



PLANES



ALL MATERIAL
MAY BE
REPRODUCED

NEWS OF THE
AVIATION
INDUSTRY

Official Publication of the

AERONAUTICAL CHAMBER OF COMMERCE OF AMERICA, INC.
Publication Office: 3324 Empire State Building • 350 Fifth Avenue, New York 1, N. Y.

VOL. 1 NO. 3

FEBRUARY, 1945

Research—An Investment!

The following statement was written especially for "Planes"

By Pat McCarran, United States Senator
Chairman, Senate Judiciary Committee

Member: Aviation Sub-Committee, Senate Commerce Committee

Among America's greatest assets in peace and war are the technical resources and equipment of her commercial air transportation system and her vital aircraft manufacturing industry.

Upon this backlog of technical skills and highly perfected equipment, this country was able to build the world's mightiest air force and the greatest global military air transport operation in history.

Airlines supplied the personnel to found and operate the military air transport services; and those services began operations with planes of the domestic airline fleet, diverted from commercial operations.

The technical achievements of commercial air transportation before the war are a testimonial to American initiative and ingenuity, and the spirit of progress which is a characteristic of our airlines and our manufacturers of aeronautical equipment. This same initiative, ingenuity, and spirit of progress is the best promise for America's continued leadership in aviation.

WHAT ABOUT THE FUTURE?

Our civil-born world-wide military air supply system has quickened the tempo and broadened the scope of all allied military operations. It may even be questioned whether this war could have been waged successfully without the military air transport system.

What about the future of civil air transportation?

Because air commerce is the logistic component of air defense, the armed services will continue to have a direct interest in strengthening the resources of the civil carriers. Air transport will be even more vital to the future supply and employment of land armies than it is today. The full military significance of air transportation is just beginning to emerge from this war. In framing our post-war air policy, we must recognize the importance of giving proper weight, at all times, to military considerations and the furtherance of our national defense. But we must also make certain that our national policy operates to encourage the orderly expansion of air commerce under primarily civil and not military regulation and control. And we must preserve, in the field of domestic air transportation, the widest possible opportunity for free competition, consistent with the public interest.

MUST ACCELERATE PROGRESS

Ours must be a policy which will operate to accelerate technical developments by private industry for the armed forces in the interest of national security. These developments must be made available through private industry to air transport operators, in the form of new and improved equipment, so as to have the effect of constantly reducing air transportation costs and promoting air commerce. The wealth so created can be carried as a credit against the funds expended by the Army and Navy on research, and we may well find that, viewed in that light, the cost of such research will prove to be an investment rather than out-of-pocket expense.

The expansion of air commerce will produce unifying political and economic influences throughout the world. Let us open the door of opportunity for the development of air transportation. World leadership in that field will be of vital importance to this nation in the air age upon which we have already entered.

Plane Design Begins Four Years Before Production

Aircraft Engineers Must Think in Terms of the Future

(See Chart Page 2)

The battle of aircraft design begins as much as four years ahead of aerial combat. It also follows the entire production life of a combat model.

It takes an average of four years and eight months to get a new design of four-engine aircraft into quantity production. And in that time the basic design has undergone thousands of minor design changes, and will undergo many hundreds more incorporated in the production line.

That is why aircraft engineers must keep at least four years ahead of present-day aviation. They must consider current practice but think in terms of the future.

One of America's most famous heavy bombers first began its development in August, 1934. It was not until October, 1940, that it was being turned out at the rate of 12 per month. It was two years later before it began precision daylight bombing of the enemy.

THIRTY MONTHS REQUIRED

The time required to develop new types of aircraft or engines is roughly proportional to their size.

The average overall elapsed time between start of engineering and peak production for a medium weight airplane is one month less than three years. Planes of this size (10,000 to 25,000 lbs. gross weight) include medium twin-engine bombers, single-engine dive bombers and twin-engine fighters. One medium bomber, however, was at peak production 30 months after it was on the drawing boards.

EIGHT MODEL CHANGES

For single-engine fighters and naval reconnaissance aircraft the average elapsed time from drawing board to production peak is approximately 28 months.

One single-engine fighter plane now in action has gone through eight major model changes requiring more than 1,800,000 engineering man-hours since its original conception.

Approximately 45 months elapse from start of engineering to peak production of aircraft engines.

"Critical" Plane Quotas Boosted

Revised production quotas call for an increase of approximately nine per cent in aircraft units for 1945, over previously announced schedules, with further increases expected.

