



# planes

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## STOP-AND-START PLANE BUYING IS COSTLY

### U.S. Develops 34 Jets Compared to 24 British Types

The U. S. aircraft industry has a backlog of experience and "know how" in the development of jet powered aircraft probably unequalled by any other nation, according to a resume of Air Force and Navy jets which have been built and are flying.

In the field of jet transport plane development alone the British hold acknowledged leadership, with such planes already flying, while no jet plane for commercial passenger or transport service has ever been built—or even started—in the U. S.

#### Production Limited

The British showed 24 types of jet planes at their recent annual exhibition at Farnborough. The U. S. has a total of 34 different types of jet aircraft flying or being evaluated, according to records of the Navy and Air Force. Experience in the conventional aircraft field shows that U. S. aeronautical engineers can change from military to commercial types successfully when finances are available.

In both countries, the jets developed are mostly experimental, with relatively few having been produced in quantity even by peacetime standards. In the U. S. only two jet fighters have been produced in quantity with a third now attaining such a rate. In Great Britain, only two jet fighters have been in quantity production.

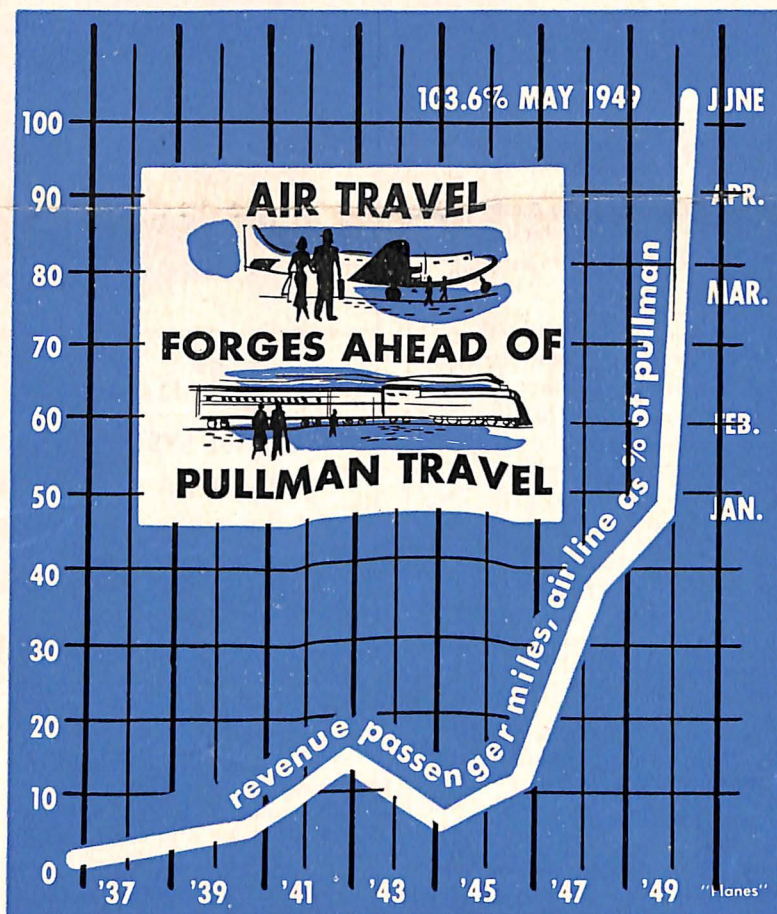
Actually the number of jets produced in both countries combined amounts to only a "dribble" compared to World War II standards.

#### List of Types

Here is the box score on U. S. jets: The Air Force has six types of multi-jet bombers, 12 types of fighters, and one trainer. The Navy has seven types of jet planes in operation. The military services have five types of planes using both jet and reciprocating engines. Going even further into aeronautical frontiers, the services have three rocket-powered planes and two types with both jet and built-in rocket power. In addition, the Air Force is developing a helicopter propelled by ram-jet engines. These do not include research contracts still classified as secret.

Actually the U. S. Air Force flew the first combat type jet aircraft ahead of the British as far back as October 1, 1942. This was not disclosed to the public until 1944. When it was first flown, the British were experimenting with

—See "Jet Types" page 3—



Source: Civil Aeronautics Administration and Alvin P. Adams & Associates.

