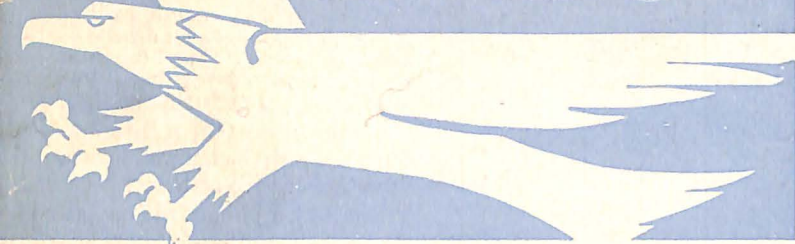


PLANES



AERONAUTICAL CHAMBER OF COMMERCE
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No. 1

Chamber Gives Postwar Blueprint to Congress

A blueprint for demobilization and postwar adjustment—presented by any industry—has been placed before Congress by the Aeronautical Chamber of Commerce of America on behalf of the nation's leading aircraft manufacturers.

Appearing before the War Contracts Subcommittee of the Military Affairs Committee of the Senate were E. E. Wilson, vice-chairman, United Aircraft Corporation, and chairman of the ACCA; Harry Woodhead, president, Consolidated Vultee Aircraft Corporation, and J. Carlton Ward, Jr., president, Fairchild Engine and Airplane Corporation, both members of the board of governors of the Chamber, and Joseph T. Geuting, Jr., vice-president, General Aircraft Corporation and chairman of the ACCA Personal Aircraft Council.

Among the points made were:

1 Today American aviation in operation, engineering design and production is preeminent.

2 To hold this advantage—adequate Air Power—this country must maintain a large air force, train youth to fly, maintain strategic air bases, encourage air sport and personal flying, strengthen aircraft manufacturing industry and expand research and development.

3 With estimated production in 1944 at \$21,300,000,000 and 2,100,000 employees, the industry presently is a major part of the

national economy and the nation's number one industrial demobilization problem.

4 Therefore, national policy calls for an orderly termination of contracts, allowing for demobilization and reemployment needs of employees and avoiding dissipation of the industry's research and production resources.

5 Workers should be provided with adequate unemployment insurance, should be transported to their prewar homes or to new employment and should be retrained for this employment.

6 Government contracts should be terminated promptly, with full cooperation among Army, Navy, other government agencies and manufacturers, with full and accurate information being given to employees at the earliest possible time.

7 Cutbacks should be synchronized with demands for increased employment by other industries.

8 Factories should be sold or leased to present operators, or maintained as standby plants or warehouses.

9 Military and naval airports should be opened to commercial and personal use.

10 Surplus aircraft should be disposed of under the control of one central government agency with unusable aircraft and their components scrapped and usable aircraft overhauled by competent manufacturers.

11 Light liaison and observa-

Plan for New Air Fields Gives Nation New Words

New terms in the American lexicon — the words "airparks," "flightstops" and "air harbors" — are receiving national attention today through the efforts of the Personal Aircraft Council of the Chamber.

The organization has under way a countrywide campaign to bring into reality thousands of landing facilities bearing those titles within the next four years.

Volume production of low-cost,

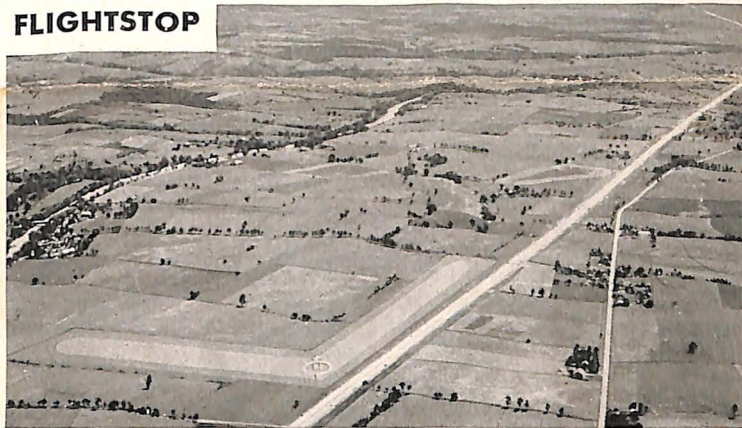
venient walking distance.

