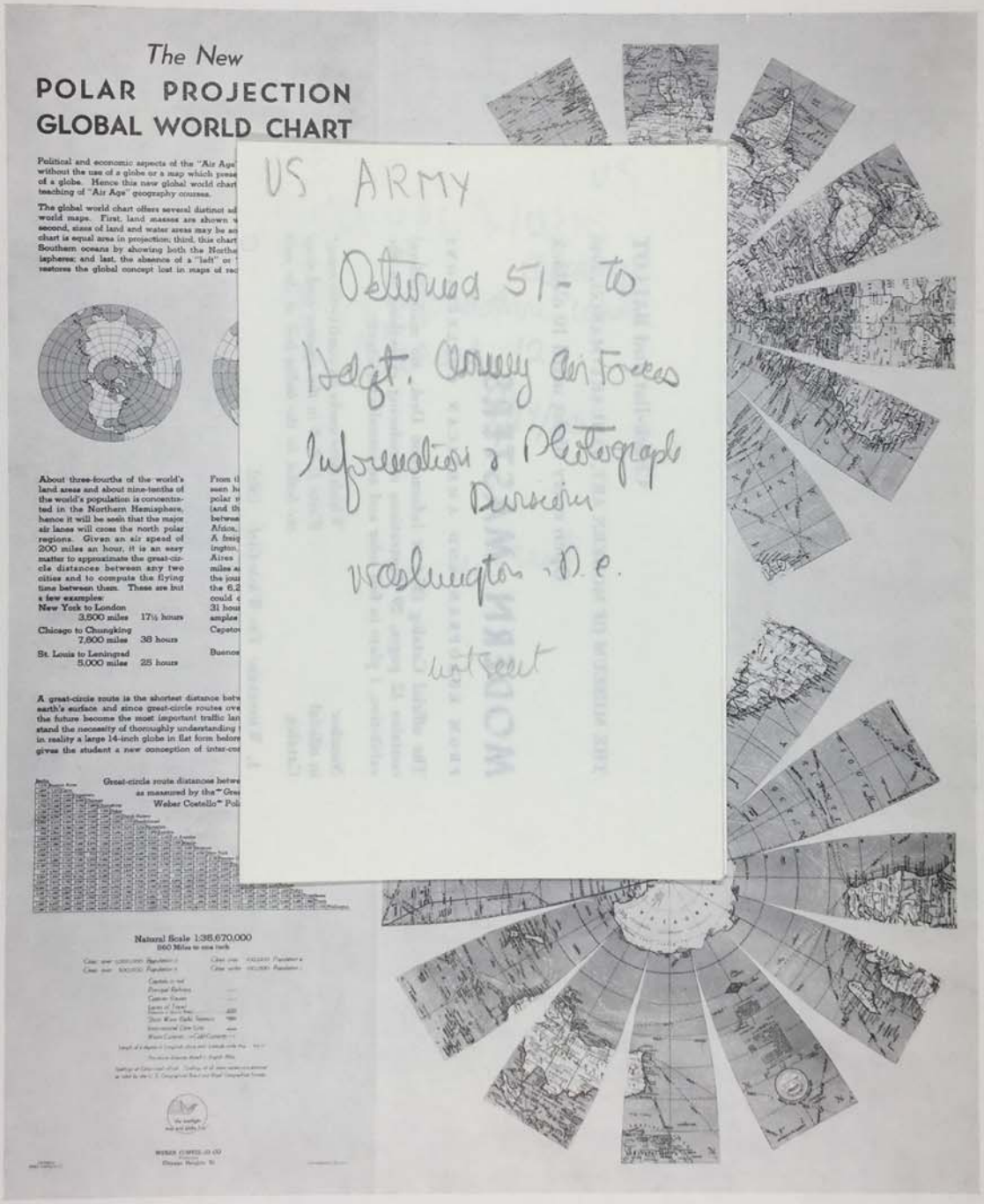


(This photograph is about 1/25 of the size of the actual chart. The chart measures 36 by 45 inches and is lithographed in beautiful and contrasting colors)

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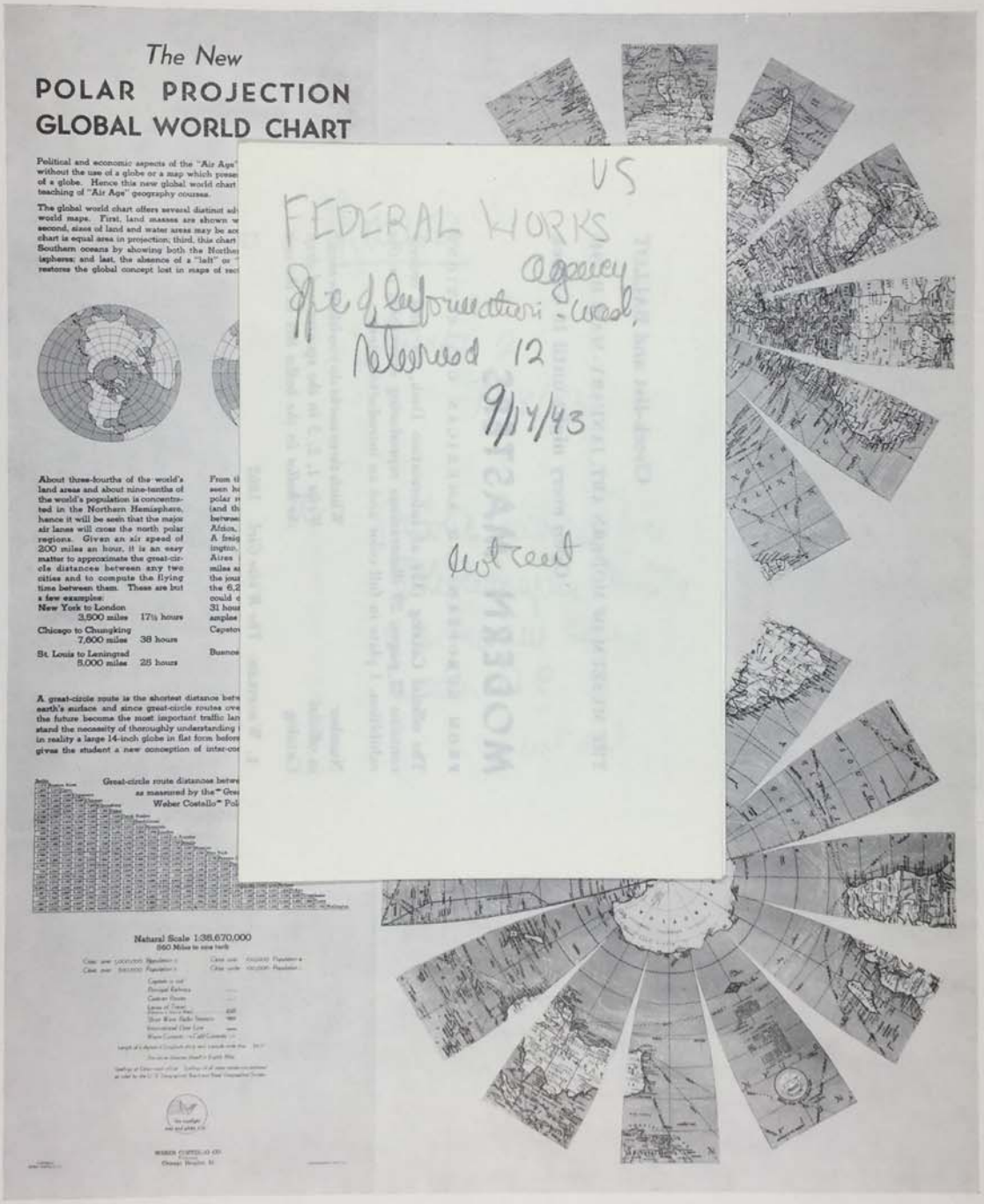


VS
FEDERAL WORKS
Agency
Records Information - Unit,
Returned 12
9/14/43
Retained

(This photograph is about 1/25 of the size of the actual chart. The chart measures 36 by 45 inches and is lithographed in beautiful and contrasting colors)

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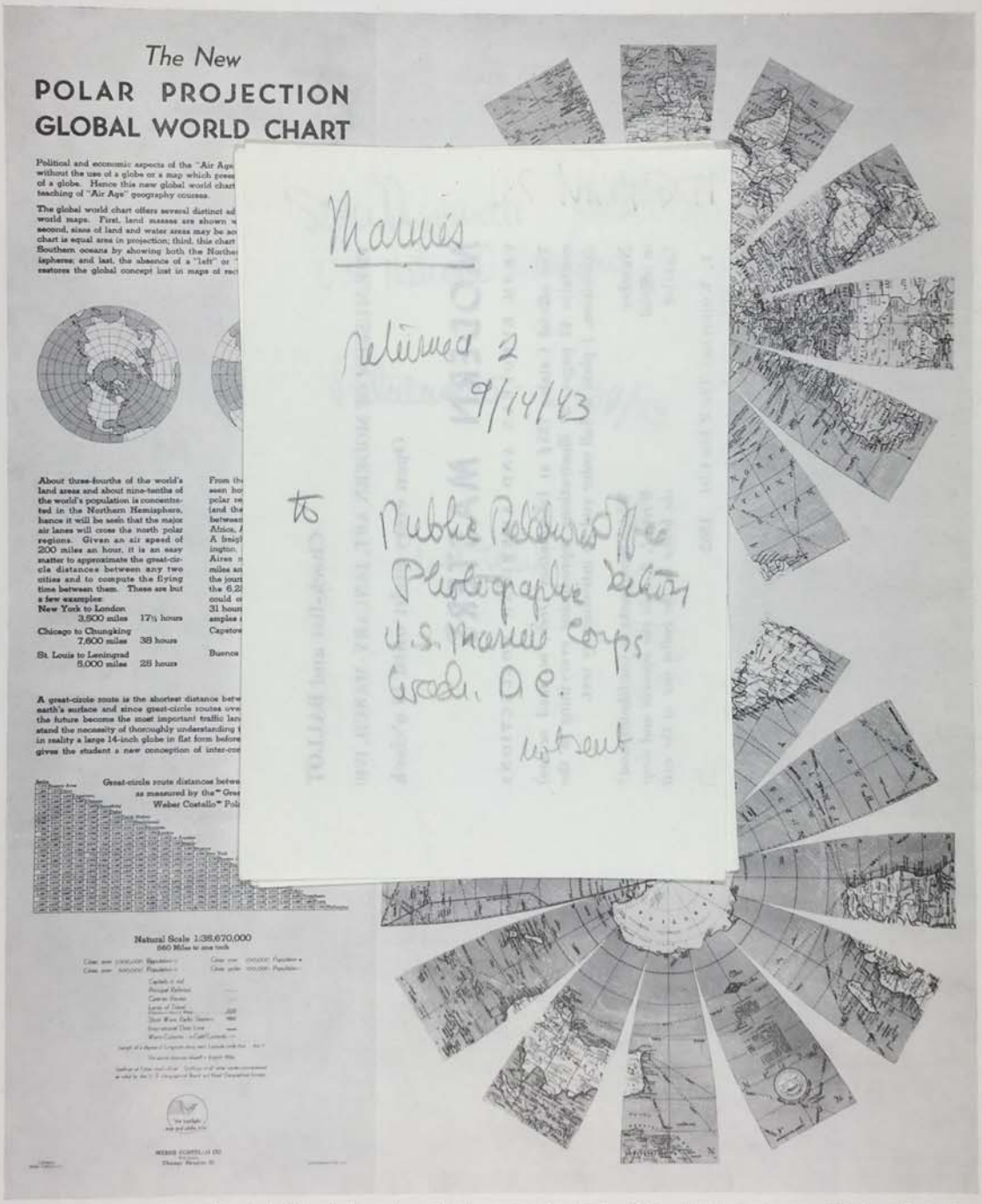


Marines
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to Public Relations Office
Photographic Section
U.S. Marine Corps
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Restricted

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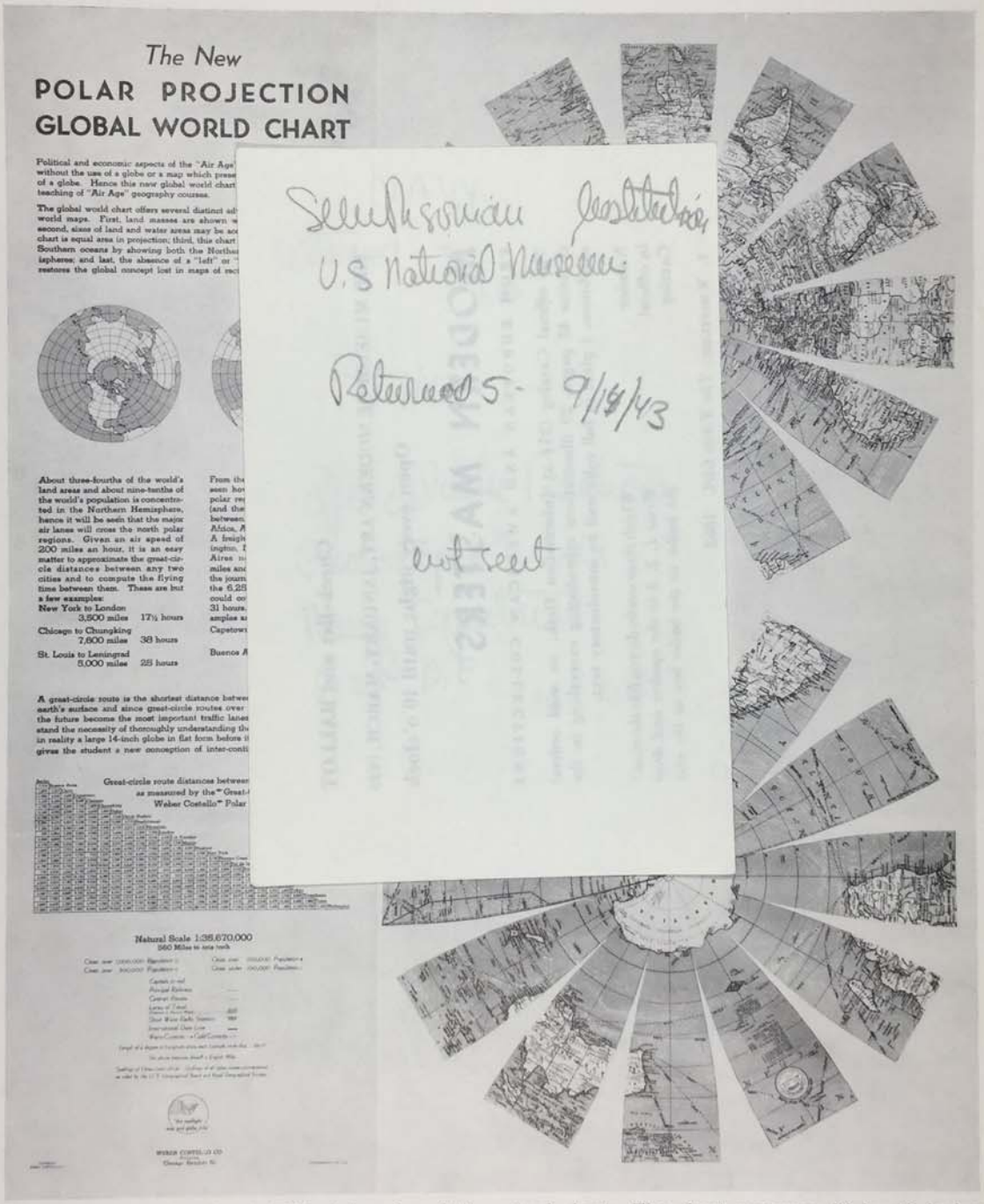


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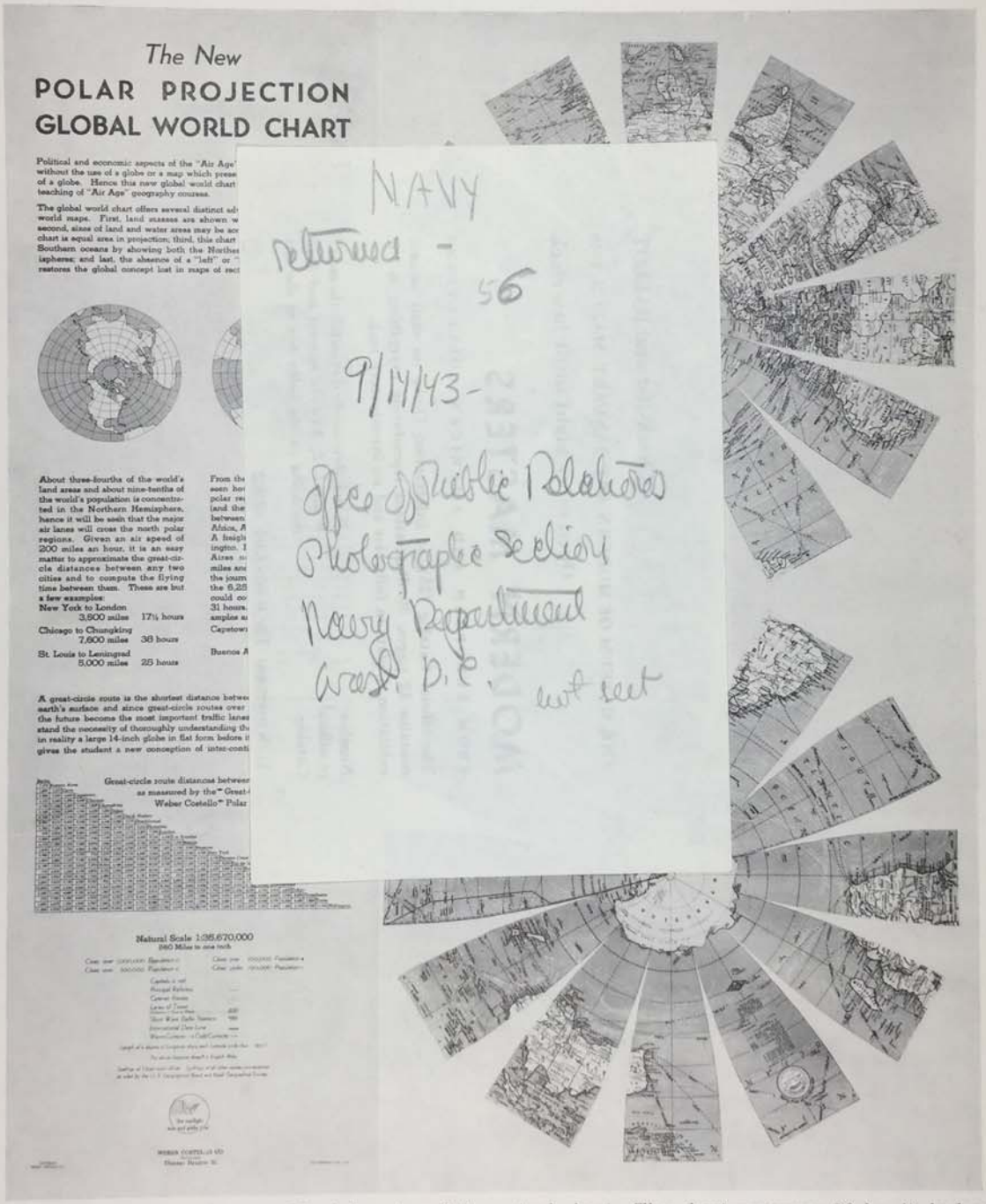


(This photograph is about 1/25 of the size of the actual chart. The chart measures 36 by 45 inches and is lithographed in beautiful and contrasting colors)

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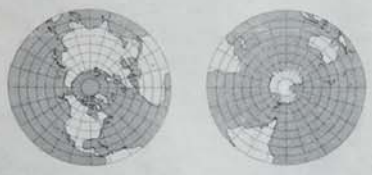
# JUST OFF THE PRESS

*The New*

## POLAR PROJECTION GLOBAL WORLD CHART

Political and economic aspects of the "Air Age" cannot be fully understood without the use of a globe or a map which preserves some of the advantages of a globe. Hence this new global world chart will be found helpful in the teaching of "Air Age" geography courses.

The global world chart offers several distinct advantages over other types of world maps. First, land masses are shown with no apparent distortion; second, sizes of land and water areas may be accurately compared since this chart is equal area in projection; third, this chart retains the continuity of the Southern oceans by showing both the Northern and the Southern Hemispheres; and last, the absence of a "left" or "right" or "top" or "bottom" restores the global concept lost in maps of rectangular design.



