



planes

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OFFICIAL PUBLICATION OF THE AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA

Leading Senator Says Plane Will Solve Farm Ills

"A mighty influence"

Written for Planes

By

Senator Elmer Thomas (D., Okla.)
Chairman, Agriculture Committee,
Ranking Member Appropriations Committee,
U. S. Senate

Among the most serious problems facing our government today are those relating to soil conservation and restoration. The airplane as a new farm implement will exert a mighty influence in the solution of these problems. Realizing this, the American farmer has welcomed the airplane as necessary to his operations.

Let each of us consider the picture familiar in our minds of the non-productive farm lands in our respective states. In my fine state of Oklahoma we are unfortunate in having over 10,000,000 of our 35,000,000 acres of agricultural lands rendered non-productive by the invasion of useless brush. This growth is a result of the disturbances of the balance of nature. Something must be done to solve this problem.

Soil-saving Planes

One of the most recent answers to soil restoration seems to be in the proper application of the very highly potent hormone type chemical. Without the airplane and these new chemicals it would take us over 200 years to solve this problem but now it appears possible and logical to settle it in a period of five years.

Another development is a pelletized seed which has been sown by airplane on several hundred thousand acres in the past three years. These pellets are made of suitable soil and contain the right number of seeds. In each pellet is a fertilizer element, and insect, bird, and rodent repellents. The pellets weigh enough to stay where they fall and the seeds within them will germinate with only a little moisture.

Aerial Seeding

In the rich and fertile coastal plains of Texas and Louisiana, far sighted young men in both agriculture and aviation have used the airplane as an implement in planting, fertilizing, and weed control of their crops. In eight hours of flying one plane can plant or fertilize or control the weeds in 1500 acres of rice. On the West Coast approximately 80 per cent of their entire rice crop is planted, fertilized and weeded by plane.

Other services the airplane is performing on the farm today include pollenization, crop defoliation, forest patrol, patrolling fences, checking cattle, aerial photography, and mapping. During the last winter the airplane gained many friends as a means of emergency distribution of

—See "Thomas," page 2—

Farm Air Advocate



Senator Thomas

Aircraft Speed Boosted By Wing "Sculpturing"

One of the newest production processes required by the vastly increased aircraft performance of the sonic speed era is a method of "sculpturing" metal wing surfaces to pare precious pounds from an airframe. It is done with a hypro planer mill, a huge machine developed by a plane manufacturer specifically to meet the extremely high accuracy requirements of a late model fighter.

Although the hypro planer looks like a machine shop gargantua, its output is comparable in accuracy to that of a jeweler's lathe. The milling of a wing skin, in fact, requires the same kind of precision workmanship as jewel cutting. But so exacting are the demands for precision on new high speed planes that such jobs as skin milling cannot be trusted to hand methods.

Electronic Control

Electronically-synchronized motors control the hypro planer's two cutting heads, as well as the rate at which the metal sheet is fed through for milling. Two men "ride herd" on the operation, handling the push button controls and keeping the surface clear of shavings.

Operators guide the progress of the milling by watching the movement of a pointer along a template, the pointer being geared to the movement of the cutting heads. The sheet being milled is held securely in place by means of a rubber suction chamber. If it has to be lifted from one operation to another, motor-driven vacuum cups are lowered against it and then hoisted. Out comes a sur-

—See "Sculpturing," page 4—

Aircraft Costs Held Far Below General Price Rise

The price of an airplane delivered to Uncle Sam has soared sharply in the past two years in common with other prices, but if allowance is made for the better performance of modern planes, the cost-increase is far less than has been marked up by living costs, studies by the industry reveal.

Aircraft cost more because: (a) labor and raw materials are roughly double what they were before the war; (b) modern aircraft require a great many more complicated and costly instruments and gadgets than even wartime planes; (c) production processes are more costly because of

the need for building planes for the greater performance they give in the subsonic and sonic speed ranges.

New studies made by aircraft companies reveal, however, that the cost of an airplane per pound is only slightly more than it was in 1940.