The current 1945 schedule calls for a total of 82,250 units instead of the 75,600 total forecast four months ago.

The increase in certain critical types including very heavy bombers, Navy fighters and new jet-propelled aircraft will amount to as much as 300 per cent, in terms of monthly dollar volume.

UP TWELVE PER CENT

The new 1945 quota was still substantially under the past year's record of 96,369 units, the largest aircraft production accomplishment in history. The 1944 total was a 12 per cent increase over the 85,946 aircraft built in 1943.

The 1944 record, which is expected to stand as an all time war production high, brought to 232,149 airplanes the total produced since Pearl Harbor, and to nearly a quarter of a million aircraft since January, 1941.

The annual production for the past four years follows:

1941	19,290
1942	47,873
1943	85,946
1944	96,369
Total	249,478
1945 (schedule)	82,250

ELAPSED TIME FROM START OF ENGINEERING TO PRODUCTION OF MILITARY AIRCRAFT AND ENGINES



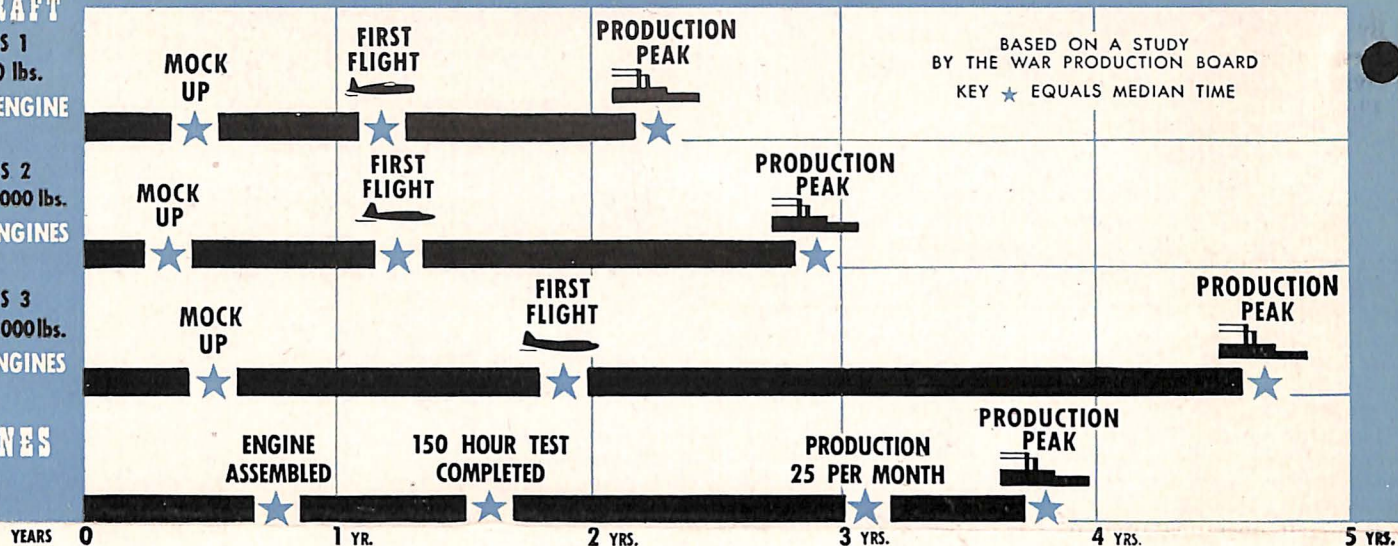
AIRCRAFT

CLASS 1
10,000 lbs.
SINGLE ENGINE

CLASS 2
10 to 25,000 lbs.
TWIN ENGINES

CLASS 3
OVER 25,000 lbs.
FOUR ENGINES

ENGINES



Aircraft design must stay at least four years ahead of production. For this reason design engineers must think in terms of the future while considering current practice.

Aircraft design is a continuous process following the aircraft through

its production life. Modifications incorporated in the production lines are necessary to meet ever changing tactical requirements and to give our pilots an ever mounting edge in performance over the enemy. It takes about 45 months to mass-produce a new engine.

Twelve Stages In Development

In general, there are twelve basic stages in aircraft development from drawing board through production. They are:

1. Development of a general specification.
2. Calculation of basic strength, power and design data as a criteria for future work.
3. Construction of wind tunnel model (optional).
4. Analysis of structural strength (development of stress analysis data).
5. Development of basic working drawing.
6. Construction of full-scale airframe model.
7. Static testing of basic structure (to prove ultimate strength of airframe members under various attitudes and load conditions).
8. Ground test of complete airplane.
9. Flight test.