Flightstops: Runways built along highways, equipped with telephone pay stations, automatic fuel vendors and rest rooms. Planned as state and county highway department projects.

Air Harbors: Improved landing places in quiet waters.

The landing facilities described by those terms will thus differ in purpose from airports, a term identified with large com-

FLIGHTSTOP



private planes, and therefore the future of civilian flying, to a large measure depends on the development of landing facilities for plane owners.

It explains the new designations for these facilities as:

Airparks: Community aviation centers of fixed size built with community funds. They should be constructed adjacent to main shopping districts or within con-

mercial landing areas for airline and air freight traffic.

Official recognition of the new terminology has been secured from the Civil Aeronautics Authority.

Planning groups in several sections of the country have approved it tentatively, and plans are getting under way to build several thousand of the facilities immediately after the war.

tion planes should be released to personal owners and training planes to universities, colleges and technical schools. Landing facilities should be built and the Civil Air Regulations liberalized.

12 Transport airlines should be aided in the development of main and feeder lines through the release of airplanes and increased use of air mail.

MURRAY PLANS BILL

Later, Senator James E. Murray of Montana, chairman of the subcommittee, said he would introduce a bill covering the points made by the Chamber's representatives. He declared testimony by Under-Secretary of War Patterson and Assistant Secretary of Navy Gates before his committee showed the War and Navy Departments in substantial agreement with the Chamber program.

More Than Two Million Work in Plane Industry

Today 2,100,000 workers are employed in the aircraft industry, an increase of 2400 per cent over the 85,000 employed in January 1940, latest reports reveal.

Sub-industries employ more than 900,000 of those workers.

In spite of a monthly turnover of approximately six out of every 100 employees, more pounds of airplanes per month are being produced per employee due to better production techniques.

The records indicate that approximately 70 per cent of all employees leaving aircraft plants do so for personal and family reasons. Military inductions, deaths, resignations for reasons of health, and dismissals for cause, together account for 30 per cent.

Aircraft Profits Prove Lowest of War Industry

Credited with the greatest industrial expansion and production achievement in American history, aircraft company profits during the war period have been the lowest of any war industry.

An erroneous impression of high earnings in aircraft industry had previously been created by certain analyses and statements showing profits in relation to invested capital. A much more equitable way is to show profits in relation to sales or volume of business done. Risks are commensurate with bargains. The higher the bargain, the greater the risk, particularly if capital doesn't increase proportionately.

EFFECTS OF EXPANSION

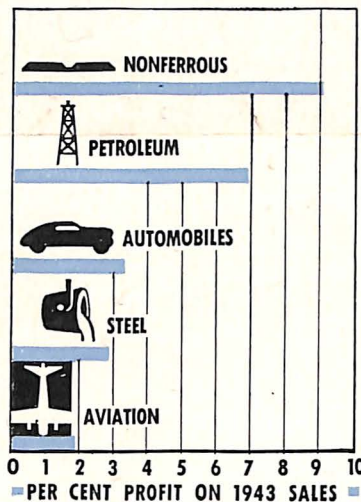
The aircraft industry has been expanded to fantastic levels in relation to capital. For one of the largest and strongest airframe manufacturers, a loss of 4 per cent on its 1943 business would have wiped out working capital.

In 1943 the percentage of net income to sales for 24 major aircraft and parts manufacturers was 1.8 per cent, according to a survey by the National City Bank of New York. Other industries, such as non-ferrous metals, earned 9 per cent; petroleum products, 6.8 per cent; automobiles, 3.2 per cent; iron and steel, 2.8 per cent.