### Airplane Becomes First Successful Weapon Against Grasshopper Plague

It took a fleet of 40 airplanes last summer to save a vast expanse of Western range lands from devastation. The "rescue" was spectacular in the Western tradition, but it also was a well-planned, scientific operation, utilizing the full potential of aviation for the first time in success-

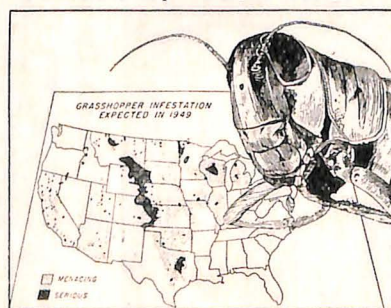
ful combat against one of man's most historic enemies—a grasshopper plague.

Statistical results of the aerial war on grasshoppers read like a page out of "Believe It or Not," but it is more important that the undertaking set a pattern through which millions of dollars' worth of crops, range lands and livestock will be saved to the American economy in the future through the use of airplanes. And the recurring grasshopper plagues, against which man has been almost helpless since Biblical times, eventually may be wiped out entirely.

The 1949 infestation struck hardest in northern Wyoming and southern Montana where the grasshopper population reached as high as 2000 per square yard. U. S. Department of Agriculture entomologists, using three government-owned planes and contracting with private fliers for 37 individually-owned planes, declared aerial war on the hungry insects.

—See "Plague" page 4—

#### Halted by "Air Power"



Because of the wide geographical scope of the grasshopper plague, only the airplane has provided an effective means of control.

### Mahon Demands Better Planned Appropriations

Written especially for Planes

By

Honorable George H. Mahon  
Democrat, Texas, Chairman  
Subcommittee on Military Appropriations  
U. S. House of Representatives

The House of Representatives several times in the last few years has registered its conviction that our first line of defense is the Air Force. That being the case, it is imperative that we at all times support a logical and consistent program intended to guarantee that we have the most modern and effective Air Force in the world. I am proud that the House of Representatives has recognized the need for logic and consistency in providing for the national defense.



Rep. Mahon

A year ago we decided that thoughtful and careful studies of our requirements by such impartial and qualified agencies as the President's (Finletter) Air Policy Commission and the Congressional Aviation Policy Board should receive adequate emphasis in our planning. The findings of these groups had great weight and were supported by the studies and hearings of our own committee. Our decision was that a gradual build-up to the 70-group Air Force was essential.

#### True Economy

This year the House of Representatives again held firm to their belief in consistency and adherence to sound planning. We were faced with a budget involving a complete scrapping of the 70-group plan that had been recommended by the Finletter and Congressional Boards. The House decided instead by an overwhelming vote that the build-up towards a 70-group program should be continued.

Our decision was based both upon our conviction that we must have an adequate Air Force and on a belief that it would be unwise, uneconomical, and inimical to the national security to cut back sharply Air Force appropriations just one year after the program had been started.

I firmly believe that adherence to a sound program and not the

—See "Mahon" page 2—

## 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

## Your 3c. in U.S. Security

Few Americans doubt in this atomic age that air power, ready for defense and equally ready for retaliation in the event of attack upon us, must be of vital concern to the citizens of the United States throughout the foreseeable future.

At the same time, probably few citizens realize that only three cents of their Federal tax dollar in the 1949 fiscal year went for the procurement of aircraft—the front line of the nation's military security. Because of personal interest in his own security and his investment in it, every citizen properly should know more about the aircraft manufacturing industry, its problems, and the manner in which it is discharging its obligations to the country.

Unlike other business enterprises, the aircraft industry has little that resembles a normal free market. Government aircraft procurement today comprises approximately 85% of the industry's total production. The manufacturers have comparatively little control over the volume and nature of their markets, which depend upon a complex set of factors translated into an annual appropriation for the procurement of aircraft.

Yet despite this dependence on the government market, healthy competition flourishes and the competitive spirit accounts to an appreciable extent for the industry's progress and accomplishments.

But its problems are many. Their solutions depend upon and in the main call for long-range Government planning—and a full understanding by the public of the issues involved.