Global Military Air Transport Dwarfs All Pre-war Standards

The Air Transport Command, largest of the military air transport services, today is flying the equivalent of one round-the-world trip every thirty-three minutes.

There are now more than 1900 daily transport flights throughout the world by the A.T.C. Its North Atlantic service is now more frequent than the New York to Boston railway service.

These facts are indicative of

10. Development of production drawings (working drawings developed into production blueprints by incorporation of results of static, ground and flight tests).
11. Production (model is frozen for period necessary to complete shop production set-up).
12. Production changes (continuing process to meet service requirements).

the scope of wartime air transport operations and of peacetime operations to come. The A.T.C. flew more miles in foreign operation in the first eight months of 1944 than were flown by all U. S. commercial airline operators in foreign and domestic service for the combined years of 1942 and 1943.

Although smaller than the A.T.C., a vital link in the global air supply system is the Naval Air Transport Service which, in itself, is nearly as pretentious an operation as that of the combined United States commercial airlines before the war.

The N.A.T.S. flew more than 97,000,000 plane miles in 1944 with approximately 351 airplanes. The United States commercial airline companies operated a combined total of 359 planes in 1941, the largest prewar domestic civil air carrier fleet.

The total fleet of the A.T.C. is believed to be several times that of the N.A.T.S. It is known that the A.T.C. has 500 planes in the air over a 160,000-mile world-wide network every minute of every 24 hours winter and summer. The N.A.T.S. flies an 80,000-mile network.

More than one million passengers were flown to and from foreign points by the A.T.C. between July, 1942, and September, 1944.

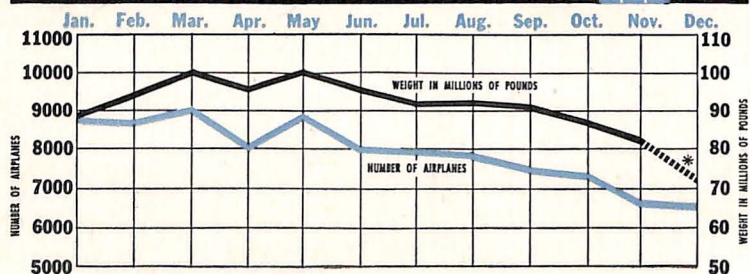
The A.T.C. mileage in foreign operations between January and September last year totaled 272,123,256 miles.

'NON-STOP DESIGNING'

Experience of aircraft manufacturers has shown that the man-power required to design an airplane up to delivery is, in general, substantially less than that required in keeping pace with modifications on the production line. Modifications are necessary to meet ever-changing performance requirements dictated by tactical considerations.

To answer the question, "Why can't airplane design be frozen?" West Coast aircraft manufacturers reported the following: To design a typical fighter up to delivery, an average of 140,273 engineering man-hours is needed, and after delivery 1,617,335. For a typical bomber, 414,012 man-hours are required up to delivery, and 2,553,683 afterwards.

1944 AIRCRAFT PRODUCTION AT A GLANCE

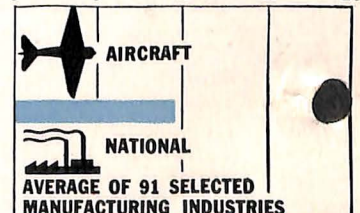


* December total exclusive of spares.

This production "line" charts the course of last year's 96,369 record total which substantially met schedules, frequently adjusted to conform with realistic production estimates.

AIRCRAFT MANUFACTURING HAS FEWER ACCIDENTS THAN MOST INDUSTRIES

Disabling Injuries Per 1,000,000 Man Hours



January to June, 1944

Standard Aircraft Parts Increase Plane Utility

By reducing the number of "special" parts with identical uses, the aircraft industry's wartime standardization program is saving lives, increasing production and slashing costs.

These vital dividends are evident from the records of the National Aircraft Standards Committee of the Aeronautical Chamber of Commerce which has vigorously prosecuted the standardization program in cooperation with the armed services.

The standardization of many separate designs of nuts, bolts, rivets, structural shapes, etc., has reduced total aircraft parts by many thousands. This has saved material, manpower, shipping space and money. But even more important — standardization has saved lives.