One typical fighter plane manufacturer built a fighter in 1940 at a cost of \$13.29 an airframe pound. His modern fighter is produced today at a cost of \$15.16 per pound, or less than 20 percent more than prewar despite the fact that costs and prices generally are 100 percent more than prewar. This is typical of the entire industry.

Performance Value

Another manufacturer with long experience in building transports worked out his charts on a different basis. They show that the buyer of transports is actually getting about the same performance value today per dollar invested in planes as he did prewar. This manufacturer found that for each \$100,000 invested in airplanes in 1939, the purchaser would have purchased the capacity to carry 7,060 pounds for a distance of 200 miles in one hour. Today, the transport buyer gets the capacity to carry 6,950 pounds, or approximately the same as in 1940.

Had the 1949 plane been purchased with 1939 dollars, the capacity would have been 18,400 pounds or two-and-one-half times as much. Actually, were the 1949 plane, with its improved performance, purchased with dollars of 1939 purchasing power, the

—See "Costs," page 4—

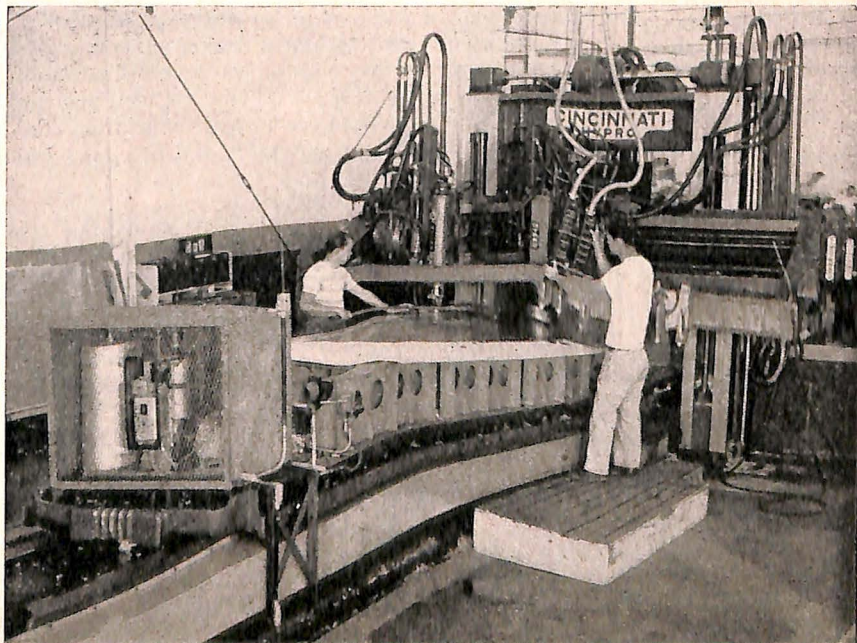
Titanium Tested For Aircraft Use

A new metal titanium, stronger and lighter than present aluminum-steel alloys, has aircraft designers eyeing new horizons of plane performance.

Results of recently-announced tests show that this new metal is far superior in corrosion-resistant properties to any known metal. After 120 days' exposure to salt spray, the new metal showed no deterioration while other metals rusted and corroded. Corrosion is an old bugaboo of plane metals.

Although it is difficult to produce at present, one of the most important features of the new metal is that its basic "ore" is superabundant in the United States. The National Aircraft Standards Committee already is drawing up a specification for the use of this metal in military aircraft.

Machine "Sculptures" Wing Skins



Hypro planer type mill shown cutting away unnecessary material in wing areas where it is not required for structural strength.

PLANES

Planes is published by the Aircraft Industries Association of America, Inc., the national trade association of the manufacturers of military, transport, and personal aircraft, helicopters, flying missiles and their accessories, instruments and components.

The purpose of *Planes* is to:

Foster a better public understanding of Air Power and the requirements essential to preservation of American leadership in the air;
Illustrate and explain the special problems of the aircraft industry and its vital role in our national security.