About three-fourths of the world's land areas and about nine-tenths of the world's population is concentrated in the Northern Hemisphere, hence it will be seen that the major air lanes will cross the north polar regions. Given an air speed of 200 miles an hour, it is an easy matter to approximate the great-circle distances between any two cities and to compute the flying time between them. These are but a few examples:

New York to London
3,800 miles 17½ hours

Chicago to Chungking
7,600 miles 38 hours

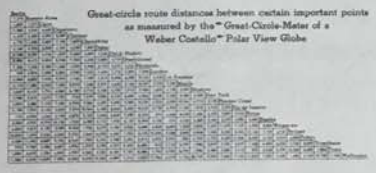
St. Louis to Leningrad
5,000 miles 25 hours

From the above drawing it will be seen how flights across the south polar regions are the great-circle (and therefore the shortest) routes between cities in South America, Africa, Australia and New Zealand. A freighter sailing between Wellington, New Zealand and Buenos Aires now covers about 6,920 miles and takes about 20 days for the journey, whereas a plane flying the 6,250 mile great-circle route could cover the distance in about 31 hours. Check the following examples and add some of your own:

Capetown to Wellington
7,200 miles 36 hours

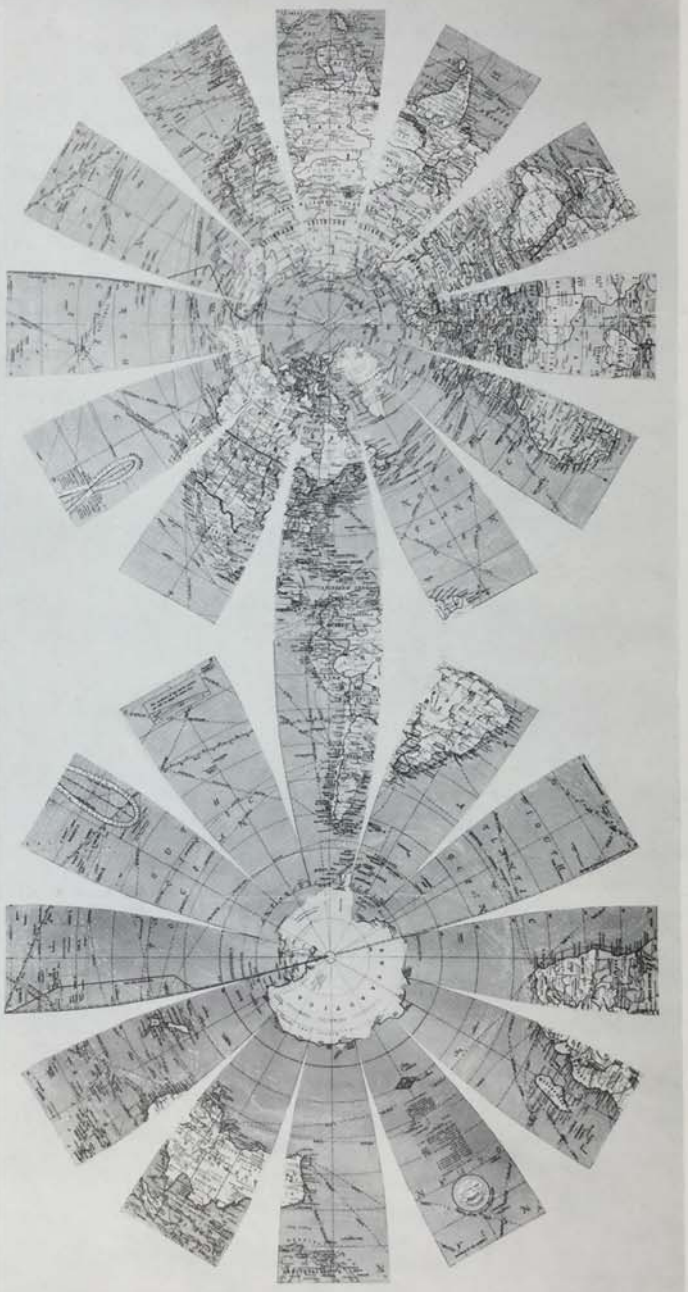
Buenos Aires to Melbourne
7,300 miles 36½ hours

A great-circle route is the shortest distance between any two points on the earth's surface and since great-circle routes over the polar regions will in the future become the most important traffic lanes, the student will understand the necessity of thoroughly understanding them. This chart, which is in reality a large 14-inch globe in flat form before it is pressed into a sphere, gives the student a new conception of inter-continental relationships.



Great-circle route distances between certain important points as measured by the* Great-Circle-Master of a Weber Costello* Polar View Globe

Natural Scale 1:35,670,000
560 Miles to one inch



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## WHAT THE CHART SHOWS

- Both the Northern and Southern Hemispheres in beautiful and contrasting colors. The chart is in reality a large 14-inch globe map, before it is pressed into spherical form.
- Nearly 4,000 places are accurately located and named, making it possible to follow daily developments on all world fronts.
- Major steamship, railroad and caravan routes as well as both warm and cold ocean currents.
- In the panel on the left side of the chart a great deal of vital information on the teaching of "Air Age" geography.
- A tabulation of great circle distances between major places all over the world.

## TEACHING ADVANTAGES OF THE CHART

- Preserves many of the advantages of a globe and eliminates many of the disadvantages of the usual polar projection map.
- Allows accurate size comparisons of countries, continents and oceans, since the chart shows both land and water areas in equal area projection.
- Land and water areas are shown with practically no distortion — the distortion occurs between the gores, is therefore apparent and not deceptive. To fill in the space between the gores might improve the appearance of the chart but would give an erroneous impression of ocean areas.
- Retains the continuity of the Southern oceans by showing both Northern and Southern Hemispheres.
- The absence of a "left", a "right", or a "top" or "bottom" restores the global concept which is lost in maps of rectangular design.

## HOW TO MEASURE GREAT-CIRCLE-ROUTES

To approximate great circle distances measure the space between any two points with an ordinary ruler, deducting the white spaces between the map sections and multiplying by the scale of 560 miles to the inch. For example, your ruler will tell you that the distance between New York and Dallas is 3 inches, you deduct the space between the map sections (½ inch) and have a net measurement of 2½ inches, which multiplied by 560 gives you 1400 miles as the approximate distance between the two cities.

Measurements of great circle routes between points not separated by the white spaces between the map gores can, of course, be even more simply and accurately made.

## DESCRIPTION AND PRICES:

Lithographed in 5 colors on sturdy, long wearing vellum. Charts measure 36 by 45 inches.

| "V" Mounting | No. 10 Mounting | No. 12 Mounting |
|---|---|---|
| Folded with eyelets for hanging | Wood rollers at top and bottom | Spring roller with backboard |
| $3.00 | $3.75 | $6.75 |

# WEBER COSTELLO COMPANY

PUBLISHERS

CHICAGO HEIGHTS, ILLINOIS

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WEBER COSTELLO COMPANY

MANUFACTURERS OF BLACKBOARDS • ERASERS • CHALK • ART MATERIALS
PUBLISHERS OF MAPS • GLOBES

CHICAGO HEIGHTS, ILLINOIS

June 3, 1943

Mr. W. F. Scarborough
Weber Costello Company
Chicago Heights
Chicago, Illinois

Dear Mr. Scarborough:

Thank you kindly for your comprehensive letter of May 25. Very shortly we will know exactly what material of yours we will be able to use and will notify you about it. The suggestions you have made seem good and I think we will be able to use them for the most part.

In the meantime we would like to purchase Map No. T-1A depicting the routes of explorers. Please send us this map as soon as possible with the bill. We would also like any available information concerning your new polar projection global world chart, particularly sizes in which it is available. We would like to display a large copy in full colors of a good polar projection chart. Yours may be satisfactory for the purpose. The reject gores and globe to which we referred in our letter of May 18 still interests us. We would like to obtain such a globe, say 12" in diameter, merely for the purpose of demonstrating the distortion between the actual glove and the Mercator Projection. The demonstration we had envisioned for this would look something like this:

If we could stiffen the gores with shellac and mount them on the globe only around the equator with the gore points extended and place a Mercator Projection Map along side this display, it might bring home more graphically the story we want to put across.

Thank you again for your cooperation.

Very truly yours,

Charles Keller

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Weber Costello

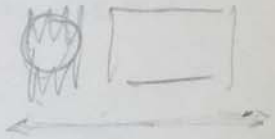
# WEBER COSTELLO COMPANY

*MANUFACTURERS OF BLACKBOARDS • ERASERS • CHALK • ART MATERIALS*
*PUBLISHERS OF MAPS • GLOBES*

CHICAGO HEIGHTS, ILLINOIS

May 25th, 1943

The Museum of Modern Art
11 West 53rd Street
New York, New York



Attention: Mr. Monroe Wheeler

Dear Mr. Wheeler:

Thank you kindly for your letters of May 18th and May 19th expressing an interest in some of our publications for the exhibit that you are planning this Summer.

We are enclosing information on our Reality Political-Physical Maps and their accompanying Life and Latitude Charts, our Tryon Illustrated American History Maps and globe catalog and catalogs on our new World History Maps which are just off the press. This will give you a rather general idea of our line and we suggest that you select those items that appeal to you and we shall arrange to loan them to you for the duration of your exhibit.

I believe that you would be especially interested in our Reality Political-Physical maps of North America, South America, Africa, Asia and Australia as they are on the same scale of miles and if they are hung together on the wall it presents the same picture as though you have a huge 75 inch globe. Europe and United States are just twice the scale as the other maps.

For world maps we would like to call your attention to World in 1914 and World in 1939 shown in our World History catalog.

We have just recently completed a Polar Projection Global World Chart which has come off the press within the last few days. We do not have circular material but certainly you would want to include one of these.

We did produce the 50 Inch Military Globe for the War Department a short time ago and they are now in the offices of the Allied leaders. We are enclosing information on this new and unusual map. We are not at liberty to send out copies of these gores and will not be able to do so for the duration as it is necessary to secure a release from the Office of Strategic Services for each and every map even though all of them have been used by various branches of the Government. We would be glad to send you a photograph of the globe which is similar to the one illustrated in the article of the Chicago Heights Star and perhaps a combina-

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Weber Costello



tion of this information would give you sufficient material for your display.

I would like very much for you to check over this and let me know exactly what you want and we shall arrange to send it to you for a period of 30 to 60 days with the understanding that they can be returned for full credit.

Very truly yours,

WEBER COSTELLO COMPANY

W F Scarborough

W. F. Scarborough

WFS:ERB

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Weber Costello

AIRWAYS

May 19, 1943

Weber-Costello Globe Company
Chicago
Illinois

Attention: Mr. Scarborough

Dear Sir:

I wrote you yesterday regarding our exhibition on air-age geography, and the possibility of your lending us some material for it. This morning I have heard from the OWI that you made the gores for the fifty-inch globes for the Army, the Navy, the President and Churchill, and the OWI has suggested our showing these gores in the exhibition, with proper credit to you, of course. We may not have space enough to show the entire globe, but we should certainly like to show a few sections of it if you cared to supply them. Won't you be good enough to let us know whether this suggestion meets with your approval?

Sincerely yours,

MW:CH

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Weber-Costello

AIRWAYS

May 18, 1943

Weber-Costello Globe Company
Chicago
Illinois

Attention: Mr. Scarborough

Dear Sir:

The Museum of Modern Art is planning to show this Summer an exhibition of geography in the air age, and its effects upon human affairs. We shall include maps, globes, models, charts etc. Mr. Richard E. Harrison has suggested that I make inquiries of your firm as to whether or not any reject globes or gores might be available for demonstrations in connection with the Mercator and polar projections. If so, could you send us a list of the material available, including prices?

With many thanks, I am

Sincerely yours,

MW:CH

P.S. If you would care to furnish this material free of charge, proper credit would be given your company in the exhibition. The Museum, as you doubtless know, is a non-profit, educational institution.

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WILLKIE

Airways

19

September 10, 1943

Mr. Wendell L. Willkie
15 Broad Street
New York, New York

Dear Mr. Willkie:

I am sending you herewith twenty-five copies of the Museum Bulletin on the Airways to Peace exhibition. The exhibition, thanks I am sure to your splendid cooperation, has been immensely successful and in order to accomodate New York school children we have arranged to keep it on until the first of November. It will then go to Washington where the government is making special arrangements to show it in the Commerce Building and thereafter it will tour the entire country.

Your text has been greatly admired in all quarters and we are planning a very wide distribution of this Bulletin to schools, colleges and libraries throughout the United Nations.

With renewed thanks for your brilliant text, I am,

Very sincerely yours,

MW:hw

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Willkie

AIRWAYS

HA 2-3A1

June 18, 1943

Mr. Wendell L. Willkie
15 Broad Street
New York, New York

Dear Mr. Willkie:

I enclose herewith a slightly revised scenario of the AIRWAYS TO PEACE exhibition. The introductory remarks for each section have been prepared for your reference. If you can provide expository paragraphs of about the same length and along the same general lines, but written in your own distinguished and inimitable phrases, we shall be more than delighted.

We have just received confirmation from the White House that the President is sending us, for the opening, the immense globe in his study.

We hope that you and Mrs. Willkie will be able to attend a small supper which the Trustees of the Museum are giving upon the occasion of the opening of the exhibition at seven-thirty on July first. It will be quite informal and will not keep you late.

With many thanks for your invaluable cooperation, I am

Sincerely yours,

MW:CH
Enclosure

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Airways to Peace

Duplicate Willkie

AIRWAYS

HEADQUARTERS FIRST SERVICE COMMAND
Army Service Forces
Boston 15, Massachusetts

June 1, 1943

HA 2-3

Mr. Wendell Willkie
15 Broad Street
New York, New York

Dear Mr. Willkie:

I have spoken to our mutual friend, Russell Davenport, about the possibility of your writing a few paragraphs of text for a great exhibition of American aviation and air-age geography which the Museum of Modern Art is opening at the end of this month.

This exhibition, which we are calling AIRWAYS TO PEACE, is a sequel to ROAD TO VICTORY, which we held a year ago and which attained such success that five editions of it are now touring the world--one in England, two in South America, and two in this country. The purpose of AIRWAYS TO PEACE will be to show the layman, first, why and how the airplane has made it possible and necessary to fight the war all over the earth, and, second, why a durable peace can be made only if the air world is thoroughly understood.

The text for the ROAD TO VICTORY exhibition, which you will find in the enclosed booklet, was written for us by Carl Sandburg, but we feel that no one is so well qualified as yourself to write the text for AIRWAYS TO PEACE. These paragraphs, which would sum up the content of each section of the exhibition, would be enlarged and shown as mural panels, as shown in the illustrations of ROAD TO VICTORY.

The President and Trustees of the Museum all feel that you could render an immense educational service if you would care to lend your international knowledge and your literary skill to this most important undertaking. The Museum, as you know, is a non-profit, educational institution, operating under the charter of the University of the State of New York.

Awaiting the kindness of your consideration, I am

Very truly yours,

MW

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US Army Duffy-

AIR-WAR

HEADQUARTERS FIRST SERVICE COMMAND
~~SERVICES OF SUPPLY~~
Army Service Forces
Boston 15, Massachusetts

IN REPLY
REFER TO: SPKAS 413.53

BJD/hc
~~BOSTON, MASS~~

7 July 1943

The Museum of Modern Art
11 West 53 Street
New York 19, New York

Gentlemen:

As you conjectured, Special Service does not have funds to promote a photographic exhibition. Furthermore, it is questionable whether funds could be raised among public-spirited citizens to finance an exhibition of this sort.

We have not had much success with exhibitions of this sort; and it is my honest opinion that at the present time Special Service cannot aid you.

Sincerely yours,

Bernard J. Duffy

BERNARD J. DUFFY
Major, Infantry
Chief, Special Service Branch

6

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US Dept of Comm - *CAA.

DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
WASHINGTON 25
September 9, 1943

* see also under Civil Aeronautics Admin.

sent 9/14/43

Mr. Monroe Wheeler
Museum of Modern Art
11 West 53rd. Street
New York, New York

Dear Mr. Wheeler:

We have not yet received the negatives and prints of the pictures sent you for your map exhibit. Some of these are our only copies, and we would appreciate having them for our files at your convenience.

Yours very truly,

Charles E. Planck

Charles E. Planck
Chief, Press Section

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AIRWAYS

LIFE

TIME & LIFE BUILDING
ROCKEFELLER CENTER
NEW YORK

EDITORIAL OFFICES

June 28th
1943

Dear Mr. Wheeler:

Just a note to enclose the 8 x 10 print of the helicopter picture which you requested for use in the exhibit at the Museum. I hope we have selected one which gives you the most suitable view for this purpose.

Although this print bears the usual legend about restriction against reprinting, we are agreeable to its being used as you have explained it would be in the exhibit.

Sincerely yours,

Mary Alves

Mary Alves
For the Editors

Mr. Monroe Wheeler
Museum of Modern Art
New York City

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Time-Life - Fortune
JUN 22 1943
AIRWAYS

FORTUNE
TIME & LIFE BUILDING
ROCKEFELLER CENTER
NEW YORK

June 24, 1943.

Dear Mr. Geer:

Miss Ruth Kammler has told me that you are donating the copy of the April 1932 FORTUNE for our Airways to Peace exhibition. Thank you very much indeed for this kindness.

We appreciate also your generous assistance and cooperation in connection with the FORTUNE Maps.

Sincerely yours,

Mr. William Geer
FORTUNE
14 West 49 St.
New York City.

MW:lf

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Miss Ulrich

JUN 22 1943

FORTUNE

TIME & LIFE BUILDING
ROCKEFELLER CENTER
NEW YORK

PUBLISHER'S OFFICE

June 21, 1943

The Museum of Modern Art
11 West 53 Street
New York, New York

Gentlemen:

The confirmation of your order for a copy of the April 1932 FORTUNE, asking that an invoice be sent to your controller's office has arrived. Mr. Geer has asked me to tell you that as he said in his letter of June fourteenth, this copy of FORTUNE was sent to Mr. Keller with his compliments.

Sincerely yours,

Ruth Kammler

Ruth Kammler
Publisher's Office

RK:kh

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Fortune
AIRWAYS

# FORTUNE

TIME & LIFE BUILDING
ROCKEFELLER CENTER
NEW YORK

EXECUTIVE OFFICES

June 17, 1943

Mr. Monroe Wheeler
The Museum of Modern Art
11 West 53rd Street
New York City

Dear Mr. Wheeler:

I have your letter of June 10 and am very glad indeed to give you permission to show a number of the preliminary sketches and drawings for our FORTUNE Atlas, in your Airways to Peace exhibition.

I note that you will give credit to FORTUNE and to artist Harrison. But if any photographs are taken for press or other purposes I would appreciate it if you would see that the TIME Inc. copyright is clearly indicated.

Sincerely yours,

William D. Geer

William D. Geer
General Manager

WDG rk

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Ed Zukin WI 7-4922
Hill, Knowlton
Fortune
AIRWAYS

# FORTUNE

TIME & LIFE BUILDING
ROCKEFELLER CENTER
NEW YORK

John Hill

EXECUTIVE OFFICES

June 14, 1943

Mr. C. Keller
Museum of Modern Art
11 West 53rd Street
New York City

Dear Mr. Keller:

Miss Hamilton has told me of her conversation this morning with Miss Weinstein concerning the Museum's interest in the Ptolemy map reproduced in the April 1932 issue of FORTUNE. I am having a complimentary copy of that issue of the magazine sent you from our Jersey City offices, and it should be in your hands very shortly.

So far as we are concerned, you are of course more than welcome to this magazine copy of the map. But unfortunately I am not at liberty to give you permission to use it for your Airways to Peace Exhibit since (as you will see from the credits on page 60) it is from the collection of Dr. Rosenbach. Will you therefore get in touch with the Doctor before making any plans in this connection?

Sincerely yours,

William D. Geer

Dr Abraham Simon Wolf Rosenbach

William D. Geer
General Manager

WDG rk

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Fortune

AIRWAYS

June 14, 1943

Time Magazine
Rockefeller Center
New York, New York

Attention: Miss Bishop

My dear Miss Bishop:

Mr. Wheeler has gone to a meeting, but before he left he asked me to return to you the attached map by Richard E. Harrison. Mr. Wheeler is more than grateful for your kindness in letting have this map. Thank you very much indeed.

Very sincerely yours,

(Mrs. C. S. Hartman)

CCH:cv
Enc.

(The Yok-to-off Undercide of Europe)

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TIME

Fortune
AIRWAYS

June 10, 1943

Mr. William Geer, Business Manager
Fortune Magazine
Time and Life Building
New York, New York

Dear Mr. Geer:

I am enclosing herewith the outline for an exhibition which I believe Richard E. Harrison has mentioned to you, entitled Airways to Peace. The Museum of Modern Art is planning to open this exhibition on June 29. We have had the generous cooperation of the Army, Navy and other Government departments. We should like to request permission to show in this exhibition certain preliminary sketches and drawings from the Fortune Atlas, and should be willing, of course, to give Fortune proper credit. If you approve of the inclusion of this material in Airways to Peace, will you kindly drop me a note giving us your permission to use it?

With many thanks, I am

Sincerely yours,

MW:BK
Enc.

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A to P

TIME

TIME
INCORPORATED

TIME & LIFE BUILDING
ROCKEFELLER CENTER
NEW YORK

EXECUTIVE OFFICES

June 3, 1943

Mr. Charles Keller
Museum of Modern Art
11 West 53rd Street
New York City

Dear Mr. Keller:

All in all, I had a pretty bad time getting together the maps you wanted, and not too much luck in the end at that. For the past couple of days I have kept up the struggle and so these are somewhat delayed, for which my sincerest apologies.

I am sending you my own file copy of "The Not-So-Soft Underside" and would like very much to have it back after you are through with it.

The maps which are missing from this collection are as follows:

Blood, Toil, Tears and Sweat.
China
Grosse Deutschland
World Divided

And there is only one of the U. S. S. R. and one of "Southeast to Armageddon".

Sorry that I couldn't fill the entire bill and I hope that you will get in touch with me if there is anything else I can do.

Sincerely,

Dorothy W. Bishop

Dorothy W. Bishop
Bureau of Special Services

DWB:met

Eyes East

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Davenport - re. Willkie

AIRWAYS

May 28, 1943

Mr. Russell Davenport
Time and Life Building
Rockefeller Center
New York, New York

Dear Russell:

I send you herewith the outline of our big Summer show on air-age geography, called "Airways to Peace." This is a sequel to the Road to Victory exhibition, which showed in great photographic murals the fighting power of our country. The captions for the Road to Victory show, illustrations of which you will find in the attached booklet, were written by Carl Sandburg, and we must now find someone of equal or greater distinction to write the captions for this new exhibition which, judging by all the responses so far, promises to be even more popular. Three editions of Road to Victory are now touring the United States, and two have been sent to South America--one to Colombia to travel south, and one to Uruguay to travel north. The OWI sent a duplicate version of the exhibition to London, where it was shown at Dorland Hall to 70,000 people in three weeks, and is now touring Great Britain.

The purpose of the Airways to Peace exhibition will be to show how and why the fighting power demonstrated in Road to Victory must be used all over the earth. The show will simplify for the layman aspects of global geography which he has heretofore not understood.

We all feel that no one is in a better position to write the captions for this important educational exhibition than Wendell Willkie, and as you are his friend I wonder

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if you will be good enough to tell him about it and find out whether he would want to do so? All that would be necessary would be a dozen or so paragraphs which would crystallize the essential story, and I think it would be possible for him to do this without too great cost of time.