Another point of difference between the aircraft and other major manufacturing industries is its unusual close integration with technology and science. Technical factors are ever present in all phases of the industry's operation, and are among the principal determinants of success for any individual company.

Also, unusual capital and manpower problems result from the instability of its work load. Communities find it difficult to understand and to be reconciled to the violent and irregular employment fluctuations of the industry. Problems of management multiply with every change in procurement programs.

Obviously, the aircraft industry can operate more effectively and at lower cost with a relatively stabilized total market. Wide annual variations in procurement budgets should be supplanted insofar as possible by establishment of a carefully planned long-range program subject to annual review by the Congress.

This need was aptly summarized by the American Legion at its recent national convention in a resolution urging that

"the Congress immediately enact legislation to authorize a succession of five-year programs, reviewable yearly, for research, development, and procurement of aircraft for the Air Force and naval air arm for the purpose of maintaining the industry in a state of production capable of rapid expansion."

When we visualize air power and its potentials, we must begin at the beginning. The beginning is the aircraft industry. It is upon the health and stability of this industry that our national security must depend.

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

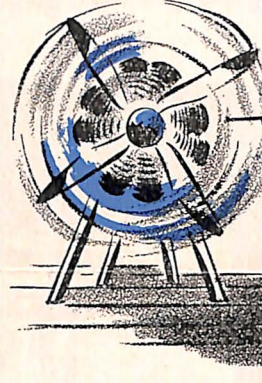
## PLANE VIEWS

from A.I.A.

### THE WORLD'S ONLY COLLEGE AIRLINE



PLANES USED IN ITS AERONAUTICS COURSE ARE OPERATED TWICE DAILY BY PURDUE UNIVERSITY BETWEEN LAFAYETTE, IND. AND CHICAGO UNDER A CAB CERTIFICATE!



### THE SHOTGUN TEST

A 12 GAUGE SHOTGUN, LOADED WITH SPECIAL QUARTZ PELLETS, IS FIRED ACROSS A PROPELLER BLADE IN ONE OF THE STRINGENT HARDNESS TESTS!

### A NEW ELECTRONIC CONTROL SYSTEM

ENABLES A PILOT TO TURN RUNWAY LIGHTS ON FROM THE AIR BY RADIO AS HE APPROACHES AN AIRPORT!



### MAHON

(Continued from page one)

scrapping of that program is true economy and is the only defensible course. Starting and stopping, expanding and contracting—the old hit-and-miss procedure we followed in the '20's and '30's—is costly, wasteful, and dangerous to the national security.

We would be faithless to our

trust if we failed to prepare for trouble and thereby seek to avoid it.

Those who prepare for the possibility of World War III with the pattern of World War II in mind invite disaster as did the French who with their Maginot Line prepared for World War II on the basis of techniques used in World War I.

We must shake ourselves out of any complacency that would lead us into any such error.

Air power, and I am referring to Army and Navy air, was a negligible factor in the first World War; it was decisive in the second World War; it will be incomparably more decisive if there is a third world war.

We put the emphasis of air power into our military appropriation bill. Those who look backward are inviting disillusionment and disaster.

### Warning to Aggressors

There would have been no Pearl Harbor in 1941 if we had been prepared to strike a quick and deadly blow at the vitals of Japan and Germany. We greatly diminish the likelihood of World War III when we prepare ourselves to strike a quick and deadly blow at the very heart of the potential enemy.

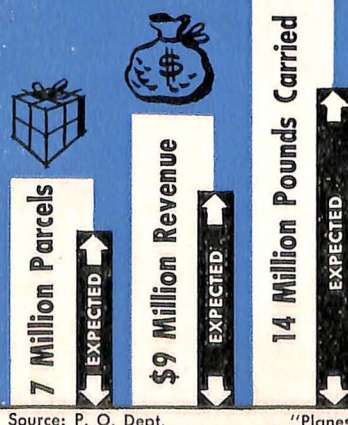
Aggressor nations attack because they think they can somehow eventually get away with it.

The only force under heaven that can now deliver the quick and devastating blow is the United States Air Force. So I say without hesitation that our first line of defense is the Air Force.