AIA was founded in 1919 as the Aeronautical Chamber of Commerce, and the name changed to Aircraft Industries Association in 1945.

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ALL MATERIAL MAY BE REPRODUCED—MATS OF ALL CHARTS ARE AVAILABLE

Air Program Falling Behind

The United States is slipping behind schedule in several vital respects in meeting the 1952 deadline for the existence of an atomic age defense force in being, as recommended by the Congressional Aviation Policy Board and the President's Air Policy Commission in 1948.

We perhaps are inclined to overlook the implications beyond the reports of these two boards. They are not those of interested parties in any phase of aviation, but of two groups constituted to examine the nation's requirements in the air, and to report to the executive and legislative branches their findings. They arrived at significantly similar conclusions, reached by different methods. In each case, they were unanimous.

Serving on the Presidential Board were Thomas K. Finletter, distinguished New York attorney, as chairman; George P. Baker, professor at Harvard University, as vice chairman; Palmer Hoyt, publisher of the Denver Post; John A. McCone, West Coast industrialist; and Arthur D. Whiteside, president of Dun and Bradstreet.

Members of the Congressional Aviation Policy Board were Senator Owen Brewster, chairman; Representative Carl Hinshaw, vice chairman; and Senators Albert W. Hawkes, Homer E. Capehart, Edwin C. Johnson, and Ernest W. McFarland; and Representatives Charles A. Wolverton, Karl Stefan, Alfred L. Bulwinkle, and Paul J. Kilday.

These groups established the 1952 date, and in view of the caliber of the membership their recommendations merit complete public support. Some phases of their recommendations were authorized in 1948, others have as yet had no final action.

A year ago Congress voted funds to start modernizing the Air Force and Naval Aviation. The 70-group Air Force with a proposed long-term aircraft procurement program was the basis for the modernization. However, despite this start, legislation authorizing the composition of a 70-group Air Force has not been completed. There is as yet no statutory long-term program of aircraft procurement upon which the health and stability of the aircraft industry and economical purchasing for the taxpayer depend. Other recommendations which would tend to make for more sound and economical aircraft procurement have had no action. These are elimination of overlapping and duplicating provisions of the Vinson-Trammell Act and the Renegotiation Act of 1948, and a peacetime contract settlement act similar to that used in wartime to provide efficient, equitable and prompt termination procedures.

Stepped-up plane production, another recommendation of the two groups, has come along fairly well since the reports were issued, but today it is still under the minimums recommended. Both groups asked gradual buildup to between 60 and 63 million pounds airframe output annually by 1952, based on the fact that by then all war surplus planes would be used up and all replacements thenceforth would come from new production. Actually, all war surplus planes and engines will be exhausted before 1952.

Both groups recommended a succession of five-year programs for research, development and procurement of planes. Evidence given these boards showed that the ordering of planes in quantity under such programs will enable a savings of 20% to the taxpayer.

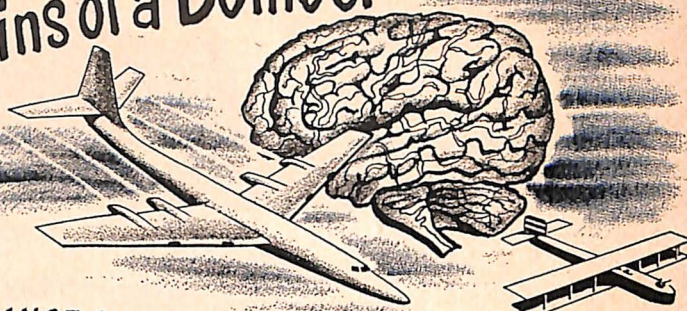
The deadline set for attaining air supremacy was based on the considered judgment of the nation's leading authorities that by 1952 America must have, in being, air defence power to meet any sudden atomic attack. Nothing has happened in the past year to change that belief.

DeWitt C. Ramsey (Admiral, U.S.N., Ret.),
President, Aircraft Industries Association.