The Museum of Modern Art is, as you know, a non-profit educational institution operating under the charter of the State of New York, and we cannot as a rule offer honoraria. Carl Sandburg contributed the test to the Road to Victory exhibition, and we hope that Mr. Willkie will feel, as we do, that a few words from him on this subject will perform an invaluable service in clarifying the layman's view of our new concept of our world.

With many thanks, I am

Very sincerely yours,

P.S. If Mr. Willkie would like to write the captions, or in any case for that matter, we should very much to have him and Mrs. Willkie attend the dinner preceding the opening of the exhibition on June 29.

MW:CH
Enclosures 2:
Outline
Road to Victory Bulletin

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# ARMY & NAVY

## AIR

### What's in It for the U.S.?

*At the close of the last war I sat at international council tables representing our nation on vital matters affecting aeronautics. Yet my colleagues and I had been given only a few days . . . to prepare. And across the tables sat representatives of the Allies who had been preparing for months and even years. They were equipped with a program. . . .*

Colonel Edgar Staley Gorrell, president of Air Transport Association of America, was testifying last week before a House committee. Like many another U.S. air executive he was not only looking back with regret, he was also looking ahead with foreboding. One day peace would come, and with it the vastest problem in world transportation that peacemakers had ever met. The world had to be opened to the airlines, How could it be done?

**Dream Fulfilled.** The day of world air transport is no longer a pipe dream. It is here. There is not a meridian on the earth's fat face that freighters and passenger aircraft do not cross. There are few latitudes where they do not operate, none where they cannot. Yet the day of air transport is only dawning. New aircraft with vastly increased loads and ranges (up to 10,000 miles) are all but ready to fly. Behind them, far past the planning stage, are larger craft still. And following them are new technologies that will increase ranges and loads again.

One of the rubs in the problem is that most of these improvements are the developments and properties of the U.S. Driven by war's necessities, the U.S. has developed its passion for big aircraft (beginning with bombers) beyond airmen's most purple dreams. Cast by war as operator of its longest supply routes, the U.S. has literally been driven into the world transport business.

AIR TRANSPORT'S GEORGE
*Now statesmen are needed.*

So when crop-haired, electric Major General Harold Lee George of the U.S. Army looks at his Air Transport Command, it is the whole world he sees. At some of his bases camels lug in the fuel for U.S. transports; at others, sledge dogs; at others, Chinese coolies or Untouchables. Seeing what he sees, he can and does say that "to place any limitations on air transport at all would be to deny progress."

**Fulfillment Deferred?** But to implement that progress, the need now is not for soldiers but for statesmen. Though the U.S. has the equipment and the experience no other country has, it is still poor in the pivotal bases on which world air transport depends. Those bases belong to U.S. allies —Britain, Russia and China. Unless U.S. statesmen can wangle the rights to their use, the U.S. will be left at the post. That is why airmen say that now is the time to face the situation.

Aircraft's increasing ranges have changed the old concept of world air trade out of all knowledge. Most of the world's worthwhile trade territory, except for South America, lies in the Northern Hemisphere. The shortest way to points in that hemisphere is by Great Circle routes. All these routes go over the top of the world (*see map*), where airmen have already demonstrated they can fly.

Thus the shortest U.S. routes to the great trade centers of the world lie across Canada, Russia and China. At many of the terminal points, and at pivotal spots along the routes, the U.S. has already put billions into airdromes, weather reporting stations, radio stations. All these paraphernalia are necessary to world air travel. Yet, six months after the war ends, all will revert to the nation on whose possessions they are built, unless. . . .

**Five Freedoms.** At this point airmen like Hal George can tell anybody exactly what they want. They are not much concerned with what might be called "freedom of the air"—a phrase not yet fully defined. More than an as-yet-undefined freedom for everybody, they want more freedom for the U.S. To their practical minds, what is wanted is not four freedoms but five: 1) ownership of bases,

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# DOUBLE DANGER TO FALSE TEETH IN BRUSHING

**WITH MAKESHIFT CLEANERS**

**1 BREAKING**

The more you handle your dental plate while brushing it, the greater the danger of dropping and breaking it. Millions of experienced denture wearers have changed from dangerous, old-fashioned brushing methods to the modern way of soaking the plate in Polident.

**2 WEARING DOWN**

Toothpastes, toothpowders, soap and household cleaners are only "makeshifts" when it comes to cleaning dental plates—which are much softer than natural teeth. Brushing with "makeshifts" may scratch and wear down dental plates. Also, these scratches cause stains to collect faster, cling tighter.

**DO THIS EVERY DAY!**

Put one level teaspoonful of POLIDENT in ½ glass of lukewarm water. Stir briskly. Place plate or bridge in solution for 15 min. or longer —overnight if convenient. Rinse well—and use.

**PREVENTS "DENTURE BREATH"**

You won't know you have it—*but others will!* POLIDENT, used regularly, dissolves film—leaves plates odor-free, sweet.

Daily use of Polident maintains the original natural appearance of your denture. *Polident is recommended* by many leading dentists. Approved by leading mfrs. of denture materials.

**LESS THAN A PENNY A DAY**

Generous 3 oz. size—30¢, Economy size, 7 oz. —60¢. At all drug, department, variety stores. Less than 1¢ a day for safe cleaning of dentures.

**POLIDENT**

*The Safe, Modern Way to Clean Plates and Bridges*


2) of customs (so that transient passengers and freight can pass freely, 3) radio communications, 4) operations without unreasonable interference, 5) weather observation. To secure these five points is the statesman's problem. Airmen can only state it.

The most effective guarantee of world air transport and its promise of world peace would be complete freedom of the air—the right of any nation's planes to fly over any other nation. Yet Britain, for one, forced by war to the exclusive building of warplanes and the consequent neglect of commercial aviation, is hardly likely to agree off-hand. If she did, it would mean world domination of trade by the U.S. Russia is in a like situation; so is China.

Even U.S. airmen are doubtful of the wisdom of unqualified freedom of the air: along with its easing of trade routes it would also carry a constant menace. Free air traffic by all nations would expose the peaceful to surprise air attack.

**Trading in Order.** But airmen see great hope in qualified freedom. The broad-minded concede that, since the U.S. has the tools and the know-how, and Britain most of the bases, the obvious thing to do is to strike a bargain. For its share of the bargain, the U.S. is likely to have to trade more than the five freedoms at its own ports of entry. To keep title to some of the bases it has built, and to fly its planes over other countries, it may have to give up airplanes, manufacturing methods, even experienced airmen, to the airlines of other nations.

The U.S. will have to strike a bargain, too, with China and Russia, knowing that in their case it can lay far less claim to the five freedoms than it can in dealing with Britain. It will have to bargain with Liberia, Persia, Sweden, many another non-combatant that is under no obligation for U.S. help in World War II. For airmen the bargaining cannot begin too soon.

## COMMAND

### Up Ike, Up Andy

The most important U.S. command in World War II last week fell upon the husky shoulders of Lieut. General Dwight David Eisenhower. When he was appointed Chief of the Allied Forces in North Africa, with American, British and French land, sea & air forces under him, there was no longer any doubt that 52-year-old "Ike" Eisenhower was to be the Pershing of 1943. His immediate responsibility: to crack Tunisia, a nut which was beginning to look tougher every day. His probable eventual responsibility: to invade Europe.

Eisenhower's elevation to a full general, giving him equal rank with Marshall and MacArthur, seemed to be only a matter of time. By the account of newspaper dopesters, a British General (Alexander), Admiral (Cunningham) and an Air Marshal (Tedder) will serve under him, as will French General Giraud. Only 23 months ago Ike Eisenhower had been a lieutenant colonel, five ranks and a million years below four stars.

**Airman to England.** To succeed General Eisenhower as Commander of U.S. Forces in the European theater went Lieut. General Frank Maxwell Andrews, whom many flyers rank No. 1 among American military airmen. Silver-haired, deep-chested Frank Andrews is the soft-spoken father of U.S. air power by virtue of his term (1935-39) as first chief of the GHQ Air Force. He was the ranking and most

Official Photo U.S. Army Signal Corps-International

**GENERALS, JUST OUT OF BED**

These U.S. generals, convalescing on an Australian hospital porch, are proof enough that this war can be as perilous for military bigwigs as for privates. They are Brigadier General Hanford MacNider, Major General Albert Whitney Waldron and Brigadier General Clovis E. Byers. All were wounded in New Guinea battle action. For his part in the war in the Pacific, MacNider, onetime National Commander of the American Legion, last month won the Oak Leaf Cluster, Byers won the Silver Star.

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# WORLD BATTLEFRONTS

## BATTLE OF THE PACIFIC

### We Have Not Yet Begun

The job of beating Japan has only been started. It is not even certain that Japan has been stopped.

**Concentrated Diversion?** Since Nov. 15 the restless Jap has made no major offensive moves. He seems for the time being to have given up much thought of retaking Guadalcanal: each of his tries there had been disasters. Reconnaissance has made the Jap aware of the great increases in Admiral William Halsey's forces east of Australia. This week Navy Minister Shigetaro Shimada said that Jap planes had spotted a huge U.S. task force off Rennell Island, south of Guadalcanal. (He claimed that torpedo planes had sunk two battleships and three cruisers.)

If a major action was actually in the making, the Japs might well be anxious to create a diversion. In Canberra last week the Australian Government announced that it had "ample evidence" that the Japanese were preparing "a move of the utmost importance." All along the great arc of islands above Australia new concentrations had been sighted. Reconnaissance had spotted new airfields on Timor, 300 miles from Darwin. The increasing tempo of Allied raids directed at Timor and the naval base of Amboina was a measure of Australian nervousness.

Prime Minister John Curtin warned his country three times within the week that some dangerous new Japanese initiative was possible. He mentioned Timor and The Netherlands Indies as possible springboards. Said he: "The concentration of which the Japanese is capable . . . may be stronger than the resistance which we can concentrate."

To the Australians the danger seemed serious. They know that the Jap is still strong. In no single vital respect is Japan yet defeated.

**Shipping** is Japan's first vulnerability, but the weakness is so far only potential. The Japanese merchant marine on Dec. 7, 1941 amounted to about 6,000,000 gross tons. Since then the Allies have sunk 170 Japanese bottoms, probably sunk 18, damaged 80. Altogether about 1,250,000 tons have been destroyed. But these sinkings have been largely offset by Jap seizures, requisitions and purchases—such as the huge coastwise fleets of British firms in China, Jardine, Matheson & Co. and Butterfield & Swire. Old ships which have had to be broken up have probably been at least partly replaced. New production, now somewhat under 500,000 tons a year, is increasing gradually toward a goal of about 750,000 tons a year. This is less than one-tenth of the 1942 U.S. program.

Best evidence that shipping is not yet seriously handicapping the Japanese is the fact that they have plenty of tankers. This is a fuel war, yet the Japs have enough tankers to use them for other military cargoes. The Japs have also converted whalers to be seaplane and landing-craft tenders, and they are now busily building a fleet of wooden junks, for coastal bay-hopping. Overland routes on the continent are beginning to relieve coastal shipping of part of its load. So far, Japan's shipping shortage is less acute than that of the Allies.

**Manpower.** The Japanese Army has scarcely been touched. In all the South Pacific theater and in Burma, not more than three or four Jap divisions are in immediate contact with Allied troops. Probably not more than 40,000 Japanese soldiers have been knocked out. The Japs still have almost 3,500,000—about 750,000 in Manchukuo, 800,000 in China, perhaps 100,000 in Indo-China, Malaya and Thailand, more than 75,000 in Burma, perhaps 90,000 in the southern islands, and all the rest in "depot" divisions in Formosa and Japan.

Even if Allied troops can pick off Japanese at the rate of better than two for one* victory will call for greater Allied numbers than are now to be seen on any Asiatic horizon—except in China, where offensive equipment is lacking. Wrote Archibald T. Steele in the Chicago *Daily News* last week: "We are killing Japs at the rate of a couple of hundred daily, but Jap youths are coming of age at the rate of a thousand daily."

**Air Power.** The qualitative superiority of U.S. pilots is now unquestioned. Yet there is so far no conclusive evidence that Jap air power has been seriously hurt. U.S. pilots in the Solomons say they think they are up against the Jap second team, but that does not preclude the possibility that the first team is resting somewhere on the bench.

According to the best available estimates—and the best are none too good—Japan started the war with between 5,000 and 6,000 battle planes. About 2,000 have been destroyed in all theaters. The Japanese have doubtless suffered much wear & tear behind the actual fronts. But the present Japanese rate of production is estimated at around 1,000 per month, and there have been 14 months of war. Jap first-line strength is probably still 5,000 or over—perhaps equal to Germany's quantitatively. Pilot losses have been heavy, but it is impossible to know, for instance, how many of the pilots from the four Jap carriers which sank at Midway pancaked near other Jap vessels and were saved.

**Sea Power.** The stirring autumn battles in the Solomons have given the impression that the Japanese Navy has been whittled unmercifully. Indeed, since war's beginning, 104 Jap warships have been claimed sunk, plus 22 probably sunk. Of these perhaps 25 were cruisers and more than 50 were destroyers, whittling the Japs in these vital categories to about 25 and 85 respectively. However, little is known of the Japanese replacement program. U.S. production ought by 1944 to give the U.S. definite naval superiority over Japan; but the fact is that at this moment Japan still enjoys at least equal naval weight in the areas of contact.

**Bases.** In the kind of Pacific warfare which Vice Admiral John W. Greenslade calls "omnibian," air and sea bases are as important as numbers of planes and ships. In this respect Japan is in a far stronger position than the Allies. At sea, while the Allies improvise with external lines at such harbors as Nouméa and Suva, the Japs have great forward bases at Rabaul, Surabaya, Singapore, intermediate bastions at

* On Guadalcanal, where most of the land battles have been defensive, the ratio has been higher. But on the offensive, better than two for one is an average expectancy. General MacArthur announced last week that Papuan losses had been "less than half" of Japanese losses.

Acme

THREE JAP PRISONERS IN NEW GUINEA
*The Japanese Army has hardly been touched.*

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Hong Kong, Manila, Formosa, Truk, rear bases in Japan proper. In the air, they have a string of airfields from Manchukuo, through China, down the Indo-China and Thailand promontory, along the Malaysian chain to Borneo, the Celebes, New Guinea and the Solomons.

**Warstuffs.** Naturally and by conquest, Japan now finds herself in possession of just about all the raw materials she needs for war. Copper is the only apparent shortage, and she has plenty of aluminum to substitute. She has crude oil to spare and soon will have refineries at work. She has enough rubber to sell some to Russia. She has acquired iron in Korea, Indo-China, Malaya and the Philippines—enough for an annual steel production of something less than 8,000,000 tons; coal in Korea and China; lead and zinc in Burma; bauxite in Malaya and The Netherlands East Indies; chrome in the Philippines; antimony in China. Her facilities for processing these metals are not altogether satisfactory. She can count on rice from Burma, Thailand, Formosa; sugar from the Philippines and Netherlands Indies; soybeans from China. Lumber, especially for shipping, worries her a little. For the time being, she is well set for aircraft machinery but needs certain precision tools and parts, such as exact ball bearings. She does not worry about bombings as long as Shangri-La is farther from Tokyo and much more uncertain than Britain in relation to the Ruhr. Industrially, Japan is by no means near collapse.

**Ambiguous Empire.** The most significant single thing about Japan's exploitation of East Asia is the differentiation between inner and outer zones of Empire. The inner zone roughly comprises the territory gained before Pearl Harbor, the outer zone the rest.

Japan pursues two distinct policies in the two zones. Capital investment, colonization, education and a centrifugal imperialism are evident in the inner zone. Emigration to the outer zone is discouraged, perhaps even forbidden; those who go there are sent on specific missions. No capital is invested in the outer zone. The cream is simply skimmed by persuasion or force. Throughout the outer zone an inextricable web of legal ownership is being developed, while on the surface autonomy is apparently maintained—as with the Vargas regime in the Philippines, the Luang Pitul Songgram government in Thailand, the surviving Decoux governorship in Indo China.

There is an obvious point to this dichotomy. Japan may not retain full sovereignty in the outer zone after the war. But she clearly intends to remain dominant economically. Japan is apparently jockeying to be in a position, after Hitler's fall, to bargain for a negotiated peace in which the war-weary Allies would lose no face, Japan would lose no vital advantages. If she achieved such a stalemate, Japan would have won her war.

**BEHIND EUROPE'S WALLS**

With his new defeats in Russia and the loss of all Africa except Tunisia, Hitler may indeed go on the defensive as he promised his people last fall. And if he does so, the defensive may make him harder rather than easier to beat. He is turning his *Festung Europa* into a giant hedgehog with many outlying strong points.

On the south, where the Germans expect a thrust across the Mediterranean, they are building their main line of southern fortifications well back of the initial invasion area, preparing in the last resort to sacrifice Italy, Greece and southwestern Yugoslavia. The southern line, existing and abuilding, runs from the Spanish border across northern Italy to Fiume, then southeastward along the Sava valley and down a historic route of Balkan invasion—the Vardar Valley—to heavily defended Salonika.

On the east, where the Russians last week were within 125 miles of the old Polish border, the Germans' plans were better hidden, but London heard that the famed Todt organization was at work on an "Eastwall" extending southward from Riga, through Poland and the deep Pripet marshes, along the Carpathians, to the famed "Iron Gate" of the Danube Valley.

On the west German fortifications are being strengthened all along the coast of the Low Countries and France down to the Spanish border where the Pyrenees offer natural defensive positions. On the north the Germans have outlying bastions in Norway to protect their relatively unarmored Baltic front.

But in one sense Hitler has no wall at all—the R.A.F. and U.S. Air Forces can carry the war at will into the heart of Germany from Britain, and in North Africa and the Mediterranean the Allies are fighting f r bases which will expose German Europe to sustained air attack from the lower side as well.

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# WORLD BATTLEFRONTS

## BATTLE OF THE ATLANTIC

### To the Finish

Adolf Hitler last week served notice that his submarine campaign is the most dangerous weapon in Germany's armory of defense, and that to beat it the U.S. and Britain must bring their best might & brains to bear. Into the supreme command of the German Navy, succeeding famed old Erich Raeder, moved thin-lipped Admiral Karl Doenitz, whom the Germans call the greatest submarine genius of history.

Doenitz devised the U-boats' "wolf-pack" tactics, and he has recently sent them to sea in multiple, menacing "echelons of packs." Said he when he took command last week: "I will put the entire concentrated strength of the Navy into the submarine war. . . . The entire German Navy will henceforth be put into the service of inexorable U-boat warfare. The German Navy will fight to the finish."

With the ruthless, 50-year-old Doenitz now in full charge, with submarine production in Germany booming, the U.S. and Britain can expect intensified assault by 500 or more long-range, highly effective U-boats this spring. Until this threat is checked by more escort vessels and perhaps by a top Allied anti-submarine commander of Karl Doenitz' caliber, the Allies will not win their war.

International

WOLF-PACK DOENITZ
*Wanted: a way to check him.*

Wide World

BRITISH PACK TRAIN IN TUNISIA
*Aircraft might open the oyster.*

U.S. Secretary of the Navy Frank Knox, in Honolulu after a tour of the Pacific (*see p. 20*), well understood the danger in the Atlantic. Said he: "It would be unwise to be optimistic as to the submarine war in the Atlantic. There are losses ahead, but this is a victory we have got to win, and we will win."

## BATTLE OF AFRICA

### Bloodiest Stage

The Allies faced a new and probably the bloodiest stage of all in North Africa.

Advance British patrols crossed the Tunisian border last week. Behind them the main force of the victorious British Eighth Army swept boisterously through Tripoli, pounded on over arid, rocky desert land on the heels of Rommel's retreating troops. But General Sir Bernard Law Montgomery was ahead of his supplies, and he may have to pause until Tripoli is put in shape to serve him as a base.

As Rommel fled, Allied forces in central Tunisia jabbed at the Axis flanks, trying to slash through to the coast and intercept him. Along the edge of the Axis corridor, the fighting showed signs of developing into a major conflict. But at week's end determined German resistance still kept the corridor open for Rommel's escape. His junction with General Jürgin von Arnim, uniting some 130,000 Axis troops in a strong position, seemed certain.

Washington strategists thought a month ago that the African situation might be cleared up in February. Now they hardly hope for victory before summer. Transatlantic supply is slow and difficult. Rains still wash the northern quagmire. Not until late spring or early summer will Tunisia really dry out.

**Land, Air, Sea.** At Allied headquarters in North Africa, an imposing assemblage of military chiefs conferred.* Their presence underscored the problems which will have to be solved: problems of supply, manifold and coordinated operations on land, in the air, on the sea. For the moment, the air offered their major opportunity. Allied planes had the edge over the *Luftwaffe*. Axis positions, concentrated as they are, are an airman's oyster. Axis ports are few: Bizerte, Tunis, Sousse, Sfax and Gabès—none of them large, all within 200 miles of each other, all within easy bombing range of Allied airdromes. Perhaps aircraft can lay the oyster open for earthbound troops before Tunisia dries out.

## BATTLE OF RUSSIA

### Definition of Disaster

The gains of summer were now nearly consumed by the losses of winter. Berlin's communiqués intoned a refrain: "In order to shorten the front . . . the German troops, obeying orders, are withdrawing to a new, shortened line. . . . Movements of our troops continued without interruption by the enemy. . . ."

For Germans at home, bombarded by official pessimism in order to screw them up to maximum effort, the most fearful fact of all was that their propaganda was

* General George C. Marshall, Admiral Ernest King, Field Marshal Sir John G. Dill, Admiral of the Fleet Sir Dudley Pound, Lieut. General Dwight Eisenhower, General Sir Harold Alexander, Admiral Sir Andrew B. Cunningham, Lieut. Generals Henry H. Arnold and Brehon B. Somervell, Vice Admiral Lord Louis Mountbatten, Lieut. General Sir Hastings Ismay, Air Vice Marshal Inglis and Lend-Lease Administrator W. Averell Harriman.

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true. The Axis armies in Russia were indeed shortening their lines—shortening them so far that nearly all the gains of 1942 were already lost, shortening them to the point where further retreats might invite disaster.