The elimination of "special" parts and wider usage of interchangeable standard parts has facilitated maintenance of our military aircraft operating from remote bases throughout the world. Improved maintenance means increased utility of fighting planes. Standard parts have placed many a needed fighter plane into the battle when otherwise it would have waited on the ground for a less easily obtainable "special" fitting.

DESIGN NOT COMPROMISED

The elimination of thousands of parts has released valuable shipping space previously needed to carry thousands of functionally similar but non-interchangeable items. Likewise, reduction in parts shipments and storage needs, has released manpower previously required for handling during shipment from factory to battlefield.

Parts standardization does not mean that aircraft basic designs are being standardized or "frozen". Aircraft design is never compromised under an intelligent standards program. Sound standardization progresses in the light of new developments and experience.

The NASC program demands, simply, the elimination of three parts where one will do the job.

This conserves machine tools and materials used in fabricating the similar parts in addition to the manpower involved. The importance of standardization to production and cost is very great.

SHORTAGE AVERTED

Production bottlenecks have been averted and eliminated and literally millions of dollars saved.

Examples are many. On one occasion production was increased more than ten per cent when more than 1,500 different sizes and shapes of aluminum alloy tubing and sheets were reduced to a total of 140!

At one critical period in the aircraft production program in 1942, standardization of aluminum alloy extrusions and rolled shapes reduced requirements by

NATIONAL AIRCRAFT STANDARDS COMMITTEE



"For want of a bolt a sortie was lost." No longer can this be said because the National Aircraft Standards Committee has vigorously pushed a program of fostering the wider use of interchangeable standard aircraft parts.

30 per cent. This enabled suppliers to meet their schedules and averted a shortage which threatened our entire aircraft production program.

Equally spectacular have been savings in money. One company saved \$250,000 for the government on a single contract through substitution of a standard plain bearing for a precision ball type in a non-critical application. An aircraft control wheel which cost \$24 each as a company standard, now is procurable for \$8 as a national standard. The cost of one type bolt was reduced nearly one dollar per bolt, or 50 per cent of total cost of an item which is used in large quantities in aircraft manufacture.

INTERNATIONAL STANDARDS NEXT

Aircraft parts standardization, which began with individual companies and spread to regions, then became national in 1941 under the NASC, is becoming international, the United States and Great Britain having recently established a basis for standardization and interchange of pertinent information.

Today standardization is saving lives and aiding the war effort in a dozen different ways; tomorrow it will bring cheaper and more efficient international air transportation.

PLANE QUIZ

A 70 per cent score on this quiz is excellent. Sixty per cent is good. Answers on Page 4.

1. Sound travels faster at high altitude than at sea level. True. False.
2. Is an airplane more or less efficient, aerodynamically, at high speeds? More. Less.
3. The airline distance from New York to Melbourne, Australia, is: (a) 8,970 miles; (b) 10,541 miles; (c) 6,800 miles.
4. A so-called "blind" landing is accomplished primarily with the aid of: (a) a compass; (b) a radio beam; (c) landing lights.
5. The gasoline consumed in training one American military pilot would last the average driver: (a) 5 years; (b) 15 years; (c) 25 years.
6. The present U. S. transcontinental

airplane speed record is: (a) 6 hours 57 minutes; (b) 10 hours 50 minutes; (c) 6 hours 3 minutes.



7. Approximately how many individual quality inspection operations does an average 2,000 horsepower aircraft engine undergo during its manufacture: (a) 25,000; (b) 55,000; (c) 75,000?

8. The highest total of civilian aircraft registered in the U. S. was reached in 1941. What was the total: (a) 10,000; (b) 25,000; (c) 45,000?

9. Who was the first woman pilot to fly the English Channel: (a) Amelia Earhart; (b) Harriet Quimby; (c) Jacqueline Cochran?

10. How many separate Army Air Forces are now operating outside the continental limits of the U. S.? (a) 6; (b) 12; (c) 15.

SIX MILLION FLYERS?

At the end of the war there will be a pool of some six million potential fliers in the estimation of the Civil Aeronautics Authority.

The CAA figures it this way: There will be approximately 350,000 Army and Navy pilots and 150,000 civilian pilots and students. Also interested in flying will be 2,500,000 men trained by the armed forces in other aviation skills, and almost an equal number employed in our aviation factories. Add to these the 250,000 students who are taking aeronautics courses in the high schools each year and you get around 6,000,000 prospective flyers, according to the CAA.