PLANE VIEWS

from A.I.A.

Brains of a Bomber



LONG RANGE SUPER BOMBER
HAS 290 INSTRUMENTS

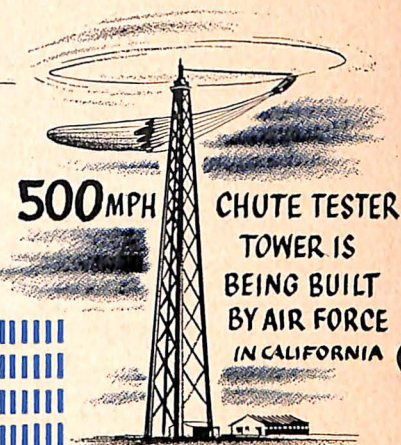
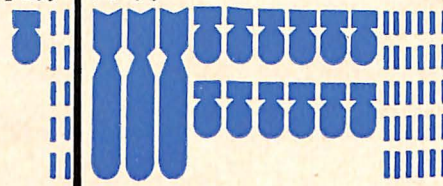
1918 MODEL PLANE
HAD 7 INSTRUMENTS

U.S. SCHEDULED AIRLINES IN 1948 FLEW THE EQUIVALENT OF
THE ENTIRE POPULATION OF CLEVELAND, O.
ON 2 ROUND TRIPS TO LOS ANGELES, CAL.



A NEW NAVY BOMBER
CARRIES 10 TIMES THE
FIREPOWER OF A 1929
MODEL DIVE BOMBER

1929 | 1949



500 MPH CHUTE TESTER
TOWER IS
BEING BUILT
BY AIR FORCE
IN CALIFORNIA

THOMAS

(Continued from page one)

foods, medicine, and attention for both farmer and livestock.

We must recognize the great amount of damage done annually by grasshopper infestation, which requires fast and effective control. The airplane, by the distribution of poison bran spread in their paths, can stop them in their tracks in a matter of hours. Any other disease-carrying insects can be eliminated through the spraying by airplane of selective chemicals which we now have.

I predict that it will be the farmer and not the soldier who will create the need for the airplane in sufficient quantities which will bring it within the financial reach of the general public within a very few years. I charge those responsible in both government and industry to effect a more coordinated relationship between the several phases of aviation and to prepare it for the general public acceptance to follow.

Edwin Thomas

Airlift Proves Large Planes Easy On Gas

Fuel supply problem of the Berlin Airlift, involving at Rhein-Main station alone twice the daily deliveries of huge La Guardia Field, New York, points up the value of larger military transport planes.

Fuel consumption at Rhein-Main, Germany, ran to 170,000 gallons daily, six times pre-Airlift volume. "Vittles" operations showed that hauling all tonnage in pre-war two-engined transports would consume 14,300,000 gallons a month. The four-engined wartime model used on the 'Lift could do the job with 8,577,000 gallons per month. But a large new, post-war, four-engined model could handle the tonnage requirements for 6,800,000 gallons.

Four-engined Zoos

Two recent charter flights of international airlines reveal how air-minded the world's zoos have become. About 500 furry passengers, who couldn't otherwise have been transported in captivity, were delivered to the New York and Cairo, Egypt, zoos.

New tenants for the two zoos, flown from Singapore and the Belgian Congo, included 350 fowl, four bears, four orangutans, monkeys, civets, giant lizards, okapis, gibbons, and one langor.

The okapi, somewhat of a cross between a giraffe and an antelope, passed up the ordinary airline fare, preferring sweet potato leaves.

Spirit Runs High As Schools Try Air Program

Competitive spirit is running high among the state school systems of America this year, each striving to strip the other in gearing curricula to the "air age."

More than a hundred accredited aviation education courses are being given this summer at teacher training institutions in the United States. During the coming months thousands of teachers will get their first ride in an airplane as hundreds of local school systems, with the help of airlines and airport operators, conduct "airport institutes" for teachers.