**Voronezh to Kursk.** The line that the Germans hoped to hold in the south became fairly clear (*see map*). If they could keep Kursk and Kharkov—the starting points of their summer drive—and retain a line swerving southeastward to Rostov, they would still have the main arteries of their principal supply system and most of the industrially rich Donets basin. Fortnight ago, the Red Army seemed to have a chance to threaten this "last line." This week, after they completed the repossession of Voronezh and swept westward, the Russians were actually attacking the outer bastions of that line near Kursk and Belgorod. To the south, beyond Kharkov, the Germans' maximum hope was to hold a bulge protecting that key city and the northern approaches to Rostov. Of these objectives, the greatest gain for the Russians and the greatest loss to the Germans would be Kharkov, fulcrum of the entire Axis line between the Red armies in the south and the outer defenses of the Reich itself (*see map, p. 21*). Second in importance was Rostov—a vital gate to the Caucasus and the Crimea—which the Germans seized and lost once before.

The Donets basin is the greatest prize the Germans have won in Russia. If they have to retreat from Rostov, giving up the eastern half of the basin, they could still try to hold a straightened version of the Kharkov-Mariupol line from which they started last year, and the richer western half of the basin would still be German. Any retirement beyond that line could be attributed only to utter defeat.

**The Caucasian Campaign** was for oil, and last week the Germans lost Maikop, the only oil center they had captured. They also lost a controlling point (Tikhoretsk) on the rail line connecting Rostov with the Black Sea port of Novorossiisk, the Germans' only alternate way of retreat from the Caucasus, and that alternative was itself being threatened near Krasnodar. The Stalingrad area had been almost cleared (*see below*), releasing troops and freeing rail lines for the Rostov battles.

In the whole south of Russia the Axis had little left to show for 1942. From Voronezh to the sea, the Axis lines had been shortened very nearly to the breaking point.

## They Won Together

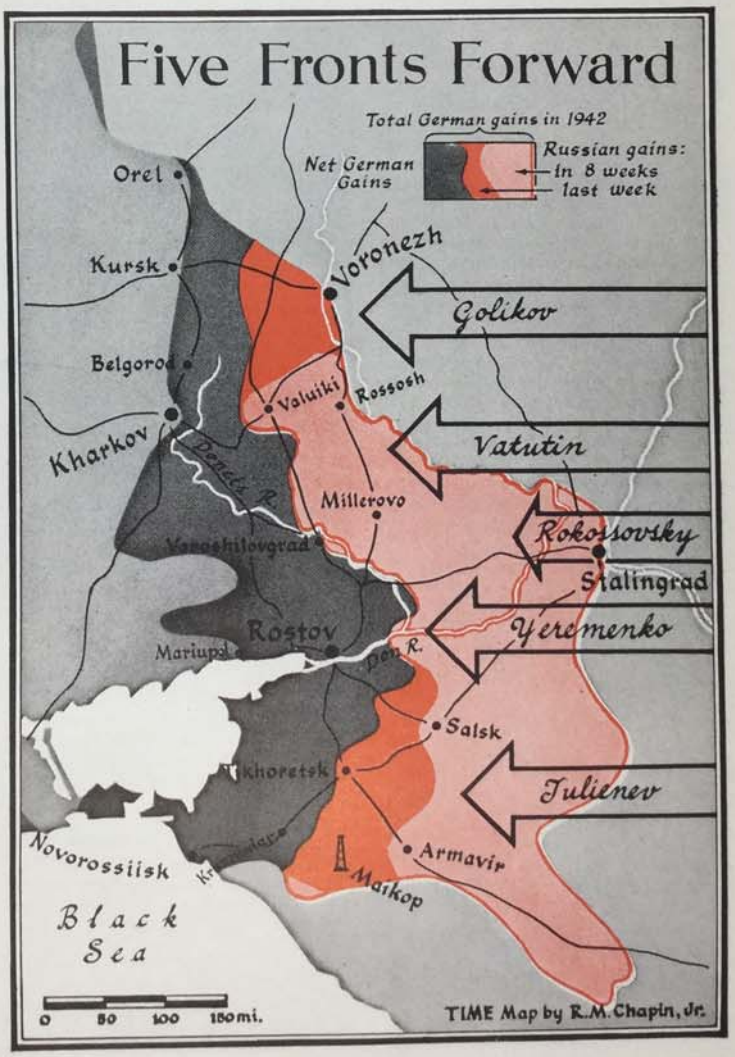
This week the battle of Stalingrad—perhaps the most decisive in the Russo-German war, if not in all of World War II—approached its end. The Red Army had killed or captured most of the German and Rumanian troops that had been hammering the city since last August. In the final stages even the Nazi Commander, Field Marshal Friedrich von Paulus, surrendered along with 16 other generals.

The victory meant much more than the destruction of a great army. It meant the complete failure of Hitler's 1942 strategy in Russia: to outflank Moscow from the south, render the Volga lifeline useless to the Russians and secure the German flank driving through the Caucasus toward Baku and the Middle East. It also meant that the Red Armies defending Stalingrad and the Volga were free to push west and join the armies smashing at Rostov and Kharkov.

The only compensation for the Germans was that by holding out for three weeks after their ultimate doom was sealed they prevented all the Red Armies in the south from striking in unison. Said Berlin: "The conclusion of this military venture supplies the epilogue to a military undertaking whose history will be written with the blood of heroic fighters."

Not until last week did the Russians reveal how nearly the German Sixth Army had come to capturing Stalingrad. In September the Germans actually occupied the central part of the city. Concentrating their power in the industrial districts, they then stormed into the Stalingrad tank factory, but failed to drive on to the Volga. Often the opposing lines were only 15 yards apart. Most of the fighting was done with hand grenades, one Russian division using more than 100,000 in a single month's fighting.

Red Army headquarters was moved five times. At one stage the Russian position



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seemed so hopeless that Lieut. General Vassili Chuikov, who commanded the Sixty-Second Army under Colonel General Konstantin Rokossovsky (*see col. 3*), ordered his chief of staff to cross to the east bank of the Volga. His chief refused and said: "We will win or die together."

## Men of War

Red Army generals remain practically anonymous until they demonstrate their abilities. Last week, as half a dozen armies continued to chew up the *Wehrmacht* in South Russia (*see map p. 23*), the bestowal of the Soviet Union's highest military honor —the Suvórov Order, First Degree— brought some of them into world's view.

**Savior of Stalingrad** and commander in chief of the armies threatening the German flank in the Caucasus from the northeast is *Colonel General Andrei Ivanovich Yeremenko*, 50. Stocky, brown-haired, he was born in the Ukraine, left a farm to join the Czarist Army in 1913. After the peace he organized guerrilla bands to fight the Germans in the Ukraine, served during the Civil War as a cavalry officer under Semion Budenny. When the Germans invaded Russia, Yeremenko assumed command of an army west of Moscow, played a leading role in the defense of the capital, shifted to Stalingrad when its fall seemed imminent. In 19 months of war he has been wounded seven times. His wife and youngest son were killed in the Ukraine.

**Hero of Kotelnikov** and commander in the field under Yeremenko is thickset, deep-dimpled *Lieut. General Rodion Yakovlievich Malinovsky*, 44. Odessa-born, he joined the army when he was a boy, fought in France (Amiens, St. Mihiel) with a Russian infantry brigade alongside Americans and Britons. "I shall never forget the British," he says. "Shaving in the darkest days, pipes perpetually between their teeth, they never moved faster than a walk whether in advance or retreat." In this war he won the Order of Lenin for helping to defeat Colonel General Paul Ludwig Ewald von Kleist during the Red counteroffensive of 1941. Last December he smashed Field Marshal Fritz Erich von Manstein's powerful effort to relieve the Germans at Stalingrad.

South of Malinovsky's Armies, in the north Caucasus, is another force, under *General I. V. Tulienev*, which last week captured the Maikop oil fields. Black-moustached, fun-loving General Tulienev is an expert in mountain warfare, often zips up to the front on skis.

Sovfoto

YEREMENKO
*Stalingrad.*

Associated Press

GOLIKOV
*Voronezh.*

**Leader at Voronezh**, where the Red Army is driving on Kursk and Kharkov (*see p. 22*), is *Colonel General Filip I. Golikov*, 48. A tall, husky man with a broad face, he is one of Russia's principal tank experts. At war's start he was a key member of the General Staff, but when Moscow was threatened he took command of a field army. His offensive may well turn out to be the most important of all the winter drives.

**Cavalryman of the Southwest**, where one army is moving side-by-side with Golikov's troops toward Kharkov and another is pushing down the railway below Millerovo toward Rostov, is *Colonel General Nikolai Vatutin*, 42. Another veteran of the Czarist Army and the Revolution, Vatutin was an Army commander in the Ukraine when the Germans invaded it. He skillfully retreated from the Dnieper Bend, then helped Marshal Timoshenko launch successful counterattacks.

Sovfoto

TULIENEV
*Maikop.*

**Master of the Don** is *Colonel General Konstantin Rokossovsky*, 50, one of the tallest (6 ft. 4 in.) officers in the Red Army. He was a Czarist major in the last war, joined the Red Guards in 1917. During the defense of Moscow he commanded the central sector on the Smolensk highway, later was shifted to the south. His armies were part of the Red pincers which trapped the Germans at Stalingrad. Now he is mopping up the Don Bend.

## AIR

### A Sergeant's Prayer

A poem which seems certain of countless reprintings, of a place in all subsequent anthologies of war poetry, reached the U.S. last week from the Near East. Its author: Sergeant Hugh Brodie of the Royal Australian Air Force, onetime Melbourne University student, now "missing in action." Wrote he:

*Almighty and all present Power,*
*Short is the prayer I make to Thee,*
*I do not ask in battle hour*
*For any shield to cover me.*

*The vast unalterable way,*
*From which the stars do not depart*
*May not be turned aside to stay*
*The bullet flying to my heart.*

*I ask no help to strike my foe,*
*I seek no petty victory here,*
*The enemy I hate, I know,*
*To Thee is also dear.*

*But this I pray, be at my side*
*When death is drawing through the sky.*
*Almighty God who also died*
*Teach me the way that I should die.*

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# SCIENCE

## Electronics in Control

One of the most important U.S. task forces of World War II—which may do the enemy as much damage as any that the nation sends overseas—consists of several thousand scientists. In complete military secrecy they all work together in one big building at one big scientific institution on one big problem: wartime applications of and improvements on the electron tube.*

The incredible accuracy of U.S. naval guns at Casablanca, which at 26 miles smashed the hull of the French battleship *Jean Bart* in two salvos, was a triumph for the electron tube. Declared Rear Admiral Stanford C. Hooper last week: "Radio directed and reported the destruction." Even at the very hour that war began the electron tube was the first to serve the nation. On Dec. 7, 1941 the electron tube caught the mutter of Japanese aircraft when they were 132 miles away from Pearl Harbor.

No man can see 132 miles, or even 26, and the men at Pearl Harbor and Casablanca were no exceptions. But the electron tube can. What is more, the electron tube can hear, feel, taste, remember, measure, count and talk. Unable to think and without a conscience, the tube is still less than human. But with proper accessories it far exceeds the human senses (except taste and smell) in keenness.

Its vision, for instance, allows it to "see" beyond the horizon, through fog and clouds, in black dark. It can "see" through stone and steel to detect invisible internal flaws. It can "see" the whiskers on a disease germ that is only a speck in the best microscope.

With electron tubes any combat unit, even a plane streaking across the night sky above the clouds, is in close touch with its command post. Army headquarters in Australia, Iceland, Tunisia, China are neighboring plugs on a single electronic switchboard.

When war ends, the new war-born developments will "go to peace." Already electron tubes of various forms can accomplish miraculous things:

▶ Count and sort merchandise (*see cut*), match colors and finishes, gauge size and thickness of materials to a millionth of an inch.

▶ Measure, control and record pressure, humidity, temperature, color, acidity.

▶ Detect fog, smoke, dust and vapors that are invisible to the eye, and take protective action.

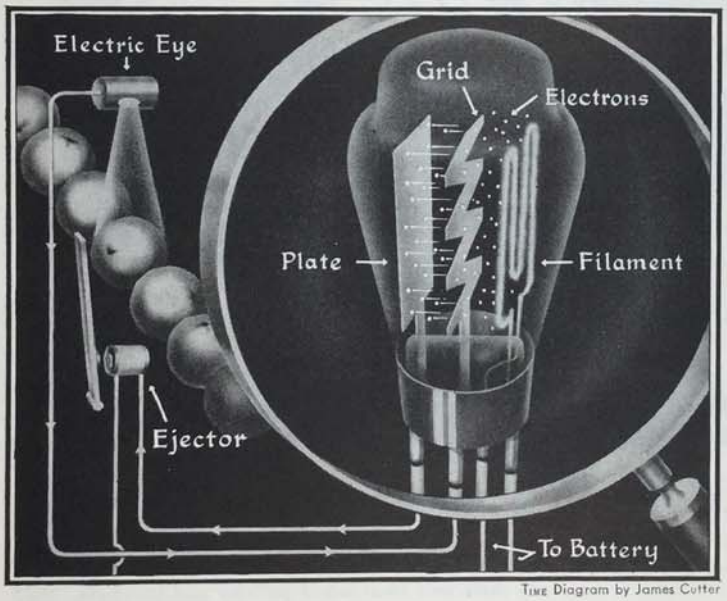
▶ Control any machine operated by a relay switch—manipulating doors, elevators, conveyors, furnaces, traffic.

▶ Operate machines by remote control—in lighthouses, electric substations, pumps, planes, ships (TIME, Jan. 18).

▶ Concentrate heat in small areas even deep within the insides of larger objects—to bake, dry, glue, stitch, anneal, weld, rivet.

▶ Motivate many medical treatments-by-heat which come under the heading of diathermy.

The electronic industry was no dwarf in the peacetime U.S. Then nearly 150 million tubes, of more than 400 different types, were produced in a year. Radio equipment production jumped from well under half a billion dollars in 1941 to $1 billion in 1942. Plans for 1943 will bring the production figure to $3 billion. Military secrecy cloaks the uses to which tubes are being put but these totals tell the story of their myriad usefulness.




TIME Diagram by James Cutter

**Mechanism of Revolution.** Actual father of electronics is Lee De Forest,* who evolved the first modern electron tube in 1906. But the grandfather was Thomas Alva Edison. He noticed in 1883 that the hot wire in his new light bulb gave off electricity, but he could neither understand nor use the effect. In 1904 Sir J. Ambrose Fleming sealed a separate metal plate through the glass into an Edison light bulb, was able to draw current from the plate. De Forest added the grid (*see diagram*). How many electrons from the filament reach the plate, and how fast, depends on the intervening grid which is acted upon by incoming electric stimuli.

The grid is the sense organ of the tube. To it is attached an antenna if the tube is to be used for radio reception, a microphone if it is to amplify sound, or an electric eye if it is to respond to light signals. Changes of voltage on the grid change the current from filament to plate. In each case the extremely faint stimuli received by the grid are amplified to hundreds of times their original strength. By using several tubes, with the plate of one connected to the grid of the next, the amplification can be multiplied to thousands or millions.

The plate is attached to the outgoing circuit leading to a radio loud-speaker, or public-address system, or telephone, or a magnet which controls an electric switch if the tube is to set a machine in motion. In the illustration, the electric eye is immune to the correct color of healthy oranges. When it "sees" a defective orange it sends a slight current to the grid. This steps up the current from filament to plate, causes a magnet to operate an ejector device which instantly sends that orange out of the packing line.

Great new streamscapes of the electronic world may be visible at the war's end:

▶ Detectors on ocean vessels to make visible other ships, icebergs, shores, through night and thick fog.

▶ Very short radio waves to multiply available radio channels, possibly by many thousands, making possible wide use of radiotelephones by truck fleets, construction gangs, large-scale industrial and mining operations.

▶ Television to project pictures on screens 18 by 24 feet, in full color (already possible). Programs are now picked up at Schenectady from Manhattan, 135 miles away, forecasting national network programs by relay stations.

* Often and deceptively called the "radio" tube (which suggests only a fraction of its uses).

* Sharp-eyed, white-fringed Lee De Forest, 69, inventor of hundreds of subsequent electronic devices, maker and loser of several fortunes, now lives in a huge hillside home at Hollywood, drives daily to his unimpressive laboratory on Wilshire Boulevard, is putting into production an altimeter which indicates the height of a plane above the actual ground beneath instead of sea level. He also manufactures diathermy equipment, to which he credits his own excellent health. Last July in a single week he climbed both Mt. Whitney (highest in the U.S.) and Mt. Langley.

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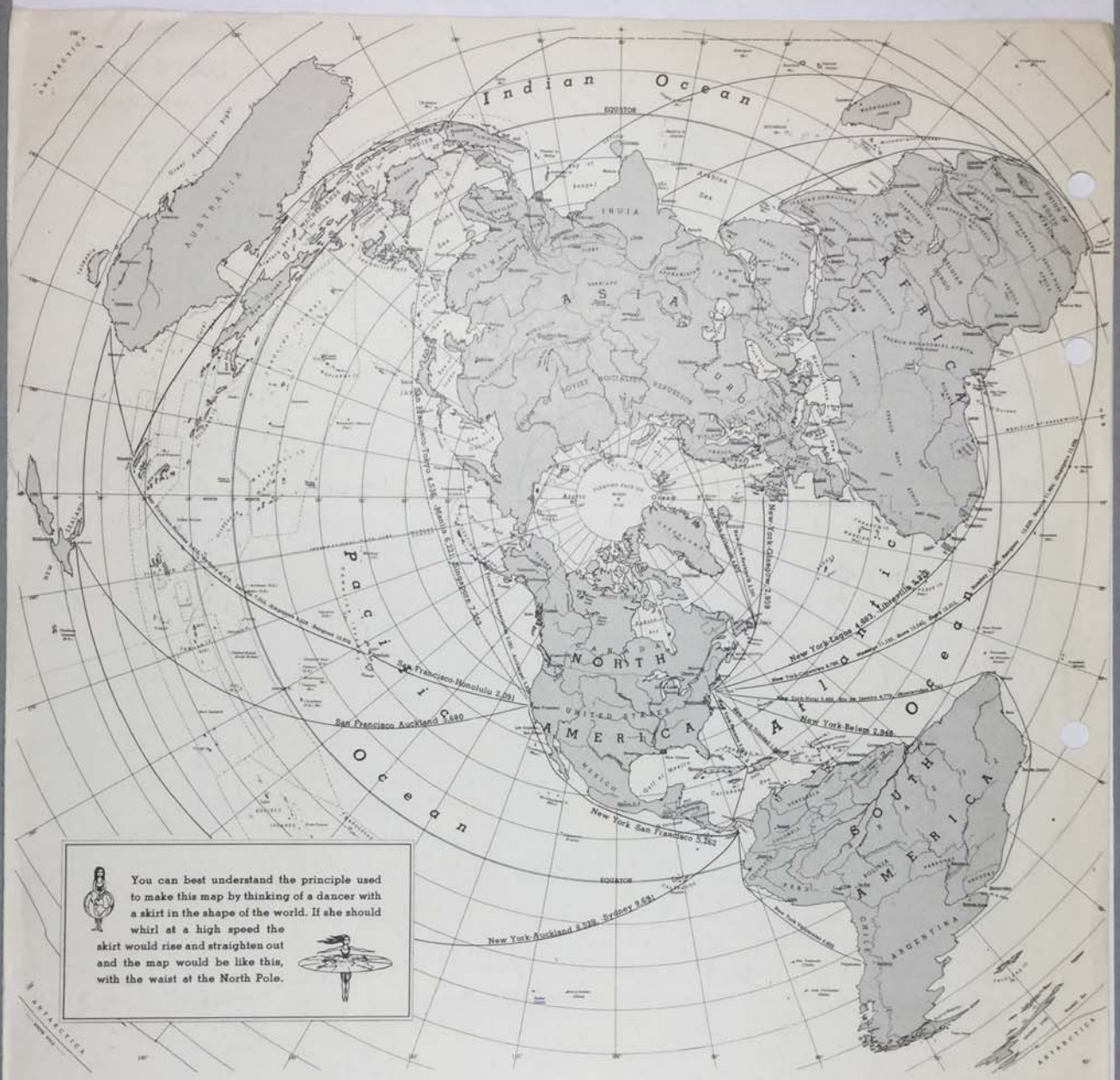


You can best understand the principle used to make this map by thinking of a dancer with a skirt in the shape of the world. If she should whirl at a high speed the skirt would rise and straighten out and the map would be like this, with the waist at the North Pole.

FORTUNE MAP BY RICHARD EDES HARRISON

September, 1942

## THE WORLD IN GLOBULAR PERSPECTIVE

No map of the world can be entirely accurate.

For you can't draw a picture of a round world on a flat piece of paper and have it exactly right. Just as you can't flatten out the skin of an orange on a table top without having it split or pull out of shape.

What the mapmakers generally do is find out how the map is going to be used and then think of some scheme that will make it as right for that use as possible.

What the Editors of FORTUNE magazine have undertaken here is a map for this World War. Such a map should make it clear that the shortest air route from New York to Chungking is over the North Pole. It should make it clear that the shortest water route from San Francisco to Manila goes right by Tokyo. And it should show the strategic importance of Alaska and Iceland.

This map does these things and many more far better than any other kind of map could.

Of course, such a map as this shouldn't be used for studying a campaign in Australia. But, because the North Pole is in the middle, this is the way to get the best picture of the real relationship between Europe, North America, and Asia.

In case you're interested, the official name for this projection is North Polar Azimuthal Equidistant.