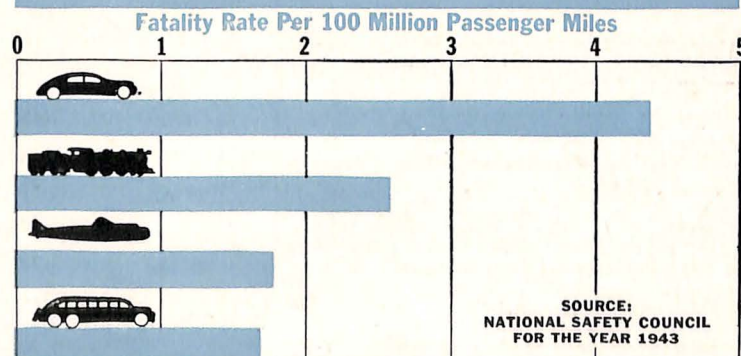
500 Clevelanders Want Planes After the War

Five hundred residents of Cleveland, Ohio, already have placed their orders for postwar delivery of airplanes, emphasizing the need for immediate planning for postwar airparks to accommodate personal plane owners.

Almost Too Simple

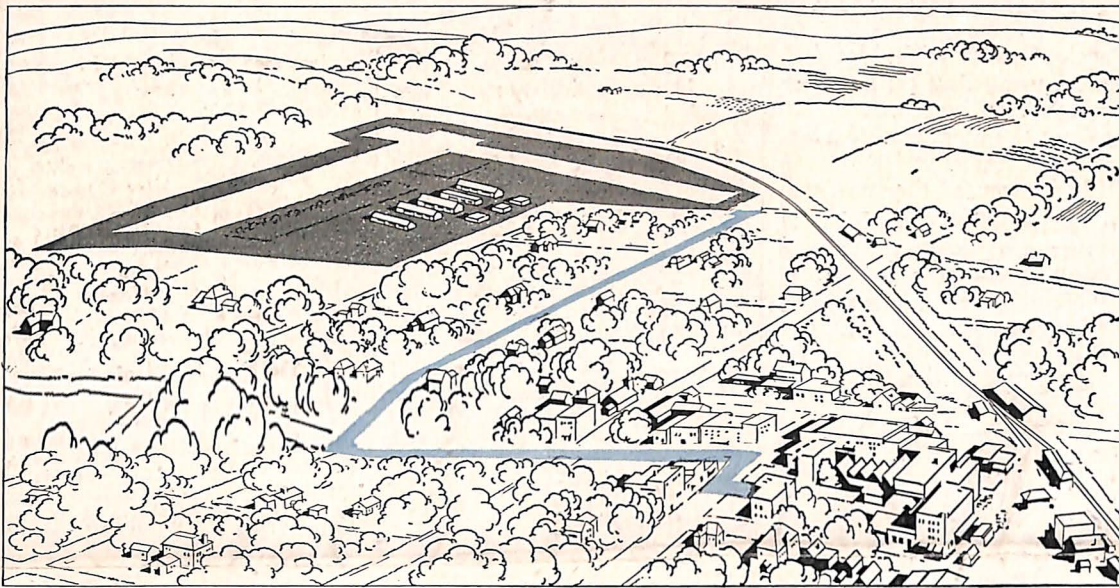
When assigned to service one of the AAF's new jet-propelled planes, air force mechanics were pleasantly surprised to find that the jet engine was held in place by only eleven bolts. Mechanics accustomed to thinking of aircraft power in terms of heavy cylinders, found tubes of thin steel instead.

AUTO AND RAIL FATALITY RATE HIGHER THAN FOR AIR TRANSPORT



Covers all fatalities connected with operation of passenger automobiles and taxis, buses, railroad passenger trains and scheduled air transport planes.

Eldon, Mo., Airpark is Model for the Nation



Features most desirable in an airpark development for personal aircraft are contained in the Eldon, Missouri, model project illustrated above. Two sodded runways, one 300 x 2,000 feet and the other 300 x 2,300 feet will provide adequate landing area. Blue line traverses residential section and shows proximity to business area. Clearing and grading now are underway. Dedication is scheduled for this June.

Missouri Town Will Provide Answers to Airpark Problems

Factual answers to many problems facing communities in airpark planning for the postwar air age soon will be found at the Eldon, Mo., Model Airpark.

Development plans are proceeding under the supervision of the Missouri State Department of Resources and Development, Aviation Division which adopted recommendations of the Personal Aircraft Council of the Aeronautical Chamber of Commerce that Eldon be a working model for the nation.