The profits of the aircraft

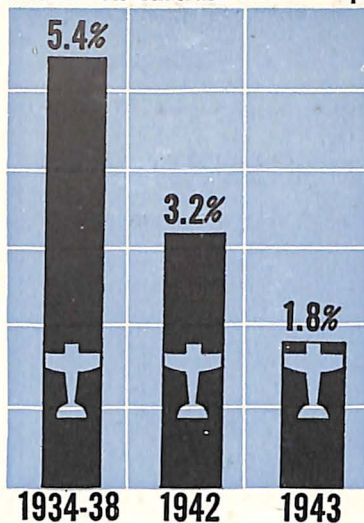
manufacturers during the war period are to a large extent book-keeping figures. The ultimate profits, if any, can be determined only when all final settlements have been made.

A very substantial part of the profits is still in the business, largely in the form of inventories and other properties.



Only a small part has been paid out in dividends. In spite of this conservative practice, working capital is meager in relation to the obligations of the business. The entire net current assets of the industry would not equal one

Profits on Aircraft Sales Drop



month's operating costs at present production rates.

In one large aircraft company, if all the salaries paid to all officers and directors during 1943 went to workers instead, the result would have been that each payment of \$10.00 to workers would be increased to \$10.01. The total payment to all officers and directors in 1943 amounted to only \$2.71 per employee.

Aircraft stockholders have not profited from the war. If all the net profits to stockholders were paid to the workers, the latter would receive \$10.35 for every \$10.00 now paid.

The stocks of six leading airframe manufacturers have lost 26 per cent in market value from the 1940 lows. The average stockholder lost \$6.62 in market value and gained only 54 cents in dividends in four years.

War Brings New, Better Maps of Entire World

As a result of the war, stay-at-homes and flyers both will see the greatest supply and the most accurate air maps that the world has ever known.

Day after day, month in and month out, hundreds of airplanes have been photographing the world's surface, providing information about remote regions. Many of the new maps chart territories which had never before been shown with accuracy.

Not only are the maps becoming more accurate and more detailed, but global projections are rapidly coming into use as cities, nations and continents are being brought ever closer together by faster and faster aircraft.

Amazing reports are being released.

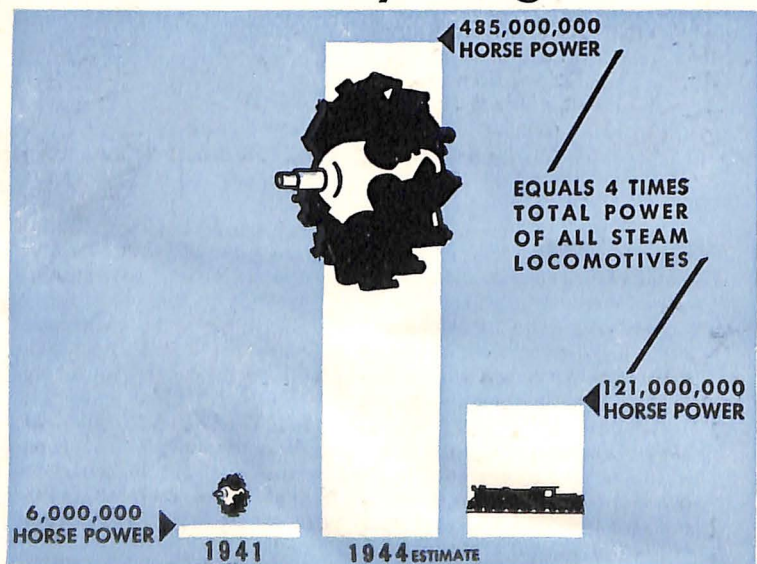
For instance, more original maps of France have been produced in two years than by France herself in 2,000 years, according to the British War Office.

CARRY 125,000,000 MAPS

When the United Nations invaded occupied Europe in June they took with them 125,000,000 maps, the result of a "combined operations" job by the Corps of Engineers, the Army Air Force, the best brains of Military Intelligence and thousands of enlisted personnel in the U. S. Army.

Aerial photographs have completely taken away the "mystery" of the Pacific islands, and the location of virtually every thatched hut village and palm tree grove is known.