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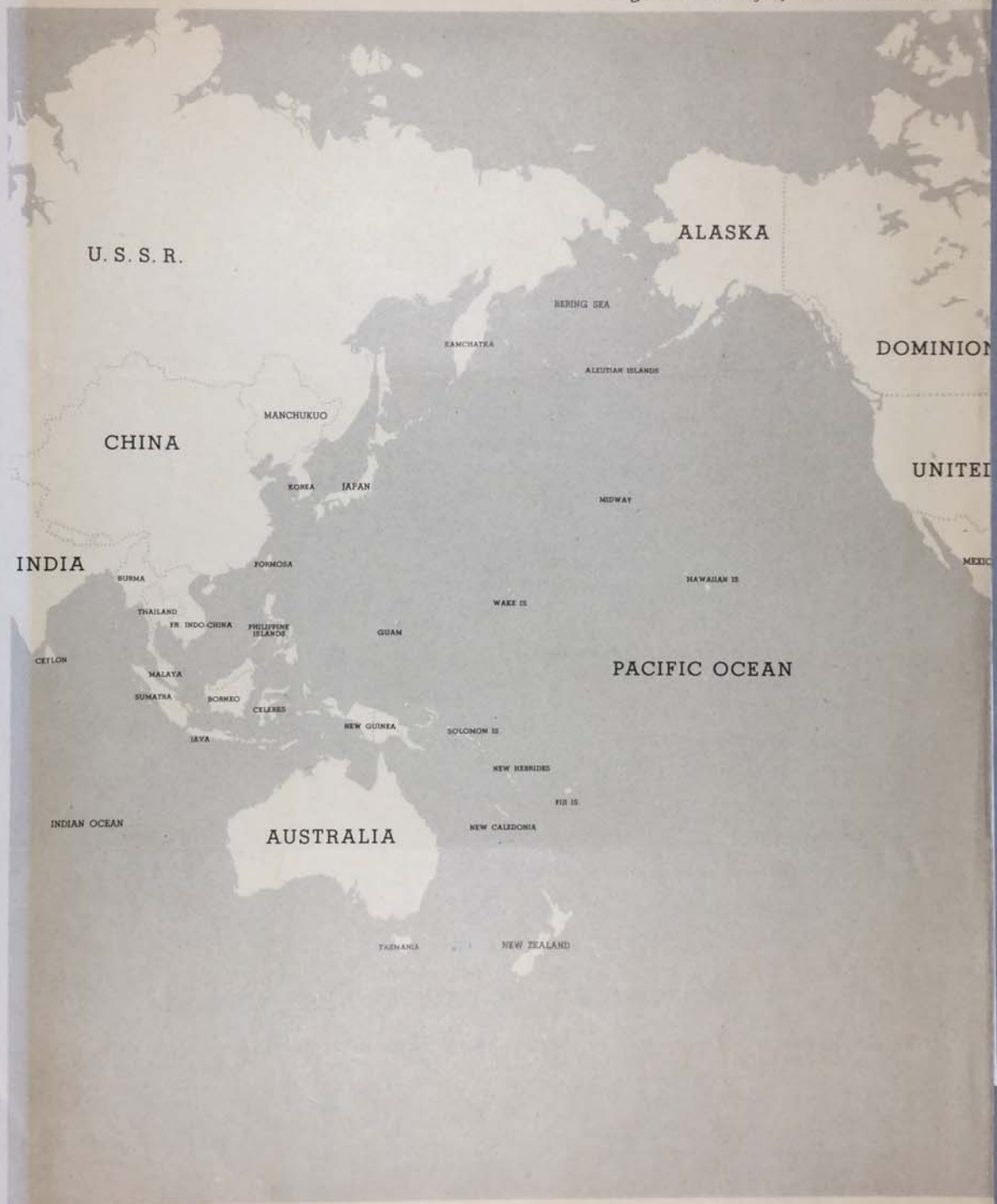
*through the courtesy of* TIME EDUCATIONAL BU




MERCATOR PROJECTION

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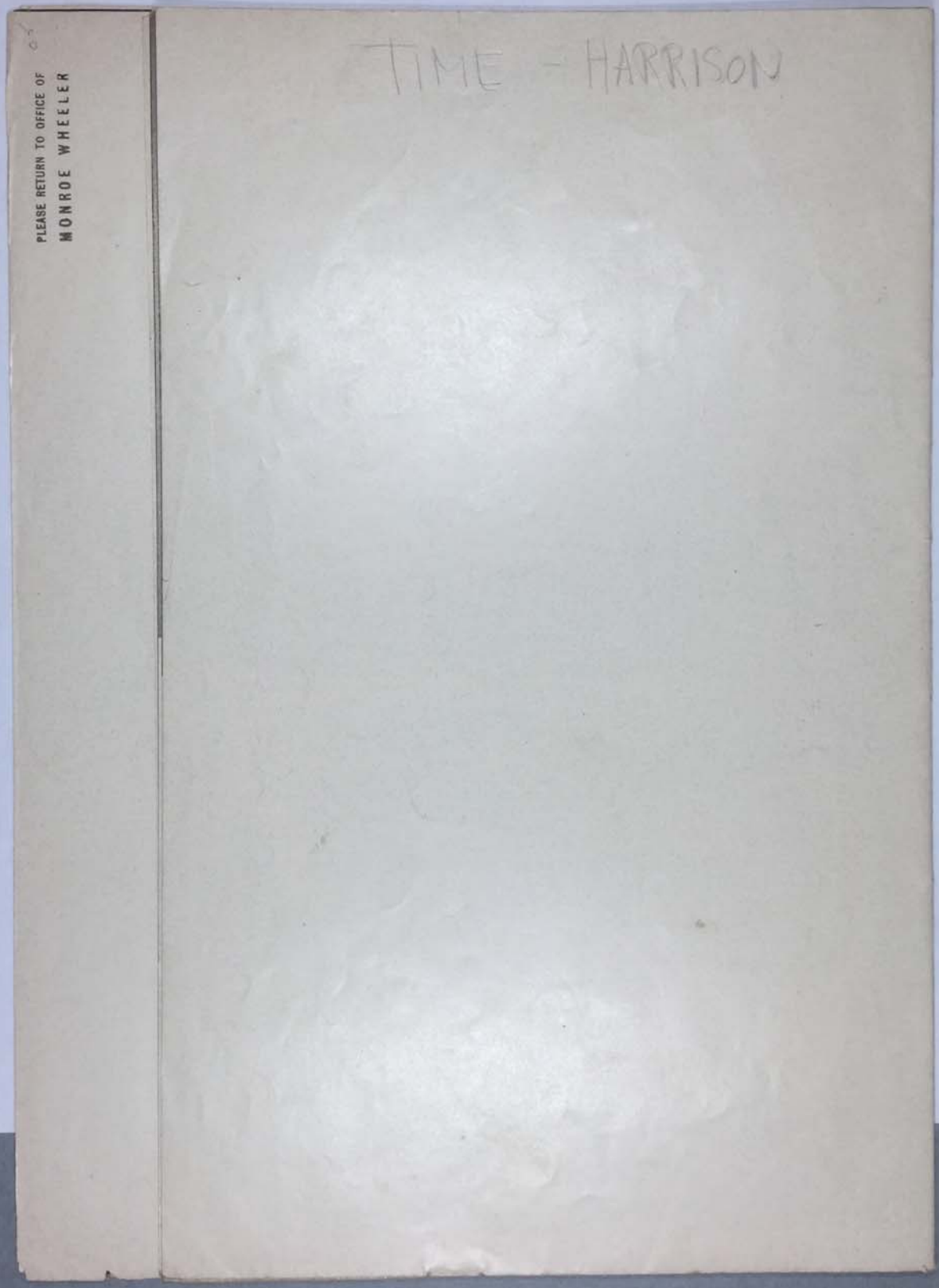

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PLEASE RETURN TO OFFICE OF
MONROE WHEELER

# MAPS
## AND
# GLOBAL CARTOGRAPHY

*Reprinted from LIFE, August 3, 1942*

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HOW TO TRANSLATE ACCURATELY THE

# MAP

Until the 16th decade of the 20th Century, knowledge that the world is round was of little immediate importance to most of the inhabitants of the planet. It was a fact that concerned some physicists and geologists, and all astronomers, navigators and map makers. But for most people, since they learned the lesson in school, the earth for all practical purposes was flat. Even now, when they consider it in larger terms, people picture their world as rolled out flat on a map that was first printed by Gerardus Mercator only 46 years after Columbus' voyage (see next page). Today, [illegible]

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HOW TO TRANSLATE ACCURATELY THE ROUND SURFACE OF THE GLOBE TO A FLAT MAP IS PROBLEM OF CARTOGRAPHY

# MAPS GLOBAL WAR TEACHES GLOBAL CARTOGRAPHY

Until the fifth decade of the 20th Century, knowledge that the world is round was of little immediate importance to most of the inhabitants of this planet. It was a fact that concerned some physicists and geologists, and all astronomers, navigators and map makers. But for most people, once they learned the lesson in school, the earth for all practical purposes was flat. Even now, when they contemplate it in larger terms, people picture their world as rolled out flat on a map that was first projected by Gerardus Mercator only 48 years after Magellan's voyage (*see next page*). Today, however, the round world is the prize of global war. Mercator's projection cannot tell this story. No one can read the map of this war until he has comprehended the fact that the world is round and that no map can give an entirely truthful picture of its surface.

Exact translation of the surface of the three-dimensional sphere into the two-dimensional plane of a map is a mathematical impossibility, one step more impossible than the squaring of the circle. The cartographer may elect to show correct scale, or correct shapes, or correct areas, or correct directions, or great circles, or a true visual picture of the globe. He can even show a few of these together, but he can never work them all into one world map. Before a map can be trusted or put to use, therefore, the purpose for which it was drawn must be clearly understood.

Mercator drew his map to show true directions to navigators who sailed by the wind and steered by the compass. The Mercator projection is a mental hazard in a war that is plotted on great circles across the land and sea and through the air. On following pages are shown some of the landmarks of cartography and the three major map projections that are essential to planning and comprehension of a global war.

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# MAPS
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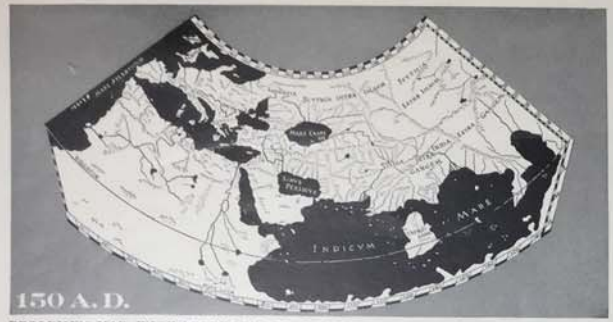
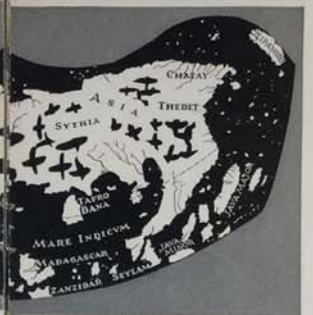



150 A.D.

PTOLEMY'S MAP, WITH ACCURATE DETAIL ON EUROPE, WAS BEST FOR 1,300 YEARS

1507

WALDSEEMÜLLER'S MAP IS "BIRTH




CERTIFICATE" OF THE NEW WORLD

1529

RIBERO'S MAP ESTABLISHED OUTLINES OF WORLD, WAS FIRST TO SHOW PACIFIC

300 B.C.

GREEKS MAPPED MEDITERRANEAN

# GREEK PHILOSOPHERS

The Greek philosophers in the 4th to 2nd Centuries B. C. did not need a Magellan to demonstrate to them that the world is round. They proved it by geometry. And by the same rules of spherical and plane geometry that lay out our world maps today, they made the first projections of the round surface of their known world onto flat maps. This was a great advance over the 6th Century B. C. world of Homer, flat and disk-shaped, bounded by an endless ocean (*left*). But even though the Ionian Greeks traced Ulysses' legendary journey to Hades, they drew a surprisingly accurate picture of the Mediterranean Sea. It was Eratosthenes of Cyrene in the 3rd Century B. C. who founded mathematical cartography. He proved that the earth is round, measured its circumference with an error of only 14%, and laid out the first system of latitude and longitude parallels and meridians. Greek maps after Eratosthenes showed the world, with impressive accuracy, from the headwaters of the Nile to the southern tip of Scandinavia, from the Ganges westward to Ireland. Culmination of Greek cartography was the atlas made by Ptolemy of Alexandria (150 A. D.). Ptolemy's map of the world, like his geocentric universe, held sway for 1,300 years. His fan-shaped Africa, his rivers across the Sahara Desert, his blunted India, his misplaced Ceylon (Taprobana), all appear on the first maps of the Renaissance. He exaggerated Mediterranean, 20° too long, was not corrected until 1700.

# MADE FIRST MAPS OF ROUND WORLD

After Ptolemy, through the centuries of the Roman Empire and the Holy Roman Empire of the Middle Ages, cartography all but vanished as a science. The early Renaissance prepared for the Age of Discovery by disinterring the atlas of Ptolemy. The first landfalls of the explorers were recorded as extensions of the Ptolemaic map. It is on such a map, made by the Alsatian cartographer Waldseemüller in 1507, that the name "America," in disproportionate tribute to Vespucci, first appears. Then in 1529, only 37 years after Columbus' discovery, the work begun by the Greek geometrists was finished and the world was unrolled on a map of its full 360° circumference. This map, projected by Diego Ribero, bounded the vast breadth of the Pacific just crossed by Magellan, located America as a continent and corrected the Ptolemaic picture of Asia.

World center for cartography in the Age of Discovery was Holland, then a major marine power. With access to the logs and charts of the ships of all nations, Dutch cartographers produced a succession of encyclopedic atlases, unrivaled for style and beauty. They overlooked few methods of projection, established all the important systems now in use. Most familiar is Mercator's, the projection in which almost everyone today visualizes the world. Dutch cartographers also divided the world in half and gave the New World a hemisphere to itself. Not the least wonderful feature of Dutch maps is their decoration, which inspired Swift's lines:

*So geographers in Afric maps*
*With savage pictures fill their gaps,*
*And o'er unhabitable downs*
*Place elephants for want of towns.*

1630

This is Gulielmus Blaeuw's 1630 version of Mercator's projection, great navigation map because all its compass directions are true. Vertical line cutting tip of Brazil is Pope's Line, by which Alexander VI in 1493 halved the world between Portugal (east) and Spain (west). Note polar projections, correcting polar distortion.

1641

This is a highly decorative two-hemisphere map from a Hondius Atlas. Note the portraits of Explorer Caesar and Cartographers Ptolemy, Mercator and Hondius the Elder, Erroneous Pacific coastline of North America, based on explorations of Sir Francis Drake, and the "island" of California persisted in maps until after 1700

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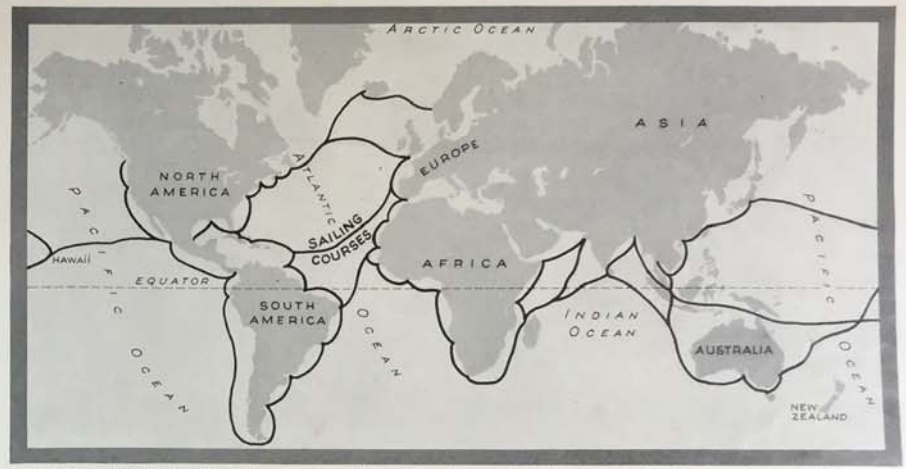
SPLIT INTO HEMISPHERES, ALMOST ALL THE WORLD'S SURFACE CAN BE SEEN AT ONCE, BUT THE SURFACE IS STILL ROUND

QUARTERED SEGMENTS SUGGEST A MAP. SEGMENTS CANNOT BE FLATTENED MECHANICALLY WITHOUT IRREGULAR DISTORTION

THE EIGHT SEGMENTS TOGETHER LOOK LIKE A DISCONTINUOUS MAP. SURFACES OF SEGMENTS (BELOW) ARE STILL CURVED

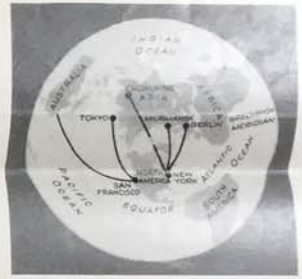



**WORLD OF SAILING SHIPS** was laid out by Mercator for navigators who hunted winds and steered their ships by magnetic compass. Its scale is accurate only along the equator. This is a world for circumnavigation parallel to the equator. Arctic and antarctic regions, in which no one could then travel, are stretched to the full length of the equator.

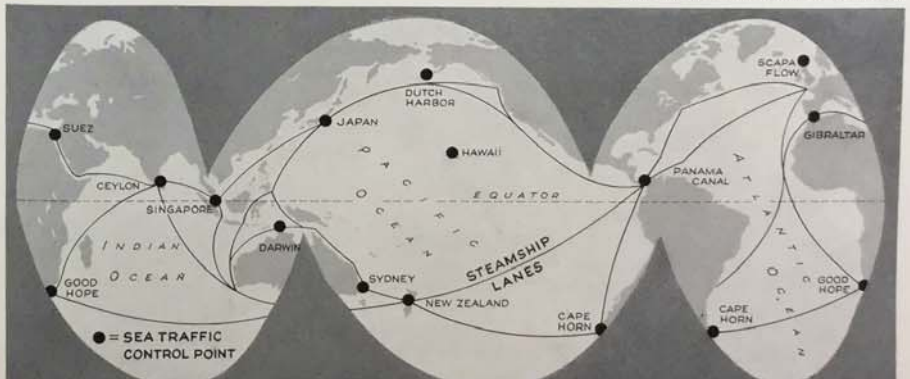
# HISTORY MAKES NEW MAPS

For a picture of the world as a whole, a map is only a poor substitute for a globe. The first lesson in map-making is the fact that the surface cannot simply be peeled off the globe and flattened into a map (*see opposite*). The surface must be torn or stretched before it will flatten out. This is precisely what is accomplished by scientific map projection. Distortions are distributed under mathematical control to maintain accuracy in some areas at the sacrifice of accuracy in others. In a few special maps distortion is relieved by cutting or interrupting the less-important areas (*see below*). Because no map can tell the whole truth, each map tells only the truth which is useful to those who must use it.

In the world of sailing ships it was most useful to know true compass directions. Hence Mercator's projection (*above*). In the world of steamships, it was important to know the great circles (the shortest distance between two given points along surface of globe) across the oceans between major ports and naval bases. This, Mahan's world of naval power, is shown below in the interrupted ocean-basin map designed in 1923 by J. H. Goode, of the University of Chicago. Of least interest to the world of Mercator and Mahan was the Arctic ice cap which the two maps completely sacrifice to distortion. In the world of airpower, communications lie in great circles across land, sea and ice cap without distinction. The polar azimuthal projection (*right*) shows that many important great circles lie far to the north, some of them across the polar region.




**AIRPOWER WORLD** shows shortest routes between major centers lie in area of Mercator's greatest distortion.




**WORLD OF NAVAL POWER** is three ocean basins, separated by narrow channels on which are planted the naval bases. Until this war began almost all these control points were under Anglo-American hands. The steamships laid their courses as closely as possible along the great circles, which plot the shortest distance between points on the round world.

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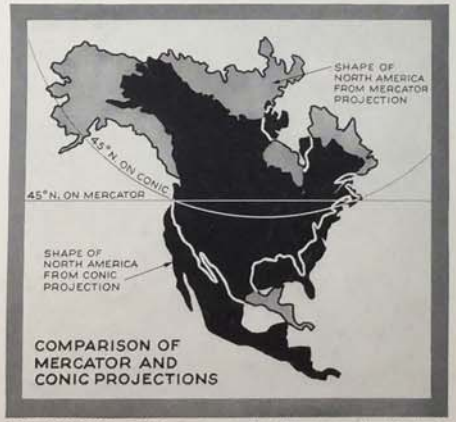
**CYLINDER AND CONE** are wrapped around globe, tangent to a parallel of latitude. Note extreme distortion in polar latitudes on cylinder, which results from straightening of arced meridians. Cone achieves good projection of temperate zone, distorts other latitudes.

**GREENLAND,** an island, inflates to subcontinent size in Mercator distortion. The little Greenland (*inset above*) is island as it would appear on a Mercator projection if it lay on the equator.

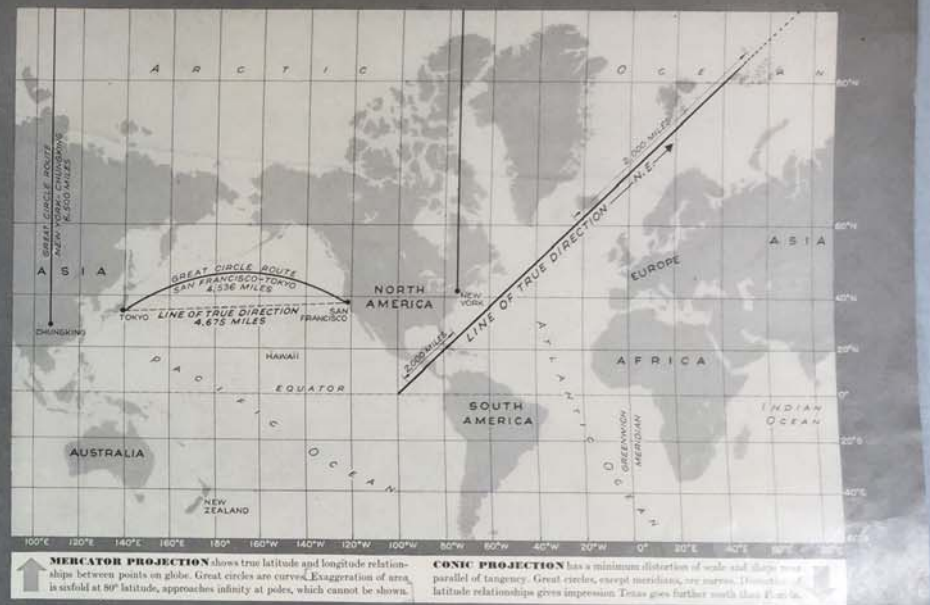
# MAPS FROM CONES AND CYLINDERS

All maps, excepting a few of special design, are derived from projection of the globe on a cylinder, cone or plane. Shown here are the cylinder (Mercator) and cone projections, from which come our traditional pictures, respectively, of the world as a whole and of the U. S. The cylinder and cone are laid tangent to a parallel of latitude. The grid and geographical features are projected from some convenient point, or according to a mathematical formula that will give the desired distribution of distortion. The cylinder or cone is then rolled flat. Obviously both projections are correct only along the parallel of tangency, and distortion increases in ratio to distance away from this parallel (*see above*).