Essay Contests

If a vote were taken on leadership in this field, from the standpoint of effective promotion of their programs two states, Idaho and Missouri, would stand high in any balloting. Both states have offered overseas vacation trips as prizes for new thinking in the field.

Missouri is giving the writer of the most significant essay on "Why Consider Aviation in the Education of Today's Child" a six-day, all-expense trip to Havana, Cuba. Last year the state resources and development board, sponsors of the contest, awarded the winner of a similar contest a week in New York and Washington, D. C.

Idaho ran a contest last year on the subject "How Can the Schools Accomplish Air Age Education" and 127 teachers entered. The winner

Airport Classroom



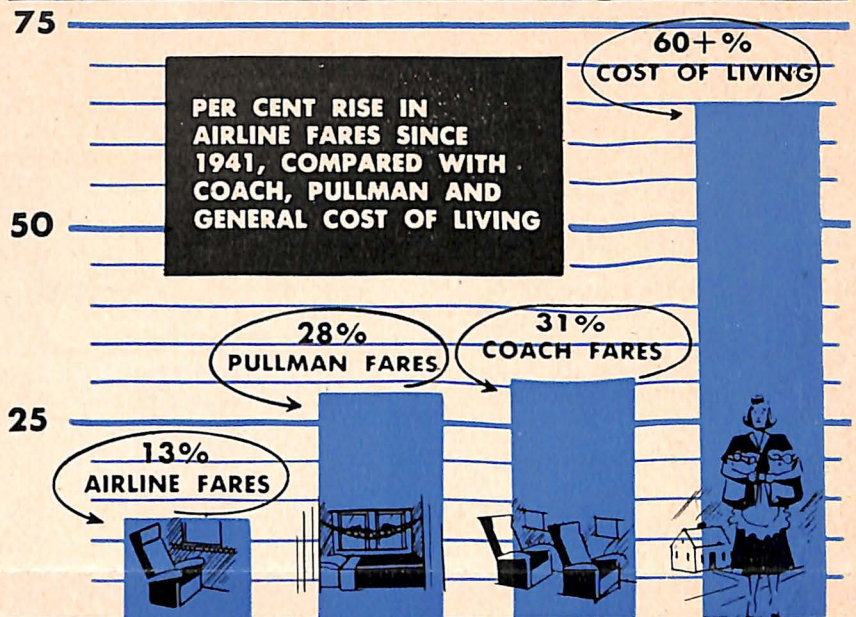
Pocatello, Idaho, educators learn about radial engines in an "airport institute."

of a vacation in Hawaii was a young woman teacher in a Boise junior high school. This year the state department of aeronautics has offered a contest on "Applied Air-Age Education in Idaho Schools." Teachers have been asked to write success stories on how they have applied air age education concepts and materials in the classroom. In addition to the Hawaiian trip, prizes this year include a five-day all-expense aerial tour of the North Western United States, and five scholarships for summer professional study at any colleges the winners select.

NEA Recognition

This movement to "condition" the teachers and schools of the nation in the social meanings of aviation has been going on for many years. Pennsylvania, for example, claims to have pioneered a high school aviation course twenty-one years ago. Until the early 40s, however, when World War II demanded a new appreciation of the airplane, only a scattering of the nation's school systems took it seriously. Today most states have well-defined aviation education programs, reaching from elementary grades through college level, focused particularly on teacher training.

Airline fares reflect lower cost operations despite inflation



SOURCE: AIR TRANSPORT ASSOCIATION OF AMERICA, INC.

"planes"

A good deal of the inspiration and impetus in recent years, school officials seem happy to admit, has come from the nine-man staff of the education division in the U. S. Civil Aeronautics Administration. For years seven field men, traveling through the United States and its territories, have been meeting with school officials and helping them organize aviation education programs.

Evidence that the movement has made permanent headway is contained in the announcement recently by the National Education Association, national parent body of local school groups, that it is considering adding as one of its operating divisions a council on aviation education.