Half-Billion Horsepower Mark Is Neared by Engine Builders in 1944



To power the air attack against the Axis, the United States is producing this year an estimated 485,000,000 horsepower in airplane engines—more than four times the power generated by all the steam locomotives in service in the United States.

In March of this year, horsepower output of engines coming off assembly lines totaled 39,200,000, compared with only 6,000,000 in all of 1941.

The need for increased performance in both fighters and bombers is reflected in the fact that in March, 1944, the average horsepower per engine was 1300, almost 50 per cent above the average achieved in January, 1941.

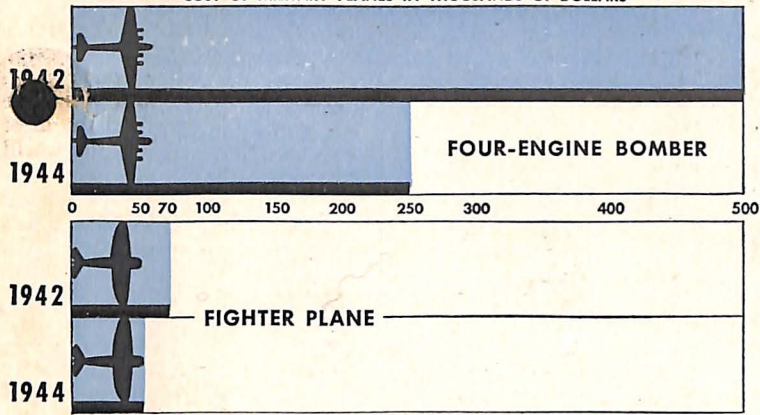
An in-line, liquid-cooled en-

gine developing 3,000 horsepower—more powerful by 300 horsepower than that developed by the average steam locomotive—was recently announced by one manufacturer. This raised the maximum power of aircraft engines far above that believed possible before we entered the war. Announcements of engines of similar horsepower are expected from other manufacturers before the year is ended.

Last year 226,561 airplane engines, valued at \$4,143,300,000, were produced. They developed 33,316,000 horsepower. Although a peak up to that time, the 1943 production represents only 15 per cent of the estimated 1944 output.

A variable-pitch propeller for light planes is being developed by a leading manufacturer. It will provide the average light plane engine with the same flexibility that gear-shifts and fluid drives give to the automobile engine.

MORE WAR PLANES FOR LESS MONEY
COST OF MILITARY PLANES IN THOUSANDS OF DOLLARS



Plane Builders Achieve Cuts in Costs, Manpower

Originally a four-engined bomber required 200,000 man-hours for construction and a typical fighter 35,000 hours. Today bombers emerge from the final assembly line after 10,000 man-hours and the fighter comes off after 4,500 man-hours.

The decline in costs and hours expended is the result of streamlined manufacturing processes, improvements in materials and in tooling, adaptation of designs of aircraft and components to meet volume production requirements and by exercise of other economies.

EFFICIENCY IS RISING

This is revealed by a just-completed survey of manufacturers of airframes—the airplane less engines, instruments and other equipment and accessories. The survey shows that in 1940 airframe industry employees each produced an average of 23 pounds of airframe per month. Today, each employee is producing 73 pounds of airframe each month.

This “know how,” which will be carried over into the postwar production era, is further revealed by the fact that in 1940 an average of 156 employees worked a month to produce a 3,600 pound plane. Today, 137 workers produce in a month a plane weighing 10,000 pounds, or three times as much.

Such savings of money and manpower have not been confined to airframe manufacture. Engine builders show a similar increase in production with constant reduction of effort.

INSTRUMENTS COST LESS

This is further carried into the instrument making field. Whereas before the war, 15 instruments used on airliners cost from \$1000 to \$2000 each, approximately 50 instruments are being installed on certain types of aircraft at an overall cost of \$15,000—an average price of only \$300 apiece, a very substantial saving.

The survey reveals that in all phases of production the economies are being accomplished with no sacrifice of quality.