### FIRST YEAR OF DOMESTIC AIR PARCEL POST

SEPT. 1, 1948—SEPT. 1, 1949

### GROWTH OUTSTRIPS POST OFFICE FORECASTS



Source: P. O. Dept.

"Planes"

## Facts and Figures

Production of a typical new fighter plane requires about 13,500 special tools.

Quality requirements for production of new combat planes are so rigid that one company uses, on an average, one inspector for each 10 direct workers.

Princeton University and California Institute of Technology now have jet propulsion centers devoted to development of peacetime applications of rockets and jet propulsion.

The world's largest airplane tire—weighing more than a quarter of a ton with its inner tube—has been made in England for a British military transport. It contains 224 miles of nylon cord.

More than 80% of California's rice crop is sown from the air.

An airplane propeller manufacturing firm operates a 10,000-watt broadcasting station which cannot be heard; it produces vibrations to test propellers.

Aircraft manufacturing is one of the few large industries in Great Britain not listed for socialization.

One airline found that 77% of its passengers on flights from California to Hawaii were riding in an airplane for the first time. And that more of them had incomes of less than \$5,000 than of \$8,000 and up.

Rocket speeds as high as 30,000 miles per hour are possible with the use of liquid hydrogen as fuel and liquid oxygen as an oxidizing agent, according to Dr. H. L. Johnson, director of Jet Propulsion Research at Ohio State University.

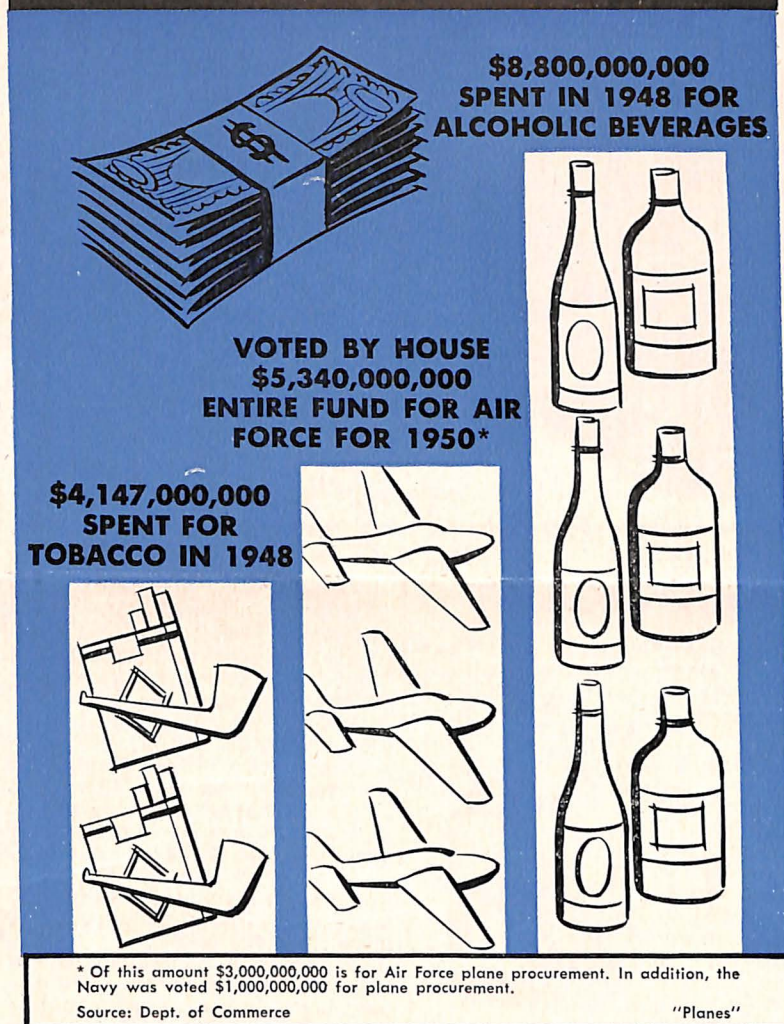
The British have built a new carrier-based jet fighter which has no landing wheels but makes belly landings on a rubber mat on the deck.