Each projection gives its own version of the earth's appearance (*see below*). It is apparent that the cylindrical, though used as a world map, is best for equatorial latitudes. The conic, rarely used as world map, is familiar as base projection for individual maps of U. S. and other middle latitude lands. Neither projection gives a working picture of geographical relationships across the pole.

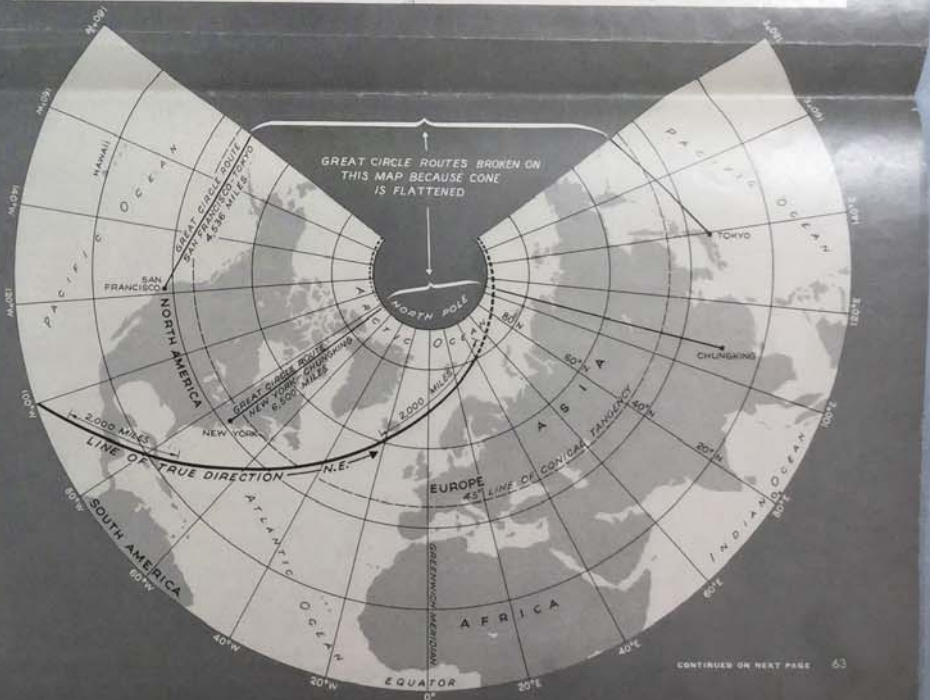



**NORTH AMERICA** on the Mercator (*gray*) is distorted fanwise in northern latitudes. In conic projection the continent is distorted mildly and evenly on both sides of tangent parallel.




**MERCATOR PROJECTION** shows true latitude and longitude relationships between points on globe. Great circles are curved. Exaggeration of area is sixfold at 80° latitude, approaches infinity at poles, which cannot be shown.

**CONIC PROJECTION** has a minimum distortion of scale and shape [illegible] parallel of tangency. Great circles, except meridians, are curves. [illegible] latitude relationships gives impression Texas goes further south than [illegible]




CONTINUED ON NEXT PAGE

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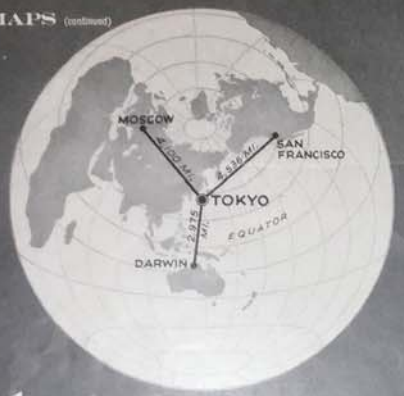


**1** JAPS SEE ALASKA BETWEEN THEM AND THE U. S.

**2** BERLIN—N. Y. ROUTE CROSSES LABRADOR COAST

**3** U. S. GREAT CIRCLES TO ALLIES CROSS THE POLE

# POLAR MAP SHOWS AIRPOWER WORLD

The azimuthal projection shown here, least familiar of the three major types, derives its increasing importance from the facts of modern history, from the ascendancy of airpower and from the strategy of global war.

The equidistant north polar map (*opposite*) is made by projecting the globe on a plane tangent to the pole. The parallels are drawn at equal distances apart, as they are on the globe, and land masses are laid on accordingly. The plane may be laid tangent to any other point (*left*). At the sacrifice of equidistance, the globe may also be projected on the plane from its center, from the antipode of the point of tangency (used for hemispherical projections, *see Hondius map, p. 59*), or from infinity (*below*).

The faults of this type of projection are apparent at a glance. Distortion increases geometrically away from the point of projection until the geographical shapes near the edge of the map become almost unrecognizable. Except in the equidistant projection there is no constant scale anywhere on the map. Lines of direction must be plotted as arcs.

Its virtues, however, for comprehension of modern history and application to 20th Century technology, more than outweigh its faults. Any straight line drawn through or from the center of the map is a great circle. In the equidistant projection, distances may be scaled accurately to any point from the center. Thus, on an azimuthal projection centered at his city, the strategist in Berlin, Tokyo or New York may plot with a straightedge the course of a bomber attack or the beaming of his propaganda radio. The admirals in Tokyo (*No. 1, at left*) can see that the shortest distance to San Francisco passes within 400 miles of Dutch Harbor, is never closer than 1,800 miles to Pearl Harbor. From Berlin to New York (*No. 2, at left*), the air route crosses Labrador. For U. S. strategy, the azimuthal map teaches even bigger lessons. The great circle from New York and the north-central industrial heart of the U. S. to Chungking (*No. 3, at left*) is dead across the pole. To Tokyo and Murmansk the shortest routes both cross the Arctic Circle. The long way around is through Australia, India and Libya.

For the Mercator mind, whose flat poleless world can only be circumnavigated parallel to the equator, a global war holds grim surprises. In all azimuthal projections centered on the world's warring capitals, the pole lies close to center. The projection directly on the pole may therefore be safely used as a general map of the modern world, with the caution that great circles not crossing the pole must be plotted as curves. Viewed from the pole the world's two major land masses, Eurasia and North America, are almost one. Between them lies the Arctic Ocean, no obstacle to airpower and flanked by the coasts of Alaska, Canada and the U.S.S.R. This picture suggests that United Nations, not the Axis, hold the interior lines.

**VISUAL PROJECTION** shows globe as it would appear from a star. It is projected on parallel lines onto plane surface (*see inset*). This projection, often used decoratively in trademarks, etc., gives good overall look at geographical relationships of one hemisphere.

**POLAR PROJECTION,** as shown in the model above, is made by laying a plane on the pole at right angles to the earth's axis. Parallels of latitude are ruled off at equal intervals in concentric circles; meridians of longitude are straight radial lines. Whole earth's surface, with extreme distortion in the southern latitudes, can then be projected on the map. All straight lines through the pole are great circles that can be measured on fixed scale, as for instance the transpolar route from New York to Chungking.

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United Aircraft
AIRWAYS

May 27, 1943

Colonel Arthur R. Christie, General Manager
United Aircraft Corporation
230 Park Avenue
New York, New York

Dear Colonel Christie:

I want to thank you for a very pleasant luncheon and for your kindness in coming over to see our building afterward. Our plans for the global geography show are proceeding nicely and we are all extremely gratified to know that you feel that United Aircraft will want to participate in subsidizing it. If I can provide you or Mr. Lyman with any further information which your Executive Committee may require, I shall be only too happy to do so.

We are approaching Mr. Willkie at once regarding the writing of the captions, but we are told that beginning next week he will have very important claims upon his time.

Very sincerely yours,

MW:CH

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June 17, 1943

United Nations Information Office
610 Fifth Avenue
New York, New York

Gentlemen:

Thank you very much indeed for sending the statistics on the combined populations of the United Nations. We needed this information in connection with a large exhibition entitled Airways to Peace which we shall open on July 1. I am sure that this show will be of interest to your organization, and hope you will be able to see it during the summer.

With many thanks for your kindness, I am

Sincerely,

MW:BK

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United Aircraft-
AIRWAYS

May 27, 1943

Mr. Lauren D. Lyman
Assistant to the President
United Aircraft Corporation
230 Park Avenue
New York, New York

Dear Mr. Lyman:

I am delighted that our proposed air-age geography exhibition meets with your approval. We look forward with pleasure to the benefit of your collaboration. We are asking Willkie to write the captions for the exhibition, as Carl Sandburg did for the Road to Victory show last year, and we hope that he will want to do so, although we have been told that from now on he will be extremely busy on some new projects.

We are very anxious that the helicopter be well represented in this exhibition, which would be the ideal place to introduce it to the layman. We should like very much to see the film of which you spoke, and I wonder whether you can arrange for us to borrow a print of it for a day so that we can run it off?

I am very much pleased that you feel that United Aircraft will want to contribute toward the subsidy for this important educational exhibition, and if you need any further information, I shall be happy to prepare it.

With best wishes and renewed thanks, I am

Very sincerely yours,

MW:CH

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| UNITED NATIONS | POPULATION | AREA (SQUARE MILES) |
|---|---|---|
| Australia (1939) | 6,997,326 | 2,974,581 |
| Belgium (1930) | 8,092,004 | 472,550 |
| Brazil (1940) | 41,356,605 | 3,275,510 |
| Canada (1941) | 11,419,896 | 3,466,556 |
| China (1936) | 457,835,475 | 4,480,992 |
| Costa Rica (1941) | 656,129 | 23,000 |
| Cuba (1938) | 4,227,587 | 44,164 |
| Czechoslovakia (1930) | 14,729,536 | 54,244 |
| Dominican Republic (1938) | 1,616,561 | 19,325 |
| El Salvador (1940) | 1,787,930 | 13,176 |
| Ethiopia | 2,000,000 | 350,000 |
| Great Britain (1931) | 44,937,444 | 89,041 |
| Greece (1928) | 6,204,684 | 50,147 |
| Guatemala (1940) | 3,284,269 | 45,452 |
| Haiti (1936) | 3,000,000 | 10,204 |
| Honduras (1940) | 1,105,504 | 44,275 |
| India (1931) | 352,837,778 | 1,808,679 |
| Iraq (1935) | 3,560,456 | 116,600 |
| Luxembourg (1935) | 296,913 | 999 |
| Mexico (1940) | 19,473,741 | 765,917 |
| Netherlands (1938) | 8,728,569 | 13,712 |
| New Zeland (1936) | 1,573,810 | 103,723 |
| Nicaragua (1940) | 899,048 | 57,143 |
| Norway (1930) | 2,814,194 | 124,556 |
| Panama (1940) | 635,836 | 28,576 |
| Philippines (1941) | 16,971,100 | 115,600 |
| Poland (1939) | 34,775,698 | 150,470 |
| Union of South Africa (1936) | 9,589,898 | 472,550 |
| U.S.S.R. (1939) | 170,467,000 | 8,173,550 |
| U,S.A. (1940) | 131,669,275 | 2,977,128 |
| Yugoslavia (1931) | 13,934,038 | 95,576 |
| Bolivia (1935) estimated | 3,226,296 | 506,792 |
| | 1,380,704,600 | 30,923,788 |

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AIRWAYS.

TELEPHONE
HAVEMEYER 6-8800

CABLE ADDRESS
"AMAIR"

AMERICAN AIRLINES, INC.
LA GUARDIA FIELD
NEW YORK AIRPORT STATION
NEW YORK

100 East 42nd Street
New York City

April 26, 1943

Mr. Monroe Wheeler
Director of Exhibitions and Publications
The Museum of Modern Art
11 West 53rd Street
New York City

Dear Mr. Wheeler:

Mr. P. P. Willis has referred to me your letter of April 19 in which you have given answers to his questions concerning our proposed sponsorship of an exhibition of Air Age Geography.

We cannot provide the funds you have requested unless we can be assured in advance concerning the nature of the exhibits, or can in some way be granted the privilege of approving them. It is our understanding that the Office of War Information is also to contribute and to have a part in the planning of your exhibit. There has been public controversy concerning some of the work undertaken by the Office of War Information which has been said to have a political flavor, and we cannot afford to become involved in a political controversy. Certainly it is not unreasonable for one who is to pay the lion's share of the expense of an exhibit of this kind to want some control over its contents.

We would expect you to approve any booklet which might be prepared to carry the name of American Airlines for distribution at the exhibition, but we would like to know in advance what the limitations, if any, are to be.

We will need to have something definite from you in advance concerning the use of the exhibits at the close of your tour.

Perhaps we should meet again to discuss these items and any other questions which should be settled in advance. We want to join you but cannot do so unless the arrangement is entirely equitable from our standpoint as well as yours. We are confident that in addition to our financial contribution, our support of your exhibition in publicity and perhaps in paid advertising can be made exceedingly effective and should go a long way to help make the undertaking a great success.

Yours very truly,

Charles A. Rheinstrom
Vice President - Traffic

cc Mr. P. P. Willis

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AIRWAYS

# Louis Bunin

239 W. 68th Street New York N.Y.

TRafalgar 4 1374

CONTROLLER

1 umbrella projection on masonite, approx. 40" dia. $3.00

1 Grape fruit(Orange peel projection) model in rubber 17.00

1 octagonal B. Fuller globe made of panel board with suitable suspension or mounting..... 25.00

One mechanically animated chart of Axis aggression 1931 to 1943 with three automatic light changes, stand motor, finish etc. Museum of Modern Art to supply lettering artist and map drawing.....285.00

Total.....$330.00 #20706 #21768

160

170.

Designers, Craftsmen

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Attention of Mr. Wheeler

610 FIFTH AVENUE
NEW YORK, N. Y.
CIRCLE 5-8060

JUN 17 1943

Here is the material you requested by telephone.

WITH THE COMPLIMENTS

OF THE

UNITED NATIONS INFORMATION OFFICE

An Agency of the Governments of: Australia, Belgium, Canada, China, Czechoslovakia, Great Britain, Greece, India, Jugoslavia, Luxembourg, Netherlands, New Zealand, Norway, The Philippines, Poland, Union of South Africa: of the Danish Legation and the Fighting French Delegation and the U. S. Office of War Information.

THE MUSEUM OF MODERN ART
11 WEST 53 STREET
NEW YORK CITY

TO Economy Blue Print Co.

DATE December 23, 1943

INVOICE BEARING

ORDER

AUTHORIZED BY

FOR AIRWAYS TO PEACE

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AIRWAYS

AIRCRAFTS

THE MUSEUM OF MODERN ART
11 WEST 53 STREET
NEW YORK CITY

TO Economy Blue Print Co.

630 Fifth Avenue

New York 20, New York

DATE December 22, 1943

PLEASE PUT ORDER NUMBER ON INVOICE

**Nº 18177**

INVOICE BEARING ORDER NUMBER SHOULD BE MAILED DIRECTLY TO CONTROLLER'S OFFICE.

| | | UNIT PRICE | TOTAL |
|---|---|---|---|
| 3 | Blue Prints Floor plans<br><br>AIRWAYS TO PEACE | | 1 26 |

ORDERED BY

AUTHORIZED BY

FOR AIRWAYS TO PEACE

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Freedom Airways

Airways

THE MUSEUM OF MODERN ART
11 WEST 53 STREET
NEW YORK CITY

TO Economy Blue Print Company

Shop 52, Concourse

630 Fifth Avenue
New York, New York

DATE September 16, 1943

PLEASE PUT ORDER NUMBER ON INVOICE

No 18157

INVOICE BEARING ORDER NUMBER SHOULD BE MAILED DIRECTLY TO CONTROLLER'S OFFICE.

| | | UNIT PRICE | TOTAL |
|---|---|---|---|
| 4 | Blueprints, 26X36. Installation, Airways to Peace | | 1 56 |

ORDERED BY

AUTHORIZED BY

FOR AIRWAYS TO PEACE

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June 8, 1943

Mr. William Friedman
Air News
545 Fifth Avenue
New York, New York

Dear Mr. Friedman:

I am writing to thank you for the admirable work you have done in planning the sequence of photographs for the section on the development of flight in our Airways to Peace exhibition. Your knowledge and willing collaboration have been of the greatest assistance, and we shall doubtless have need for further help from you in preparing the captions for the individual photographs. I am happy to confirm our agreement that you are to receive a fee of one hundred dollars as aeronautical consultant for the exhibition.

With best regards and many thanks, I am

Sincerely yours,

MW:CH

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NORMAN BEL GEDDES & COMPANY, Inc. New York 19

July 15th, 1943.

AIRWAYS

# THE MUSEUM OF MODERN ART

GEDDES

**Date** April 13, 1944

**To:** Miss Courter **Re:** Geddes Relief Map in AIRWAYS

**From:** Mr. Wheeler

Mr. Geddes has called to say that he needs the Relief Map of Europe which is travelling with AIRWAYS TO PEACE as soon as possible. It may be sent collect to Mr. Norman Bel Geddes, 50 Rockefeller Plaza, New York 20, N.Y. but we should, I think, pay for the packing.

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NORMAN BEL GEDDES & COMPANY, INC. New York 19

July 15th, 1943.

July 16, 1943

Dear Mr. Wells:

Thank you for your letter of July 15 giving us the insurance value on Mr. Geddes' Layered Relief Model of Europe from the English Channel to Switzerland. The model will be insured by the Museum for $5,000., dating from July 1. Enclosed is our receipt.

Very truly yours,

Registrar

Mr. Ralph B. Wells, General Manager
Norman Bel Geddes & Co., Inc.
50 Rockefeller Plaza
New York 20, N.Y.

Dorothy H. Dudley, Registrar
The Museum of Modern Art
New York City.

that you arrange insurance on Mr. Geddes' Layered Relief Model of Europe from the ... to Switzerland which is included in your exhibition, "Airways to Peace". This model is valued at $5,000.

We shall appreciate receiving ... when this model has been insured.

Yours very truly,

NORMAN BEL GEDDES & COMPANY, INC.

Ralph B. Wells
General Manager

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NORMAN BEL GEDDES & COMPANY INC
50 ROCKEFELLER PLAZA NEW YORK TELEPHONE CIRCLE 5-8030 CABLE NORBELGED

July 15th, 1943.

Miss Dorothy H. Dudley, Registrar
The Museum of Modern Art
11 West 53rd Street
New York City.

Dear Miss Dudley:

In reply to your letter of July 13th, we would prefer that you arrange insurance on Mr. Geddes' Layered Relief Model of Europe from the English Channel to Switzerland which is included in your exhibition, "Airways to Peace". This model is valued at $5,000.

We shall appreciate receiving notification when this model has been insured.

Yours very truly,

NORMAN BEL GEDDES & COMPANY, INC.

Ralph B. Wells
General Manager

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Harrison Retrieve

43:1385 Great Circle Map Showing Fairbanks Alaska

# THE MUSEUM OF MODERN ART

Delivered to me Nabb Office by M. 3/7/45

**Date** February 27, 1945

**To:** MISS DUDLEY

**From:** H. Ward

**Re:** Models from Airways sent to Mr. Harrison

Mr Paxton's secy Miss Mar Caldwell Ci 6-4400

Mr. Wheeler tells me that he talked to Mr. Richard Harrison and that Mr. Harrison has in office certain models from the Airways exhibition which do not belong to him. I understand that they were returned to Life magazine which in turn sent them on to Mr. Harrison. Mr. Harrison would like to have them picked up at his office and sent back to Mr. Geddes where it seems that he and Mr. Wheeler agree that they belong.

Mr. Richard Harrison
22 West 48th Street
Brg-2683-

Mr. Norman Bel Geddes
50 Rockefeller Plaza

Life - 9 Rock Plaza - 31st floor
Mr. Allen McNab

1284 Great Circle Airways - Map - R. E. Harrison 1942 Time Inc. small - mounted -

1376 Great Circle Airways - with polar Gnomonic map - Supplement to Fortune May 1943 A Fortune Map - A Gnomonic Projection (Radial)

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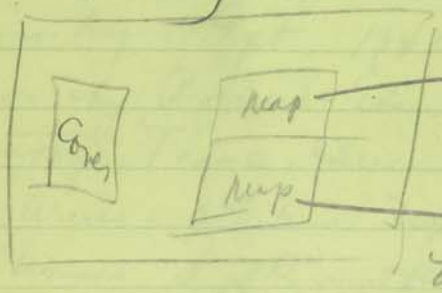
Harrison Returns

43:1385 Great Circle Map Showing Fairbanks Alaska
U.S. July 17'42 from Jean Dittus
who Purchased it in Fairbanks
Ernest Walker Sawyer — 7 x Glass -

1378 In 4 parts (backed)

1379 2000 mile Range J. McN Smiley (backed)
Map with Radii.