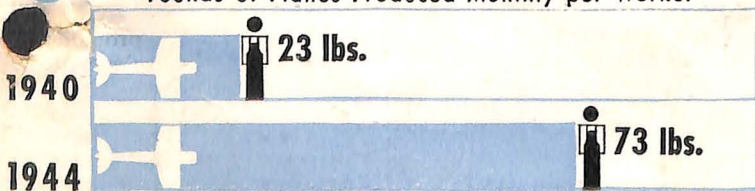
More Landing Areas Needed in Postwar

If 5,000 Airparks were located uniformly over the land surface of the United States, there would be no point in the country which would be more than 15 miles from such a park.

A large number will be needed. Government officials have estimated that 100,000 personal airplanes will be purchased and placed in service within one year after the war is over.

AIRCRAFT INDUSTRY EFFICIENCY RISES

Pounds of Planes Produced Monthly per Worker



PLANE QUIZ

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

1. If the war should end in December 1944, how many airplanes will have been produced by America's 16 leading manufacturers since 1940? (a) 50,000; (b) 260,000; (c) 103,500.
2. Name five instruments used in normal flight.
3. It will be difficult to convert bombers to commercial use because (a) they weigh too much; (b) they are loaded with armament; (c) they are not designed to carry bulk loads.
4. In making a jump from an altitude of eight miles the first need of an aviator is (a) a road map; (b) an oxygen supply; (c) a parachute.
5. Productivity per worker in airframe factories today is how many times greater or less than it was in January, 1941? (a) twice as great; (b) half as great; (c) four times as great.

6. If you were flying from one point to another and return in calm, windless air, would you (a) use more gasoline (b) less gasoline (c) the same amount of gasoline as if you went against a headwind and returned with a tailwind of the same speed?



7. In the construction of a modern four-engine bomber or transport a total of how many parts is used? (If you guess within 20 per cent of the correct figure, allow yourself a full ten points.)

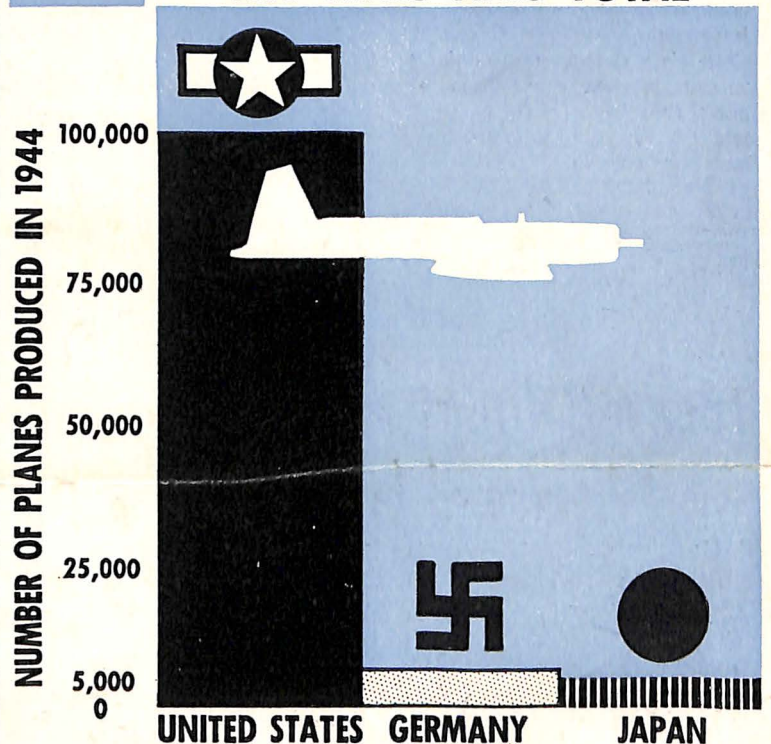
8. Name the five major components of an airframe.

9. Each time 1,000 heavy bombers take off from England to bomb Europe, they carry a minimum total of how many gallons of gasoline? (a) 1,200,000; (b) 500,000; (c) 250,000.