## PLANES QUIZ

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

1. The announced altitude record for a U. S. jet plane is: (a) 52,000 feet; (b) 48,846 feet; (c) 40,000 feet?
2. Memory test—What are the following famous planes and for what are they noted: (a) the "Truculent Turtle," (b) the "Enola Gay," (c) the "Pacusan Dreamboat"; (d) the "Lucky Lady II"; (e) the "Winnie Mae"?
3. How many individual parts do you think go into the jet plane which holds the official world's speed record?
4. An anniversary of the first successful helicopter in the western hemisphere was observed in September. It was the (a) tenth; (b) fifteenth; (c) twentieth?
5. The fastest U. S. transcontinental flight was: (a) under four hours; (c) under five hours; (b) under six hours?

## Air Force costs for 1 yr. compared with amounts spent on tobacco, alcohol



### Aircraft Mechanic Schools

A list of 102 aircraft mechanic schools in the U. S., shown alphabetically according to regions, is available from the Civil Aeronautics Administration Publications Section, Washington, D. C. Ratings of each school are given.

### JET TYPES

(Continued from page one)

jets but had not yet put them in combat-type planes, military records indicate. The Germans were experimenting with jets as early as 1941, but there has been no plane manufacturing in Germany since VE-Day.

The U. S. has far outstripped the British in jet bomber development. The first U. S. multi-jet bomber flew on March 17, 1947, three other types were flight tested the same year and still another one flew in May, 1948.

While the famous Whittle jet engine, developed by a British flight captain during the war, is still basically the jet power plant in use by the U. S. today, many developments and refinements have been made by U. S. engineers. For instance, in new metallurgy techniques the U. S. has made major advancements which increase range and power, military observers report.

#### Varied Experiments

U. S. experiments in the jet field include a tiny (15 feet long) parasite fighter plane to be carried in the belly of a bomber and released to intercept attackers. Two versions of the unique "Flying Wing" are equipped with jet engines. Also being tested is a delta-wing (wedge-shaped) jet plane, indicative of the wide range of aerodynamic studies which have built up the backlog of U. S. experience with jet power.

Other jet prototypes have been built, tested and evaluated, but not put into production when it was found that they would not meet requirements.

## Competition Keen In All Stages of Plane Contracts

The life cycle of an airplane is a story of business competition from its very beginning to its final end as an obsolete vehicle.

Design price and performance figure in the technical evaluation built up through the years by the Air Force and Navy Bureau of Aeronautics. Probably no other Government-awarded business must meet such intense competition and rigid tests as an airplane contract.

First in the cycle is design competition.

When aircraft are to be procured for a given type of operation, all major airframe companies are advised through a formal announcement of a design competition. Those companies which wish to bid for the business submit designs—either a modification of an existing airplane or a totally new configuration.

#### Extensive Studies

The extent of competition in this phase of the cycle is indicated by the fact that an Air Force trainer design competition last year brought forth 22 different designs from 16 companies. These are not fancy advertising brochures, but consist of comprehensive design studies which may cost the company anywhere from \$50,000 to a quarter of a million dollars to prepare. They represent intensive work by the most competent, and therefore the highest paid engineers.

Next comes the design contract, one or more of which may be awarded by the service to the companies with the most promising entries, after careful evaluation. These awards, termed Phase I contracts, call for detailed engineering and usually for construction of a mock-up and wind tunnel tests. If, after completion of Phase I, the design still looks promising, the service may award an experimental or Phase II contract, calling for the construction of two or three experimental planes for flight and structural tests.