Putt-putt Golf Course

An airport surrounded by a golf course is Earl Tillson's answer to making a small port pay off as a recreation center. Tillson, Walden, N. Y., airport operator, is well along in constructing a nine-hole course completely around the borders of his landing field. By next summer he expects to have added a club-house, outdoor pool and restaurant.

AIR FORCE STRENGTH
WORLD WAR II
THE PRESIDENT'S BUDGET
NEEDED FOR SECURITY



PRESIDENT'S BUDGET

48 GROUPS

RECOMMENDED FOR SECURITY

70 GROUPS*

*Minimum recommended by President's Air Policy Commission, Congress' Air Policy Board

"Planes"

PLANES QUIZ ✈️

Seventy per cent score on this quiz is excellent. Sixty per cent is good. Answers on page four.

- True. False. U. S. researchers are working on rockets to climb more than 3,000,000 feet over the earth.
- Air transportation was selected by (a) 15 per cent; (b) 48 per cent; (c) 37 per cent of all people issued U. S. passports in the year ended March 31, 1949.
- There are (a) about 56,000; (b) nearly 90,000; (c) 65,000 personal type aircraft registered with the U. S. Civil Aeronautics Administration.
- A year and a half after the recommendation of the President's Air Policy Commission, the 70 Group Air Force program now is an actuality.
- Latest actual figures publicized by Russia's embassy in the U. S. show 85,077 USSR air route miles, although she now claims to top the world. In contrast, certificated U. S. overseas and domestic airlines in 12 months ending Dec., 1948 were operating (a) 212,000; (b) 99,501; (c) 166,333 route miles.
- The U. S. Air Force can fly its long-range inter-continental bombers—loaded—from more than 40 air bases in the U. S. At end-of-mission weight, they could land at (a) more than 300; (b) nearly 150; (c) 204 air bases in the U. S.
- Electrical system in one of the sleekest World War II fighters contained 515 separate wires. A new jet made by the same company has (a) 983; (b) 1077; (c) 1880 separate wires.
- In 10 years, 1939-1948, the number of U. S. scheduled airline stops has increased (a) 162 per cent; (b) 33 per cent; (c) 93 per cent.
- True. False. The normal rate of descent for a combat parachutist is 17 feet per second.
- Twenty-five years ago Army planes circled the world in 14 days and 15 hours. Recently the Lucky Lady II circled the globe—23,452 miles non-stop—in (a) four hours, 13 minutes; (b) three days, 22 hours; (c) four days, 13 hours.

NAVY AIR STRENGTH
WORLD WAR II
PRESIDENT'S BUDGET
RECOMMENDED FOR SECURITY



PRESIDENT'S BUDGET

5,598 PLANES

RECOMMENDED FOR SECURITY

10,893 PLANES*

*Minimum 1st-line operating and support, recommended by President's Air Policy Commission

"planes"

U.S. Runs Many Military Probes

Studies of military procurement, such as that now being conducted by the Armed Services Committee of the U. S. House of Representatives, have averaged better than one a year since the first world war, a check of government records reveals.

The new study brings to at least 34 the total military procurement inquiries since 1918. Between 1918 and 1925, when President Coolidge appointed the famed Morrow board, there were no less than 25 separate studies. During and since World War II there have been two thorough probes of aviation safety, reaching into design and engineering practices, the World War II Senate studies of war production and surplus disposal, the Finletter Commission survey, the Congressional Board study, and others, for a total of nine since 1939.

From these many surveys have come progressive development of American air policy. They have also emphatically supported the economy and efficiency of the present practices of developing aircraft for defense, including the reliance upon private, competitive industry for the production and engineering task.

Typical of the findings of these studies was the conclusion of the wartime Senate Committee to Investigate the Defense Program (Truman Committee). In its aircraft report, the Truman committee said, "We may be justly proud of our war production record of aircraft. The 300,000 airplanes produced exceeded by a wide margin the most optimistic expectations."