10. All boats and conventionally designed airplanes have rudders, but while boats have keels, airplanes do not. True or false?



U. S. PLANE OUTPUT IN 1944 TEN TIMES AXIS TOTAL



During 1944, the United States will produce more than 17 times as many aircraft as Germany will make and more than 22 times the Japanese aircraft production, according to available estimates.

It is now believed that when the last day of the year arrives, the American aircraft industry will have turned over 100,000 planes to the armed forces, bringing to 260,000 the grand total produced since January 1940.

Germany is expected to build 6,000 new aircraft this year, while Japan's production is estimated at only 4,500. The Japanese rate, due to non-interference by bombing, has been increasing steadily since 1940, while the German rate has been declining steadily since the middle of 1942, when the all-out United Nations drive got under way.

Plane-Producing Skills to Prove Postwar Boon

Better performance of everything from automobiles to washing machines and from refrigerators to alarm clocks after the war will result from volume precision manufacturing which has been pioneered by the aviation industry during the past three years.

This new manufacturing technique combines great output with high precision workmanship on a scale never before achieved. It has resulted in more and more airplanes with an accompanying increase rather than sacrifice of quality.

The application of volume precision production to industrial, farm and household tools and appliances will mean that the products can be more compact and lighter, and yet can accomplish as much or more than similar current devices. They can be more mobile, efficient, powerful and they will last longer, and will be even easier on the pocketbook.

SILVER PLATED PARTS

Precision, as the aircraft manufacturing industry practices it, means machining certain parts for the vitals of engines so finely that the surfaces have to be "held" by silver plating—metal parts in many cases must be produced from ores from the same mines

and refined in the same plants to insure uniformity of certain instruments. Jigs used in assembling airframes are set into position with the aid of surveyors' transits so that there will be no variation in finished units.

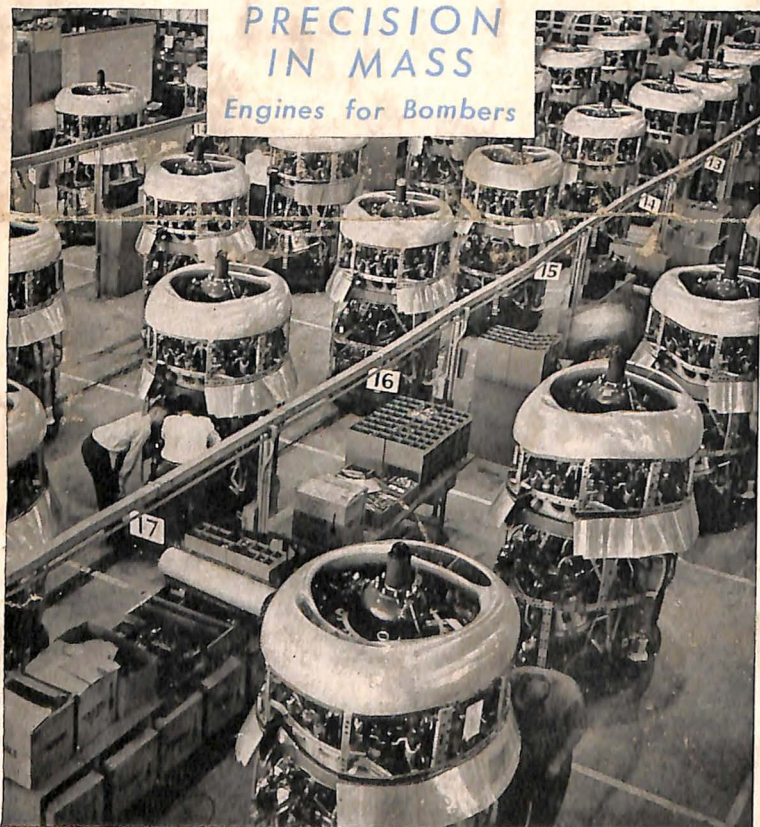
In the engine field, airplane cylinders today are held to a deviation of plus or minus five hundred-thousandths (0.00005) of an inch over entire length, where automobile cylinders were ordinarily held only to one ten-thousandth (0.0001) of an inch.