Locally financed by Eldon's 2,580 inhabitants, the airpark is located adjacent to a residential area, parallels the main highway, and is but three blocks from the business section and four blocks from the Eldon post office. In addition to all facilities needed to care for the flying needs of residents and transients, the airpark will offer a nine-hole golf course, tennis courts and other recreational facilities designed to make it a community center appealing to flyer and non-flyer alike.

Scores of Eldon's sons, now serving in Army or Navy flying services, will receive personal letters from Eldon's Mayor Bob Reed, describing the town's plans for the age of personal flight and asking their comments and recommendations.

Townpeople also will be officially interviewed as to their prospective ownership of personal planes. About twelve businessmen already have indicated their decision to have their own planes based at their own airpark. An accurate record is being main-

tained of each step in the airpark development. This will be made available as a guide to communities throughout the nation, which, like Eldon, plan to put their towns on the air map through their own initiative.

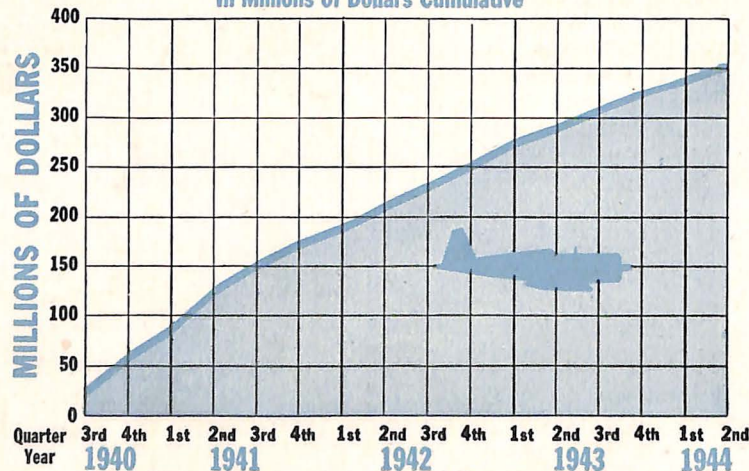
MUSICAL BEAM!

Popular songs rather than the monotonous dot-dash now mark the radio beam for the A.A.F. pilots flying at night over the "Hump" between India and China.

The War Department reports that Tenth Air Force and Air Transport Command pilots flying the "Hump" and Ledo Pass into an important airbase at Assam, now listen to popular transcriptions recorded in the United States instead of the conventional signal hum marking the radio beam.

PRIVATE INVESTMENT IN AIRCRAFT INDUSTRY 359 Million Dollars Put in Plants and Buildings Since 1940

In Millions of Dollars Cumulative



Covers facilities put in place for airframes engines parts and accessories between July, 1940 through June, 1944

Facts and Figures

The cost of one of the country's leading single-engine fighters dropped from \$68,750 to since 1942. When the initial order was placed years ago, 22,927 man-hours required to produce each plane, but this has been reduced to about 6,290 man-hours. The downward trend in cost has saved the government \$100,000,000.

The important role of women in aircraft production is indicated by the fact that they represented 40 per cent of the labor force in August, 1944, compared to five per cent in January, 1942.

Plane loads of civil air transports during 1944 reached to more than 90 per cent of available capacity, 88 per cent in 1943, and only 72 per cent in 1942.

The civil airlines are now completing more than 91 per cent of their scheduled flights—and of the flights started, more than 95 per cent are being completed.

In the four years between 1941 and 1945 the U. S. Navy increased the number of its aircraft from approximately 2,200 to more than 37,000.

American and British L dropped 1,546,000 tons of and incendiaries on enemy targets in Europe during 1944.

Reversible pitch propellers that can stop our heaviest bombers in one half their normal landing roll and can slow a single-engine fighter down to 250 miles per hour in a vertical dive are emerging from the experimental stage. A propeller in reverse pitch does not change the direction of its rotation. Instead the angle of the propeller blades is reversed, thus throwing the air blasts forward.

Answers to Plane Quiz

- False. The speed of sound decreases with decreasing temperatures, so it is actually lower at high altitudes.
- Less.
- (b) 10,541 miles.
- (b) A radio beam.
- (c) 25 years.
- (c) 6 hours, 3 minutes. Established by a multi-engine military cargo plane in a flight from Seattle, Washington, January 10, 1945.
- (b) 55,000.
- (b) 25,000.
- (b) Harriet Quimby on April 1912.
- (b) 12 air forces. Their identifying numbers are 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 20.