SCULPTURING

(Continued from page one)

face that is contoured to the varying strength requirements along the wing.

The sculptured surface is the most recent development in a long struggle for a more efficient wing structure, an effort that can be traced back nearly 30 years to the introduction of the tapered wing. Although tapering saved some weight, until the advent of the sculptured surface, the wing skin was pretty uniform in thickness and weight from fuselage to tip. Since forces in flight play heaviest on the fuselage end of a wing, the tip doesn't have to be as strong as the root, so this milling process boosts efficiency by shaving off unnecessary metal toward the tip.

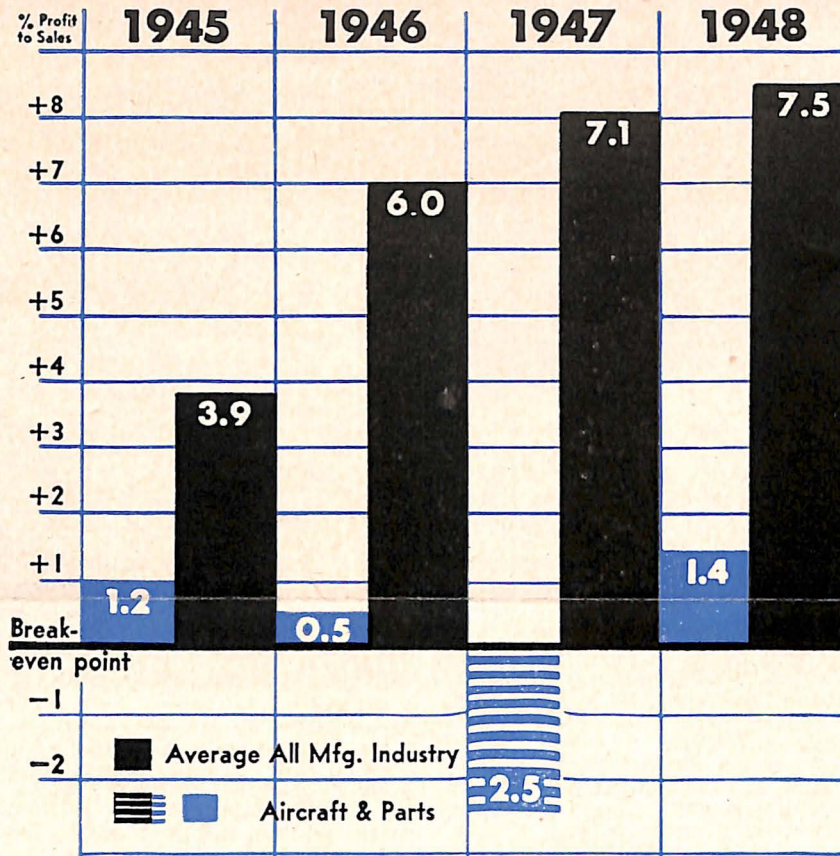
Close Tolerances

For current production purposes the manufacturer who developed this process works with sheets of aluminum alloy ranging in thickness from 5/32-inch to 1/2-inch. Hypo planer contouring makes it possible to taper such sheets from 3/16-inch at the fuselage fitting to a little more than 1/32-inch at the tip. This machining requires tolerance as high as a couple thousandths of an inch; however, even thinner sections can be machined.

As explained by the company which pioneered this new departure in wing construction, "skins are not just a simple taper, but are 'sculptured' to meet the exact stress requirements for each particular section of the wing."

The huge hypo planer was developed for a specific plane model, one that gained for America the world's speed record. Like a lot of the processes that go into the development of the world's top planes, however, this new milling technique by its very exactitude adds to the cost of producing limited quantities.

How aircraft profits compare with the rest of industry



SOURCE: NATIONAL CITY BANK OF NEW YORK

"planes"

COSTS

(Continued from page one)

transport buyer would obtain the capacity to carry 18,400 pounds 200 miles in an hour, or two-and-one-half times the 1939 performance value.