PRECISION PLUS!

Navy ball bearings for aircraft engines are held to 25 millionths of an inch. Most ball bearings for other uses are held to two ten-thousandths, making the Navy production requirements ten times more precise.

The aircraft industry today is using an "electrigauge" which has graduations of five hundred-thousandths of an inch. It can check errors which if extended would amount to three-quarters of an inch in one mile.

Tolerances of three hundred-thousandths of an inch have become routine in aircraft plants. In general manufacture, tolerances of one ten-thousandth of an inch are considered unusual.



ANSWERS TO QUIZ

- (b)
- Altimeter, chronometer, compass, air speed indicator, tachometer.
- (c)
- He needs an oxygen supply. Lack of oxygen would "starve" him to death before he could reach an altitude at which he could survive.
- (c)
- Less. You would fly longer against the headwind going than with the tailwind returning.
- 600,000.
- Wings, fuselage, empennage, nose and undercarriage.
- (a) 1,700,000 are used by 1,000 heavy bombers on the round trip to Berlin.
- False. Seaplanes have keels.

Colleges Interested in Using Training Planes

American colleges, universities and technical schools are anxious to obtain large numbers of both training and combat aircraft after the war for their training and technical courses. This is shown in scores of letters from leading technical institutions revealing their postwar educational plans.

Heads of the institutions were asked if equipment of the air forces would be of value to them providing it was released to them by the government.

OVER 400 SHOW INTEREST

More than 400 answers so far received reported extreme interest in the proposal. Two hundred and ninety asked for suggestions as to courses and for further information in regard to it.

Members of the Aeronautical Chamber of Commerce of America believe that the release of such aircraft and components will

- aid in training flight crews
- help train ground crews
- encourage the already vast interest in ownership and use of personal aircraft, and
- stimulate creative thought which will eventually lead to logical improvements to forthcoming types and models of aircraft as graduates assume their positions in the industry.

The replies show that major participation of aircraft in the war has led both to the establishment and expansion of courses in many universities, colleges and technical schools, and that educational executives look forward to even greater expansion in the postwar years.

As an indication of tremendous interest in aviation training, one girls' college located in the middle west now has 800 of its 2,200 students taking aviation courses of one kind or another. Of this group 100 are taking flying courses.

All-Metal Plane Built of Many Materials

The so-called "all-metal" plane is far from being constructed entirely of metal, paper and, especially, are also important aircraft materials.

In fact, manufacturers of military airframes rank among the leading users of plastics. Virtually every major part of a plane except the primary structure contains at least one possible application of a plastic.

Most aircraft companies have plastics research departments which are constantly investigating the use of plastics of resin and plywood types:

- To replace strategic materials, and
- To save weight.

The manufacturers have not yet overlooked any plastic which has reached the market. Tests have been run at various times on everything from big parts like plastic wing tips and wheel wells to such smaller articles as pilots' escape hatches, seats, map cases and the name plates used in the center of control wheels.

2,500 PLASTIC PARTS

One airframe producer is using 2,500 plastic parts in four military aircraft which are being manufactured. Among the parts are lightweight phenolic flooring, antenna masts, de-icer fluid tanks, and bulkhead doors.

Another reports using more than 250 pounds of various types of plastics in a four-engine bomber which comes off the production line.

The consensus among aircraft manufacturers is that plastics will be used more and more as the war progresses and later in the peacetime period because they have proved themselves in the course of millions of hours of service. Even today, when availability is a problem no longer to be considered, the manufacturers are not abandoning plastics which were originally installed as substitutes for metal.

GIVE MORE VISIBILITY

Outstanding use of plastics, according to research engineers, will be in transparent varieties which are constantly providing more and more visibility for pilots and crew members.

"The use of plastics, other than plywoods, will not be used in primary structure because of low weight-strength ratio," a manufacturer has declared. "However, on the other hand, we have only begun to use plastics in aircraft manufacture at points where no great stresses are encountered."