1382 The War in Maps 1939/40
German Library of Information 1941
(7 x Glass)




1914 Central Europe Encircled by Entente

1940 Europe Encircled This Time.

1384 Arctic Arena - A Fortune Map - R. E. Harrison 1942 Time Inc. small - mounted -

1376 Great Circle Airways - with polar Gnomonic map - Supplement to Fortune May 1943
A Fortune Map -
A Gnomonic Projection (backed)

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42.1384, 1, 2, 3 wrapped together

1372 ✓ Map. Design Fuehrer Sheets' Strategy Map of Europe. Designed and engraved by Richard Edes Harrison (backed)

1,273 ✓ 3 Fury maps - 2 air routes - not recorded (backed with cardboard)

C-47 ✓ A Fortune Map - drawn by Richard Edes Harrison Supplement to Fortune June 1942 Atlantic Arena (backed)

1386 ✓ Eyes East Toward Europe. Supplement to Fortune Map Sept. 1940 drawn by Richard Edes Harrison, Courtesy Time. Inc. (backed)

1380 ✓ Pacific Arena - a Fortune Map. Drawn by R. E. Harrison. Supplement to Fortune Sept. 1942 (backed)

1387 ✓ The Net - as of Sept. Underside Fortune Map R. E. Harrison Courtesy Time Inc. Fortune Jan. 1943 (backed)

Unrecorded -

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AIRWAYS

June 7, 1943

8/4/43.
Mrs. Hartman,
In accordance with our telephone conversation this morning, please deliver Mr. Wilson's film to bearer.
Thank you!
M. C. Nelan

Mr. R
22 We
New Yo

Dear M

I am h ereby you
are to r the Museum's
exhibi open on June
29. I nsultant's fee
of two ($250). It is also understood that you are to provide sketches and suggestions for any special maps which we may have to make for the strategic areas section.

We consider ourselves extremely fortunate to have obtained your creative interest and generous collaboration in making a simple and lucid presentation of this very complex subject. We realize that this consultation fee is inadequate compensation for the amount of your time which we have taken, but we know you agree with us that the exhibition, if it achieves its purpose, will have been immensely worth doing.

We have just received word that the President has consented to lend us his own great 52-inch globe for the opening of the exhibition.

With kind regards and best wishes, I am

Sincerely yours,

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June 7, 1943

June 7, 1943

Mr. Ri
22 Wes
New Yo

Dear M

I am h
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29. I
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TELEPHONE
MURRAY HILL 6-5014

ARTHUR R. CHRISTIE

UNITED AIRCRAFT CORPORATION
230 PARK AVENUE, NEW YORK

erby you
r the Museum's
open on June
nsultant's fee
also under-
stood that you are to provide sketches and suggestions for any special maps which we may have to make for the strategic areas section.

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With kind regards and best wishes, I am

Sincerely yours,

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Harrison
AIRWAYS
AIRWAYS

June 7, 1943

June 7, 1943

Mr. Richard Edes Harrison
22 West 48 Street
New York, New York

Dear Mr. Harrison:

I am happy to confirm our verbal arrangement, whereby you are to serve as chief cartographic consultant for the Museum's exhibition entitled Airways to Peace, which will open on June 29. It is understood that you will receive a consultant's fee of two hundred and fifty dollars ($250). It is also understood that you are to provide sketches and suggestions for any special maps which we may have to make for the strategic areas section.

We consider ourselves extremely fortunate to have obtained your creative interest and generous collaboration in making a simple and lucid presentation of this very complex subject. We realize that this consultation fee is inadequate compensation for the amount of your time which we have taken, but we know you agree with us that the exhibition, if it achieves its purpose, will have been immensely worth doing.

We have just received word that the President has consented to lend us his own great 52-inch globe for the opening of the exhibition.

With kind regards and best wishes, I am

Sincerely yours,

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Harrison
AIRWAYS
AIRWAYS

June 7, 1943

Dear Ricky,

I enclose herewith a confirmation of our agreement, mentioning that the consultant's fee will be $250. I hope you will not mind keeping the figure absolutely confidential, for while it is not large at all considering the amount of work you are doing, it is unusually large for this Museum, and we naturally would not wish to injure the feelings of all the other recipients of our regular consultation fee. I am sure you understand our position in matters of this kind, which we must work out on a very limited budget.

Ever yours,

Mr. Richard Edes Harrison
22 West 48 Street
New York, New York

MW:CH
Enclosure

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Hills Knowlton

AIRWAYS

RAND McNALLY & COMPANY

June 22, 1943

Mr. John W. Hill, President
Hill and Knowlton
Empire State Building
New York, New York

Dear Mr. Hill:

I am enclosing herewith an outline of an exhibition of air-age geography which the Museum of Modern Art is opening on July first. Inasmuch as its subject is closely related to the book on maps which Consolidated Vultee has recently issued, I have written to Mr. Girdler to learn whether they might be interested in sharing the financial responsibility for this exhibition. The cost of the show has exceeded by fifteen thousand dollars the money budgeted for it by the Museum, and we are obliged to seek this additional sum from companies whose future interests would be served by it. The exhibition is called AIRWAYS TO PEACE.

The exhibition is a sequel to one held last year, entitled Road to Victory. Wendell L. Willkie has consented to write the text for AIRWAYS TO PEACE, and the President has agreed to send us his own great fifty-inch globe for the opening.

Your Mr. Edward F. Dakin has already very kindly obliged us with material for the exhibition, and I am writing you in detail so that you will be cognizant of the facts if Mr. Girdler refers the matter to you.

Very sincerely yours,

MW:CH
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ESTABLISHED 1856 INCORPORATED 1873

# RAND McNALLY & COMPANY

CHICAGO · NEW YORK · WASHINGTON · SAN FRANCISCO · LOS ANGELES

Airways to Peace

## THE MUSEUM OF MODERN ART

11 WEST 53 STREET
NEW YORK CITY

TO Lenn Craft Studio

323 East 47th Street

New York, New York

DATE October 28, 1943

PLEASE PUT ORDER NUMBER ON INVOICE

No. 18171

INVOICE BEARING ORDER NUMBER SHOULD BE MAILED DIRECTLY TO CONTROLLER'S OFFICE.

| | UNIT PRICE | TOTAL |
|---|---|---|
| Retouching negative of Camel and Airplane montage<br>For AIRWAYS TO PEACE | | 1 00 |

ORDERED BY

AUTHORIZED BY

FOR AIRWAYS TO PEACE

globes in good

dios at $40

ART

THE RAND McNALLY MAP STORE · 7 WEST 50TH STREET · ROCKEFELLER CENTER · NEW YORK CITY

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ESTABLISHED 1856 INCORPORATED 1873

# RAND McNALLY & COMPANY

CHICAGO · NEW YORK · WASHINGTON · SAN FRANCISCO · LOS ANGELES

Airways to Peace

## THE MUSEUM OF MODERN ART

11 WEST 53 STREET
NEW YORK CITY

TO Lona Craft Studios
323 East 47th Street
New York, New York

Date July 2, 1943

PLEASE PUT ORDER NUMBER ON INVOICE

No 22346

INVOICE BEARING ORDER NUMBER SHOULD BE MAILED DIRECTLY TO CONTROLLER'S OFFICE.

| | | Unit Price | Total |
|---|---|---|---|
| 1 | Enlargement of Crying Jap, 11 X 14 | | 58 |

Ordered by

Authorized by

For Airways to Peace

THE MUSEUM OF MODERN ART

globes in good

ndles at $40

lessmore Damon)

43

THE RAND McNALLY MAP STORE · 7 WEST 50TH STREET · ROCKEFELLER CENTER · NEW YORK CITY

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ESTABLISHED 1856 INCORPORATED 1873

# RAND McNALLY & COMPANY

CHICAGO · NEW YORK · WASHINGTON · SAN FRANCISCO · LOS ANGELES

MAP ENGRAVERS PUBLISHERS

111 EIGHTH AVENUE

Airways to Peace

# THE MUSEUM OF MODERN ART

Date May 17, 1943

To: Mr. Bayer
Mr. Warren
Mr. Keller

Re: Globes (Messmore Damon)

From: Mr. Wheeler

Messmore Damon Studios 'phoned today to say that they have two 18" globes in good condition which they would be willing to sell us for $35 each.

I have ordered today four 3' 6" half-globes from Messmore Damon Studios at $40 each.

(3) Rec 7/15/43

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# RAND McNALLY & COMPANY

CHICAGO · NEW YORK · WASHINGTON · SAN FRANCISCO · LOS ANGELES

MAP ENGRAVERS PUBLISHERS

111 EIGHTH AVENUE

NEW YORK

TELEPHONE

Airways to Peace

PAA

# THE MUSEUM OF MODERN ART

To Pittsburgh Future Circ

I will

**Date** Jan. 11, 1944

**To:** Miss Dudley **Re:** Airways to Peace

**From:** M. Wodruff

At the request of Mr. Roy A. Johnson, Traffic Advertising, Pan American Airways System, Chrysler Bldg., 135 E. 42nd St., N.Y.17, N.Y., Miss Courte was having the PAA model - Boeing cutaway model, shipped by Railway Express Collect yesterday or this a.m. to: (from Washington):

Ok shipped Jan 11

Attention: Mr. K.M.Bates
Poor Richard Blub
Bellevue Stratford Hotel
Philadelphia, Pa.

I am confirming with Mr. Johnson that PAA will take over complete responsibility for the model once it reaches Phila. - since we no longer need it in the Circ. Exh.

43,1370

mw

REG:MD

(3) Pcs 7/15/43

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ESTABLISHED 1856 INCORPORATED 1873

# RAND McNALLY & COMPANY

CHICAGO · NEW YORK · WASHINGTON · SAN FRANCISCO · LOS ANGELES

MAP ENGRAVERS PUBLISHERS

Always to Peace

111 EIGHTH AVENUE
NEW YORK

TELEPHONE
CHELSEA 3-4100

July 14th
1 9 4 3

Collected 7-43

Miss Dorothy H. Dudley, Registrar
The Museum of Modern Art
11 West 53rd Street
New York, N.Y.

Dear Miss Dudley:

Will you please deliver to bearer the following merchandise which was not exhibited:

9 maps on paper
1 map on cloth
1 panel showing how a globe is made
1 steel uncolored globe.

Very truly yours,

RAND McNALLY & COMPANY

Harold E. Group
Harold E. Group

HEG:MB

P Donahue
3 Pcs 7/15/43

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July 12, 1943

Dear Mr. Group:

I have checked with the Mail Room of the Museum and find that the items you mentioned are ready to be collected by your truck any day this week. When you have checked these items, we would appreciate it if you would sign and return to us the enclosed receipt so that we may complete our records.

I am also enclosing a receipt for the three globes which we are keeping at the Museum for the exhibition and we are insuring them as indicated.

Sincerely yours,

Secretary to the Registrar

Mr. Harold Group
Rand McNally and Co.
7 West 50th Street
New York 19, New York

Encls.

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Manager Gelb -

RAND McNALLY
AIRWAYS

YALE CLUB - NEW YORK

May 20, 1943

Mr. Monroe Wheeler
The Museum of Modern Art New York
11 West 53rd Street
New York, N. Y.

My dear Mr. Wheeler:

# THE MUSEUM OF MODERN ART

**Date** July 12, 1943

**To:** Miss Dudley

**From:** M. Allen

**Re:** Returns to Rand-McNally from Airways to Peace

Rand McNally is sending a truck to pick up the items (maps and a globe and a a panel) which they sent for the exhibition and we did not use. These three things are in the Mail Room and Eddie knows which ones they are. There is a large globe, 10 maps in a roll, and a panel.

Mr. Group

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Manager Gelb -

RAND McNALLY
AIRWAYS

YALE CLUB - NEW YORK

May 20, 1943

Mr. Monroe Wheeler
The Museum of Modern Art New York
11 West 53rd Street
New York, N. Y.

My dear Mr. Wheeler:

Mr. H. M. Spencer, Manager of the Commercial Department of Rand McNally & Company, whom I told about your proposed exhibit, has expressed a desire to cooperate with you, if you want him to. The following, he says, is a list of material, all or any part of which they are prepared to contribute:

Renner "World Map for the Air Age", wood rods, vellum, 46" x 46".
Earle-McKee "United States in the Modern World," wood rods, vellum, 58" x 39".
Star Chart, "Northern Skies", 45" x 45".
Star Chart, "Southern Skies", 45" x 45".
Student's Manual of Astronomy
Standard Aeronautical Map of the United States, 42" x 28".
Goode School Atlas

Celestial Globe No. 9160, 9" diameter.
Air Age Globe with Distance Tape Finder, 12" diameter.
Air Age Map of the World, 28" x 21".
World Time Zone Map, 28" x 21".
International Atlas.

Sincerely yours,

PPWillis

PPWillis
gm

Mr. Group

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CUSTOMER'S COPY

# THE MUSEUM OF MODERN ART

11 WEST 53 STREET

NEW YORK CITY

SUTTON GLASS & MIRROR CO., Inc.

GLASS AND MIRRORS

TO Russo

450 Lexington Avenue

New York, New York

DATE September 16, 1943

PLEASE PUT ORDER NUMBER ON INVOICE

No. 18156

INVOICE BEARING ORDER NUMBER SHOULD BE MAILED DIRECTLY TO CONTROLLER'S OFFICE.

| | UNIT PRICE | TOTAL | |
|---|---|---|---|
| Negative photostat for Airways to Peace | | | 51 |

ORDERED BY

AUTHORIZED BY

FOR AIRWAYS TO PEACE

FO

Not responsible for Breakage or Shortage
After this Receipt is Signed.

PATPAKT PATENT NO. 1934478 - AM-SALES BOOK CO., INC., NIAGARA FALLS, N.Y.

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CUSTOMER'S COPY

1025
Phone PLaza 3- 1026
1027

# SUTTON GLASS & MIRROR CO., Inc.

## GLASS AND MIRRORS

891 THIRD AVENUE
NEAR 53rd STREET
NEW YORK

1394

Date _____ 193__

Sold to Museum of Modern Art 11-15-43

Address _____

| QUANTITY | DESCRIPTION | PRICE | AMOUNT |
|---|---|---|---|
| | 4 Mirrors | | |

Not responsible for Breakage or Shortage
After this Receipt is Signed.

PATPAKT PATENT NO. 1934478 - AM. SALES BOOK CO., INC., NIAGARA FALLS, N.Y.

...ware d'Pierce

...HTS, ILLINOIS

...ber 15, 1943

...NUMBER ON INVOICE

18176

INVOICE BE...

TOTAL

1 T... 2 67

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# THE MUSEUM OF MODERN ART

11 WEST 53 STREET
NEW YORK CITY

TO Weber Costello Company
Chicago Heights, Illinois

DATE December 15, 1943

PLEASE PUT ORDER NUMBER ON INVOICE

**No 18176**

INVOICE BEARING ORDER NUMBER SHOULD BE MAILED DIRECTLY TO CONTROLLER'S OFFICE.

| | | UNIT PRICE | TOTAL |
|---|---|---|---|
| 1 | T&A Tryon History Map (Invoice No. 60569) | | 2 67 |

For AIRWAYS TO PEACE

ORDERED BY

AUTHORIZED BY

FOR AIRWAYS TO PEACE EXHIBITION

WFS:ERB

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Armour & Co.

# WEBER COSTELLO COMPANY

MANUFACTURERS OF BLACKBOARDS • ERASERS • CHALK • ART MATERIALS
PUBLISHERS OF MAPS • GLOBES

CHICAGO HEIGHTS, ILLINOIS

November 10th, 1943

Dorothy H. Dudley, Registrar
The Museum of Modern Art
11 West 53rd Street
New York, New York

Dear Miss Dudley:

This will acknowledge receipt of your letter of November 2nd to let you know we have received the 50 Inch Globe which has been returned to us on Government Bill of Lading No. 2620 for repair.

Very truly yours,
WEBER COSTELLO COMPANY

W. F. Scarborough

WFS:ERB

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Our ways to Peace

WEBER COSTELLO COMPANY

CHICAGO HEIGHTS, ILLINOIS

November 2, 1943

Gentlemen:

At the direction of Cummings & Engbert, 321 East 29th Street, New York City, two crates containing two sections of a 50-inch globe were shipped to you by railway express yesterday. I am enclosing Government Bill of Lading No. 2620 covering this shipment. Will you be kind enough to notify us when you have received this globe.

Sincerely yours,

Registrar

Weber Costello Company
12th & McKinley Streets
Chicago Heights, Illinois

DD:joc

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WEBER COSTELLO A & P

# WEBER COSTELLO COMPANY

*MANUFACTURERS OF BLACKBOARDS • ERASERS • CHALK • ART MATERIALS*
*PUBLISHERS OF MAPS • GLOBES*

CHICAGO HEIGHTS, ILLINOIS

June 28, 1943

Mr. Charles Keller
The Museum of Modern Art
11 West 43rd Street
New York, New York

Dear Mr. Keller:

I have just returned to the office and your letter has been called to my attention and was very pleased to have your order for T1A map which has been shipped to you and I hope that this unusual type of map would fit into the display you had in mind.

The idea that you have suggested to demonstrate the distortion of a flat wall map particularly the Mercator is a very good one. It would be possible to make up a special globe such as you have indicated. We would like to work with you on this and could do so in normal times, but we are so far behind in our globe orders that we have established a policy of eliminating any special orders of this sort, until such time as we are caught up in our production and can continue experimenting along these lines.

It is difficult to say just when it would be possible to do this, so we are enclosing a circular on our new Polar Projection Global World Chart which might be just what you have in mind. This chart is printed on vellum and also a globe map of the World printed on a flat sheet. In other words, if you would cut out the Northern and Southern Hemispheresand paste them around the globe ball, you would have a 14" globe. The price of this chart in sheet form is only $3.00 and I know that you will be interested in it to show the change from a globe to a flat map and closely demonstrate the distortion of a World map on a flat sheet.

Very truly yours,

WEBER COSTELLO COMPANY

W. F. Scarborough

WFS:BJJ

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TELEPHONE
HAVEMEYER 6-8800

CABLE ADDRESS
"AMAIR"

AMERICAN AIRLINES, INC.
LA GUARDIA FIELD
NEW YORK AIRPORT STATION
NEW YORK

100 East 42nd Street
New York City

May 13, 1943

Mr. Monroe Wheeler
Director of Exhibitions and Publications
The Museum of Modern Art
11 West 53rd Street
New York City

Dear Mr. Wheeler:

I have received your letter of May 10 and while we regret the circumstances which will not permit us to work more closely with you, we welcome the privilege of consulting with you on the Air Age Geography Exhibition as you have proposed.

I have asked Mr. Willis to communicate with you and to be of whatever assistance he can in the preparation of your exhibits.

Sincerely yours,

Charles A. Rheinstrom
Vice President - Traffic

car jh

cc Mr. P. P. Willis

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Add. Airlines

AIRWAYS

AIRLINES

May 10, 1943

Mr. Charles A. Rheinstrom
Vice President - Traffic
American Airlines, Inc.
100 East 42 Street
New York, New York

Dear Mr. Rheinstrom:

I want to thank you for your very kind letter of April 26, stipulating the conditions under which the American Airlines might subsidize the air-age geography exhibition which the Museum of Modern Art is planning to hold this Summer. I have discussed the matter with several members of our Executive Committee, who have all reminded me that it is the policy of the Museum to reserve the final decision as to content of all its exhibitions, and that it would not be possible to transfer veto power to any other organization. Actually, I believe in this instance there is no need to fear that the OWI will unduly influence the policy of the exhibition, because our objective is, as I explained before, entirely disinterested. Our only desire is to present a readily comprehensible picture of the effect of the airplane on human affairs.

We are, however, proceeding with the exhibition, in any case, and I hope we may have the privilege of consulting you and Mr. Willis as occasion arises. With best wishes, I am

Very sincerely yours,

MW:CH

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Consolidated Vultee
AIRWAYS

August 24, 1943

Mr. Francis A. Callery
Vice President
Consolidated Vultee Aircraft Corporation
San Diego, California

Dear Mr. Callery:

It is a great pleasure to acknowledge the receipt of the check for twenty-five hundred dollars representing the contribution approved by the directors of the Consolidated Vultee Aircraft Corporation to the Museum of Modern Art. This contribution will be used to help defray the cost of the Museum's current educational exhibition, AIRWAYS TO PEACE, in which, as you know, the Consolidated planes figure prominently. This contribution, of course, is deductible in computing income taxes.

I enclose herewith the Bulletin on the exhibition which we have recently issued, and under separate cover I am sending you additional copies for distribution to your directors.

The exhibition has been most enthusiastically received in New York, and we have arranged to continue it through October so that New York children will be able to attend in groups after the schools re-convene.

You will also be pleased to hear that arrangements are pending to install the entire exhibition, following its New York run, in the Commerce Building in Washington.

With renewed thanks for your generous support of AIRWAYS TO PEACE, I am

Very sincerely yours,

MW:CH

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Consolidated Vultee
AIRWAYS

CONSOLIDATED VULTEE
AIRCRAFT CORPORATION

August 24, 1943

Mr. R. A. Bussey
Assistant Treasurer
Consolidated Vultee Aircraft Corporation
San Diego, California

Dear Mr. Bussey:

I wish to acknowledge with many thanks the receipt of the check of the Consolidated Vultee Aircraft Corporation for twenty-five hundred dollars, the contribution of the Corporation to the Museum approved by your Board of Directors. The formal acknowledgment of our Trustees will be sent to you in due course.

This contribution, as you know, will be used to help defray the cost of the Museum's current AIRWAYS TO PEACE exhibition, the Bulletin of which I enclose herewith. Arrangements are now under way to install the exhibition in the Commerce Building in Washington following its showing in New York.

With renewed thanks, I am

Sincerely yours,

MW:CH
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CONSOLIDATED VULTEE
AIRCRAFT CORPORATION

GENERAL OFFICES
SAN DIEGO, CALIFORNIA

August 20, 1943

Museum of Modern Art
11 West 53rd Street
New York City

Gentlemen:

Attention of Mr. Monroe Wheeler

We are pleased to inform you that the Board of Directors of this corporation approved a contribution to the Museum of Modern Art.

Accordingly, we enclose our check for $2,500 representing the amount approved by the Board of Directors for this purpose.

Yours truly,

CONSOLIDATED VULTEE AIRCRAFT CORPORATION

R. A. Bussey, Assistant Treasurer

rab:wer
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# CONSOLIDATED VULTEE AIRCRAFT CORPORATION

GENERAL OFFICES
SAN DIEGO, CALIFORNIA

July 16, 1943

Mr. Monroe Wheeler
The Museum of Modern Art
11 West 53rd Street
New York, N. Y.

Dear Mr. Wheeler:

Your letter of June 22 addressed to Mr. Girdler was referred to me while I was out of town and apparently was misplaced or it would have been acknowledged before this.

Our next Directors' Meeting is to be held on August 10, and as all contributions must be passed on by Directors, I will be glad to have the matter taken up at that time. I would appreciate your letting me know, however, if this project has already been financed or whether funds for this purpose are still being solicited.