The answer to ability to attain economies of this kind lies in the great increase in efficiency, in new manufacturing techniques and in more efficient plants, labor and tooling. The country is purchasing planes in all types—fighters, bombers and transports—of at least twice the speed, twice the altitude and at least one-third more range. The fighter goes 600 miles an hour as compared with 300. It operates at 40,000 feet instead of 20,000. Its range is 1500 miles instead of 900. The transport of 1939 had a useful load of 8,800 pounds and a speed of 193 miles an hour, as compared with a 40,891 pound useful load and a speed of 303 miles per hour for the 1949 version.

Difficult Processes

The answer to cost control lies in new processes, less hand work, multiple production of parts, closer inspection, better utilization of floor area, labor and equipment. And, generally speaking, manufacturing facilities are better today than before the war, a result of the war-time plant construction program. But, counter-weighting these factors are the more difficult processes that must now be used—such things as flush riveting, a technique that permits a cleaner surface since rivets do not protrude from the plane skin.

Some of the factors, such as the standardization program (through which the number of various types of many items has been reduced to a bare minimum) are industry-wide. As an example, where a prewar design might have required 100 different types of screws in a single air-

plane, standardization has reduced the number to only 10.

The industry has produced innovations in other directions. Planes today are designed from the airframe up for mass production, eliminating a step that before World War II was standard practice. This may add to the cost of a first plane, but it saves millions of dollars in later stages of the development of a particular type. Advances in the technology of manufacture have made this possible.

Design Revolution

Weight and costs can be saved with plastics. The aircraft industry has been a pioneer in the development of special plastics and in the study of their uses. Moulded tooling is a roughly similar development in which the aviation industry has led. Another example is found in this issue in "sculptured" surfaces.

The aircraft industry has been the nursemaid of a virtual revolution in design during the past 10 years. Despite this revolution, the industry has striven to hold costs in line, and despite the influence of general inflation, higher labor costs and the shock of demobilization following World War II, has managed to give the American taxpayer more than has ever been possible before.

Answers to Planes Quiz

1. True. This would be an altitude of more than 600 miles, whereas present record is about 250 miles, near the limit of the atmosphere.
2. (b).
3. (b).
4. False. Present U. S. budget program is aimed at a 48 group Air Force.
5. (c).
6. (a).
7. (c).
8. (a).
9. True.
10. (b).

Facts and Figures

Seven out of 10 people visiting Bermuda in 1948 traveled by airline.

A new transport plane now in operation by the Air Force will carry up to 26½ tons of cargo at 300 mph.

Ninety-three of 100 life insurance companies surveyed this year will cover pilots and crews on scheduled airlines.

A new pilots organization has been formed, the Indiana Flying Lawyers, Inc.

Civil Air Patrol aims to enroll 100,000 youths in a pre-flight program in U. S. high schools this fall.

During 1948 the scheduled airlines cut weather delays 50 per cent.

Rain or dew gathering on the body of a new large transport raises its weight 200 to 300 pounds.

One manufacturer reports that in 10 years he increased engine efficiency 100 h.p. per year. His latest engine, however, outstripped its immediate predecessor by 500 h.p.

In testing a new propeller blade, as many as 10,000,000 vibrations a day are imposed upon it.

Development of a current model night fighter costs three times as much as a 1942 model night fighter produced by the same company.

Design, development and construction of the B-29 took three times longer than the design and construction of the Empire State building.

Air traffic transactions handled by the International Air Transport association's London Clearing House during first quarter, 1949, reached \$46,370,000, almost double last year's first quarter total.

HOW

Helicopters

SPEED AIR MAIL

AIR MAIL

Time, mailing to delivery for a letter from Chicago to Los Angeles

AIR MAIL

AIR MAIL

39 HRS.

Surface pick-up and delivery at both ends

15 HRS.

Using 'copter for pick-up and delivery

HELIMAIL SAVES A DAY

SOURCE: HELICOPTER AIR SERVICE, INC. "planes"