Yours very truly,

Francis A. Callery

Francis A. Callery
Vice President

FAC:mlc

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Consolidated
AIRWAYS

AIR MAIL and
SPECIAL DELIVERY

June 22, 1943

Mr. T. M. Girdler
Consolidated Vultee Aircraft Corporation
San Diego, California

Dear Mr. Girdler:

The Museum of Modern Art will open on July first an exhibition entitled AIRWAYS TO PEACE, which will serve the layman as an introduction to present-day geography as it has been affected by the airplane. I enclose herewith an outline of the exhibition. It far exceeds the scope of the usual museum exhibition, and has entailed expenditures of fifteen thousand dollars in excess of the amount allocated to it by our Trustees. Mr. Juan Trippe is very enthusiastic about the need for the exhibition and its value to the future interests of the air industry in terms of public education. His company is contributing five thousand dollars toward the cost.

I am writing on behalf of our Trustees to ask whether, in view of its recent efforts in behalf of popular geographical education, Consolidated Vultee Aircraft Corporation might not be willing to contribute a like amount?

Wendell L. Willkie has kindly consented to write all major captions for the exhibition, and the President is lending the great fifty-inch globe from his study for the opening.

The Museum of Modern Art is, as you know, a non-profit educational institution operating under charter of the University of the State of New York. All contributions are deductible from income taxes.

We estimate that AIRWAYS TO PEACE will be seen by approximately two hundred thousand people in New York City, and thereafter it will travel to other important museums throughout the United States.

Thanking you in advance for the courtesy of your consideration, I am

Very sincerely yours,

MW:CH

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AIRWAYS

April 29, 1943.

October 21, 1943

Dear Mr. Lawrence:

I am writing to you at the suggestion of Mr. Juan Trippe to give you further details regarding the exhibition of Air Age Geography which the Museum of Modern Art is holding from June to October of this year. I enclose, herewith, an outline of the exhibition and a pamphlet illustrating last year's Road to Victory show to which this exhibition is a sequel.

The Museum of Modern Art is unable to finance this exhibition entirely and, inasmuch as the Museum is a non-profit educational institution, operating under the Charter of the University of the State of New York, we have been advised to seek financial aid from two or three aircraft companies whose interests will be served by this exhibition.

Mr. Trippe, as you doubtless know, is most enthusiastic about this exhibition and has arranged for his company to contribute to the Museum the sum of $5,000 toward its expenses, this sum being deductible for income tax purposes. We shall, however, need at least two additional such contributions in order to proceed with the exhibition. I shall be very happy to talk with you and your associates about this matter at your earliest convenience.

Thanking you in advance for the courtesy of your consideration, I am

Very sincerely yours,

COS-
4040

Mr. H. E. Lawrence
Advertising and Publicity Director
Curtiss-Wright Corporation
30 Rockefeller Plaza
New York, N. Y.

Enclosures
MW:lf

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Pan American AIRWAYS

October 21, 1943

Mr. Richard C. Walker
Pan American Airways System
135 East 42 Street
New York, New York

Dear Mr. Walker:

I enclose herewith a memorandum covering the contribution of Pan American Airways toward the cost of AIRWAYS TO PEACE. From the point of view of public response, the exhibition has been immensely successful. At the request of the Board of Education we extended the run of the exhibition an additional month. Arrangements have just been concluded with the C.A.A. to send the entire exhibition to Washington, where it will be shown in the auditorium of the Commerce Building. In your letter of May third you said that Pan American Airways would be willing to increase its contribution if necessary to complete the $15,000 cost. We have received $5,000 from United Aircraft and $2,500 from Consolidated Vultee, which leaves us a deficit of $2,500. We hope, therefore, that you may find it possible to increase your total contribution to $7,500. Our Publicity Department is preparing for you some photostats of the floods of clippings we have had from all over the world regarding the Pan American postwar timetable you prepared for the show. With renewed thanks for your generous cooperation, I am

Sincerely yours,

Monroe Wheeler

MW:CH

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Pan American AIRWAYS

August 26, 1943

Mr. Juan T. Trippe
Pan American Airways System
135 East 42 Street
New York, New York

Dear Mr. Trippe:

I enclose herewith a clipping from this morning's Herald Tribune, devoted to the timetable prepared at our request by your organization for our current AIRWAYS TO PEACE exhibition.

As Mr. Walker may have told you, we have received a check from Consolidated Vultee Aircraft Corporation for twenty-five hundred dollars. We are now only twenty-five hundred dollars short of our cost, and I believe Mr. Walker is going to discuss with you the possibility of Pan American's adding this amount to your contribution. May I thank you again for your great help in financing this very significant educational exhibition, which has been highly praised in all quarters. The attendance has been so gratifying that we have extended the run of the exhibition through the month of October.

Sincerely yours,

MW:CH
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Pan American

AIRWAYS

July 12, 1943

June 22, 1943

Mr. Juan T. Trippe, President
Pan American Airways System
135 East 42 Street
New York, New York

Dear Mr. Trippe:

I enclose herewith Newsweek's review of the AIRWAYS TO PEACE exhibition. You doubtless say the very flattering accounts of it which appeared in the Times and the Herald Tribune. It has aroused immense interest and attention, especially in educational circles, and the attendance so far has been much larger than it was for last year's ROAD TO VICTORY.

We still need to raise five thousand dollars, however, to cover our costs, because so far we have, in addition to your own pledge, only the five thousand dollars which Colonel Christie of United Aircraft has promised us. The other company whose representative seemed to be most interested in the exhibition is Consolidated Vultee Aircraft Corporation, and I wonder whether it would be possible for you to speak to Mr. Girdler about their coming in as the third sponsor? If, for any reason, you think this is not desirable, is there any other company which you might be willing to approach?

The exhibition will, after all, run through October, and we plan to keep it up to date throughout the Summer. Won't you please let me have your suggestions for completing the underwriting of this exhibition, in which you have been more than helpful? I am sorry you could not help us entertain Mr. Willkie the opening night. The text which he wrote is perfect and is going to be quoted in many publications during the Summer. Won't you stop by some late afternoon very soon and let me show you the exhibition? With renewed thanks for all you have done to make this exhibition a success, I am

Sincerely yours,

MW:CH
Enclosure

MW:CH

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Pan American

AIRWAYS

June 22, 1943

Mr. Juan T. Trippe
President, Pan American Airways System
135 East 42 Street
New York, New York

Dear Mr. Trippe:

I am happy to report that Wendell L. Willkie has consented to write the text for our great Airways to Peace exhibition, and the President has agreed to lend us the great fifty-inch globe from his study for the opening on the first of July. I hope very much that you and Mrs. Trippe will be able to attend an informal supper which the President and Trustees of the Museum are giving to inaugurate the opening of the exhibition.

Mr. Lawrence of Curtiss-Wright turned us down on sponsorship, but I believe that United Aircraft Corporation is going to contribute. This leaves us with still one sponsor to be found in order to cover our deficit, and, inasmuch as Consolidated Vultee has recently published an excellent booklet on this very subject of global geography, I should think they would be glad to sponsor the exhibition if you could take a moment to phone to Mr. Girdler, as you did to Mr. Rentschler. If Mr. Girdler would agree to contribute five thousand dollars, this would clear up the problem of financing.

The exhibition has aroused more advance interest than anything we have ever attempted, and there seems to be no question of its success. Mr. Van Dusen and Mr. Walker of your company are providing us with some special Pan American material for inclusion in the show.

With many thanks for the great consideration and assistance you have given us, I am

Very sincerely yours,

MW:CH
Enclosure

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May 6, 1943.

Mr. R. C. Walker, Advertising Manager
Pan American Airways System
135 East 42 St.
New York, N. Y.

Dear Mr. Walker:

It is a great pleasure to acknowledge your letter of May 3 confirming your company's willingness to contribute five thousand dollars toward the cost of the air-age geography exhibition which the Museum of Modern Art will open at the end of June. It is understood that this contribution is contingent upon your being the only airline sponsors concerned, and any further subsidy will be obtained from manufacturers, as you suggest. We are also gratified to hear that if other co-sponsors are not forthcoming you will entertain an increase in the amount that you will contribute.

I spoke this morning to Colonel Christie, who is pursuing the matter with Mr. Rentschler. He promised to give us an answer the first of the week, and I am happy to say that he seemed quite hopeful about the possibilities.

Mr. Lawrence, of Curtiss-Wright, does not wish to make any commitment until the plans for the Pentagon show in Washington--in which they are participating--have been completed, which will be next week. I have discussed with him the inclusion of some of this material in our exhibition, and if you should agree with us about the desirability of this, it could certainly be done. In view of Curtiss-Wright's delay, I have asked Mr. Trippe to speak to Mr. Thomas Morgan of Sperry Gyroscope, who may, as you suggest, be interested in an educational project of this caliber.

It will be agreeable to us to receive your contribution any time prior to the opening of the exhibition on June 29. I am sure that you will find your confidence in the Museum and this project well rewarded.

With renewed thanks for your generous collaboration, I am

Very sincerely yours,

MW:lf

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COPY

Pan American AIRWAYS

PAN AMERICAN AIRWAYS SYSTEM
General Offices, Chrysler Building, 135 East 42nd Street, New York, N. Y.

May 3, 1943

Mr. Monroe Wheeler
Director of Exhibitions
The Museum of Modern Art
11 West 53rd Street
New York City

Dear Mr. Wheeler:

In accordance with your request, this is to confirm in writing the assurance I gave you verbally that our company is willing to contribute the sum of $5,000 towards the cost of the Air Age Geography exhibit planned by your museum. This contribution and sponsorship is contingent, as I believe you fully understand, on exclusivity insofar as airline sponsors be concerned- albeit we have no objections to co-sponsors from the aviation manufacturing, accessory and kindred fields.

Should you be unsuccessful in obtaining co-sponsors willing to in aggregate make up the balance of $15,000 I understand you consider necessary, we would entertain some increase in the aforementioned amount that you can depend upon from us, although I think you should be able to raise the full requisite sum from just a few additional sponsors.

Sincerely yours,

R. C. Walker (signed)

R. C. Walker
Advertising Manager

rcw/m

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PAN AMERICAN AIRWAYS SYSTEM

April 29, 1943.

Dear Mr. Walker:

As I explained to you this morning, our Executive Committee needs written confirmation of Pan American Airways' agreement to contribute $5,000. toward the cost of the Air Age Geography exhibition which the Museum of Modern Art is presenting from June to October of this year.

As you know, the Museum is a non-profit educational institution, which makes a contribution toward its activities deductible for income tax purposes. Our Trustees are very happy to receive the cooperation of Pan American Airways in this much needed educational project, and I believe there is no doubt that your interests will be well served through your participation.

Acting upon your suggestion, I am communicating today with Col. Arthur R. Christie, of the United Aircraft Corporation, and Mr. H. E. Lawrence, of Curtiss-Wright Corporation.

With thanks and best wishes, I am

Sincerely yours,

Mr. Richard Walker, Advertising Manager
Pan American Airways System
135 East 42 St.
New York, N. Y.

MW:lf

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Pan American
AIRWAYS

PAA **PAN AMERICAN AIRWAYS SYSTEM**

GENERAL OFFICES, CHRYSLER BUILDING, 135 EAST 42ND STREET, NEW YORK, N. Y.

OFFICE OF THE PRESIDENT

April 22, 1943

Mr. Monroe Wheeler
The Museum of Modern Art
11 West 53rd Street
New York City

Dear Mr. Wheeler:

Unfortunately, I have been ill for several days and the meeting of our Committee scheduled for last Tuesday was necessarily postponed.

I have taken up the matter, however, with both Curtiss Wright and Pratt & Whitney and I hope we will be able to let you know in a few days whether Pan American jointly with them can underwrite the subsidy for the exhibition we discussed last week.

Regretting this delay, I remain

Sincerely,

J. T. Trippe

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Pan American

AIRWAYS

April 19, 1943

Mr. Juan Trippe
Pan American Airways
135 East 42 Street
New York, New York

Dear Mr. Trippe:

I wonder whether you have any news for me regarding the matter of subsidy for the exhibition of Air Age Geography which I told you about when you were kind enough to see me on April 9.

As you may recall, our Trustees were eager to know by April 14 whether this could be arranged. I have learned from your secretary that you were called to Washington last week, and this perhaps means that you have been unable to take any action regarding the exhibition. If you think that your company and its associates can definitely underwrite the exhibition in the required amount, $15,000, I should like, in all fairness to certain other companies, to discourage the overtures which they have been extending to the Museum since hearing about this project from Mr. Burden.

Need I say that we look forward with great pleasure to collaborating with you and your associates in this unique public educational project, and that we are anxious to begin at the first possible moment. But we do require almost immediate confirmation if the exhibition is to be our major Summer activity and is to open as planned on June 29.

With renewed thanks for your kind consideration of our proposal and with hopes of our future collaboration, I am

Very sincerely yours,

MW:CH

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Willis
AIR A 1R1-1946

May 10, 1943

Mr. P. P. Willis
The Yale Club
Vanderbilt Avenue and 44 Street
New York, New York

Dear Mr. Willis:

I have finally had an occasion to speak to members of our Executive Committee regarding the stipulations outlined in Mr. Rheinstrom's letter concerning the possibility of your subsidizing the Museum's air-age geography exhibition. The Museum has been unwilling to relinquish veto power to any other organization, so I am afraid that that puts an end to our financial cooperation. I shall doubtless want to consult you on various points as the exhibition progresses. Our only desire is to make the layman aware of the changes aviation has effected, and if you would like to let us have the benefit of your advice, we should be very grateful.

I want to thank you for your very interesting book on airlines advertising, and also for the excellent advertisement, You Cannot See Me. With best wishes, I am

Sincerely yours,

MW:CH

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Willis - Yale Club -

AIRWAYS

April 19, 1943

Mr. P. P. Willis
The Yale Club
Vanderbilt Avenue
and 44 Street
New York, New York

Dear Mr. Willis:

In reply to your questions regarding the attitude of the Museum of Modern Art on certain points in connection with our contemplated exhibition of Air Age Geography, I am pleased to send you the following answers:

1-Amount of subsidy required.

We estimate the total cost of preparation and installation as $22,000. Of this sum, the Museum in the present circumstances can provide not more than $7,000, leaving a balance of $15,000 to be found.

2-What role would American Air Lines play in determining the nature of the exhibits?

The final plan of the exhibition will be developed by the staff of the Museum, in consultation with you and American Air Lines experts in this field, and, of course, also with the CAA experts, who have done a good deal of spadework on this subject.

3-Will American Air Lines have the right to censor exhibits which seem to them misdirected or misleading?

The Trustees of the Museum of Modern Art assign a director for each exhibition, who is solely responsible to them for its content. In this case, I am afraid that it will be

P.T.O. →

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impossible to give American Air Lines veto power, but I think I should remind you that we have no other objective in producing this exhibition than to clarify the layman's knowledge of global geography in relation to the prosecution of the war and the planning of a durable peace.

4-Would the Museum permit American Air Lines to distribute to all visitors to the exhibition a booklet telling the story of air age geography?

The Museum would have no objection to this, providing it has the right to approve the contents of the folder. This reservation is made only to prevent the Museum from sponsoring a publication which has too obvious a commercial angle. It must be understood that the Museum's prestige is based upon its disinterested public service, and an obvious affiliation with any one commercial enterprise would tend to mitigate the effectiveness of the exhibition.

5-Would American Air Lines own the exhibits after the close of the exhibition tour?

The Museum's estimate of the cost of the exhibition is based on salvaging a good deal of the material involved, but by payment of an additional sum I think it could be arranged for the exhibition to become your property.

Our friend, Mr. William A. M. Burden, has spoken to one or two other companies about possible subsidy of this exhibition, and I hope it will be possible for you to let us have a definite answer regarding your participation after you have seen Mr. Kemp tomorrow night. We are, of course, eager to proceed with the exhibition at the earliest possible moment in order that it may open as contemplated, on June 29.

Sincerely yours,

MW:CH

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April 15, 1943.

Dear Mr. Willis:

I am sending you, herewith, the tentative outline of the Global Geography exhibition which we are planning to hold from June to October this year at the Museum of Modern Art. I enclose also a copy of our Bulletin illustrating the Road to Victory exhibition which we did last year and to which the Global Geography show will be a sequel.

As I explained to you, we shall need $15,000 in addition to the eight or ten thousand dollars which we ourselves can provide, in order to present this exhibition in the most effective manner possible. After its New York showing the exhibition would be sent to other major cities in the United States and it is quite likely that it would be duplicated for use in other countries. The Office of Inter-American Affairs has sent two copies of last year's Road to Victory exhibition to South America and the Office of War Information has sent two copies to England and one to other cities in the United States.

I shall be very glad to know what you and Mr. Kemp think of our plan.

With renewed thanks for your kindness in seeing me yesterday, I am

Very sincerely yours,

Mr. P. P. Willis
The Yale Club
44th St., Vanderbilt Ave.
New York, N. Y.

Encl.
MW:lf

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United Aircraft Corp
AIRWAYS

UNITED AIRCRAFT CORPORATION
EAST HARTFORD, CONNECTICUT

230 Park Avenue,
New York, July 21, 1943

July 22, 1943

Colonel Arthur R. Christie
United Aircraft Corporation
230 Park Avenue
New York, New York

Dear Colonel Christie:

On behalf of the Trustees of the Museum of Modern Art, I wish to acknowledge the receipt of United Aircraft Corporation's contribution of five thousand dollars toward the Museum's current AIRWAYS TO PEACE exhibition. As you know, the Treasury Department has ruled that contributions to this Museum, a non-profit, educational institution, are deductible for income tax purposes.

I wish to take this opportunity to thank you and your associates for the extremely generous and far-sighted participation in this educational display. It has been greeted with very enthusiastic response, and the attendance has already proved so much higher than that for ROAD TO VICTORY last year that we have extended the duration of the exhibition through the month of October, to facilitate the attendance of New York school children in the Fall.

We are now preparing a special Bulletin on the AIRWAYS TO PEACE exhibition. It will receive wide distribution throughout North and South America, and I shall send copies to you as soon as it is off the press.

I enclose herewith the Newsweek review. You have doubtless seen the excellent reviews which appeared in the New York papers. We are told that Time Magazine will review it shortly, and that Life Magazine is also planning to do a story on it.

Sincerely yours,

MW:CH

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AIRWAYS

# UNITED AIRCRAFT CORPORATION

EAST HARTFORD, CONNECTICUT

230 Park Avenue,
New York, July 21, 1943

Mr. Monroe Wheeler,
The Museum of Modern Art,
11 West 53rd Street,
New York, N. Y.

Dear Mr. Wheeler:

Enclosed please find check for $5,000. as United Aircraft Corporation's contribution toward the Airways to Peace Exhibition.

With kindest regards.

Sincerely yours,

A R Christie

Arthur R. Christie.

ARC:cp
Encl.

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United Aircraft

AIRWAYS

June 21, 1943

Colonel Arthur R. Christie, General Manager
United Aircraft Corporation
230 Park Avenue
New York, New York

HD:WH

Dear Colonel Christie:

I have tried several times in your absence to learn whether United Aircraft is prepared to join Pan American Airways in its financial sponsorship of our big Airways to Peace exhibition, and I very much hope that we shall receive a favorable answer from you soon. Your own response and that of Mr. Lyman were so enthusiastic that I have since refrained from approaching other companies, and now, of course, our time is very short. Acting upon your suggestion that Wendell Willkie would be the best person to write the large captions that will appear prominently throughout the show, I communicated with him directly. He came up to the Museum, talked the whole thing over with us, saw what we are doing, and enthusiastically agreed to do the text if he possibly could. He is now working at it, and we expect to have the results very shortly. The President has also consented to let us bring from Washington for the opening the great fifty-two-inch globe in his study, which is unquestionably the finest in the world. We ourselves are constructing, as you know, a fifteen-foot globe into which the visitor will walk; it will show the major air routes. We are featuring photographs of the Vought-Sikorsky Corsair in our Development of Flight section.

There is only one other high spot for which final arrangements have not been made, and that is the helicopter film, which we should like to show on a small screen right in the exhibition proper. We could not, in this case, use sound track. What we should like to know at once is whether you can provide us with a film which we can use for this purpose.

I suppose it would be too much to propose having a helicopter in the Museum Garden, which would make an ascent every afternoon, but I assure you that nothing could possibly focus greater attention upon the future possibilities of the helicopter. I do not know whether any City permits would be required for this, but you might think it over, in any case.

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I do hope that you and Mrs. Christie will be able to come to the supper which Mrs. Stephen C. Clark, Mrs. John Hay Whitney and our Trustees are giving to inaugurate the exhibition on the evening of July first.

Very sincerely yours,

MW:CH

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United Aircraft

AIRWAYS

April 29, 1943.

Referred to by Mrs. [illegible]

I Frederick J. Kiesler Exhibition Design Board

IAU 6-5014

Col. Arthur R. Christie, General Manager
United Aircraft Corporation
230 Park Avenue
New York, N. Y.

Dear Colonel Christie:

I am writing to you at the suggestion of Mr. Juan Trippe to give you further details regarding the exhibition of Air Age Geography which the Museum of Modern Art is holding from June to October of this year. I enclose, herewith, an outline of the exhibition and a pamphlet illustrating last year's Road to Victory show to which this exhibition is a sequel.

The Museum of Modern Art is unable to finance this exhibition entirely and, inasmuch as the Museum is a non-profit educational institution, operating under the Charter of the University of the State of New York, we have been advised to seek financial aid from two or three aircraft companies whose interests will be served by this exhibition.

Mr. Trippe, as you doubtless know, is most enthusiastic about this exhibition and has arranged for his company to contribute to the Museum the sum of $5,000 toward its expenses, this sum being deductible for income tax purposes. We shall, however, need at least two additional such contributions in order to proceed with the exhibition. I shall be very happy to talk with you and your associates about this matter at your earliest convenience.

Thanking you in advance for the courtesy of your consideration, I am

Very sincerely yours,

Enclosures
MW:lf

Roy Lord