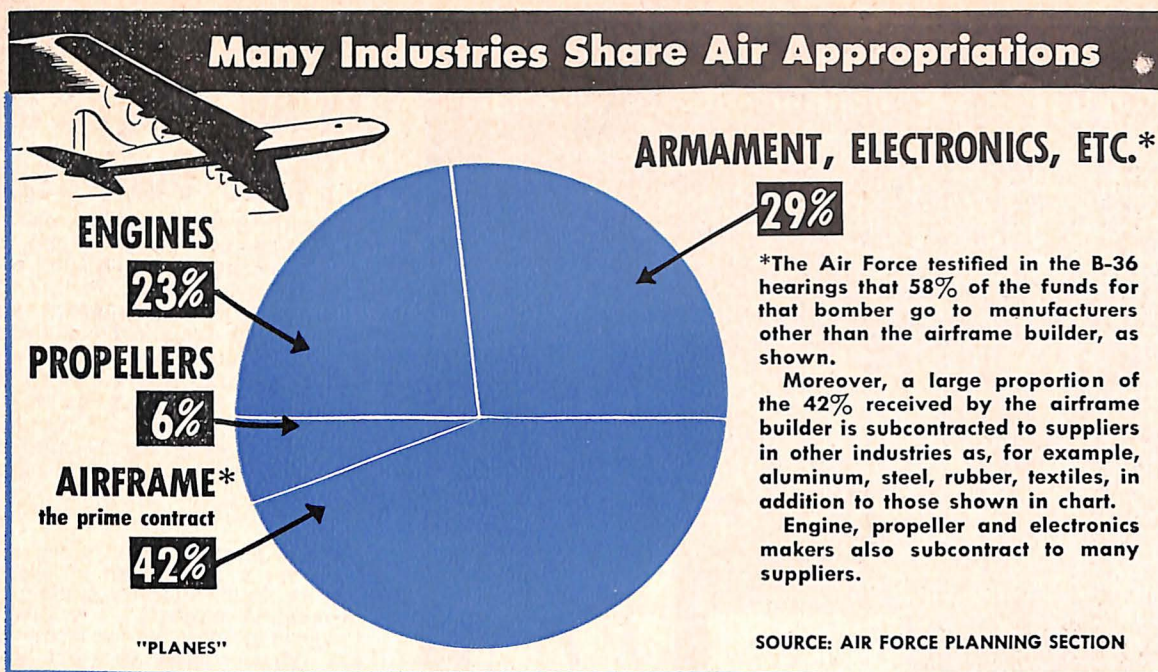
#### Holds Costs Down

Finally, if flight tests and all other evidence are favorable, a production contract may be awarded, followed by additional production contracts as long as the model remains superior in its category.

To secure the necessary advancement in aircraft types, primary emphasis at all times is on design competition. Aircraft manufacturers have stated repeatedly that they believe the evaluation by skilled engineering officers in the Air Force and Navy is objective and impartial.

While price competition is necessarily secondary to design competition, it is always a factor, and may be a dominant factor where there is only a small margin of design advantage. Over a period of years the high cost producer will either be brought into line through the constant pressure of price negotiation or will find his business diminishing.

Thus while aircraft manufacture is closely interwoven with considerations of national security, contracts are won through competitive engineering design, and by keeping production quality up and costs down.



### Answers to Planes Quiz

- (a) 52,000 feet. The 48,846 figure is the height from which a Navy plane clearly photographed Washington, D. C.
- (a) The "Truculent Turtle" is the P2V patrol plane which flew 11,239 miles, Australia to Columbus, O., non-stop in 1946. (b) The "Enola Gay" is the specially equipped B-29 which dropped the first atom bomb on Hiroshima. (c) The "Pacusan Dreamboat" is the B-29 which flew from Honolulu over the North Pole to Cairo, about 10,000 miles, in 39 hours six minutes non-stop. (d) The "Lucky Lady II" is the B-50 which early in 1949 flew around the world non-stop, 23,452 miles, in approximately 94 hours. It refueled four times in the air. (e) The "Winnie Mae" was the plane in which Wiley Post and Harold Gatty flew around the world in eight days, 16 hours.
- 500,000 pieces, including about a quarter of a million rivets and bolts.
- (a) The first successful helicopter in the western hemisphere, made by a U. S. company, flew on Sept. 14, 1939.
- (a) A U. S. jet bomber flew across the continent in three hours and 46 minutes.
- (b) 20,000,000, according to International Air Transport Association figures.
- (c)
- (a)
- (c)
- True. Between Aug. 9 and Dec. 10, 1947, Clifford V. Evans, Jr., and George W. Truman flew around the world in two 100 hp planes, covering slightly less than 25,000 miles.

### Air Quotes

"As a requirement of the 70-group Air Force program, there must be an aviation industry prepared to give us the aircraft and equipment we need now and capable of rapid expansion in event of an emergency. The aviation industry in this sense is understood to include a strong air transport system of commercial aviation.



Gen. Vandenberg

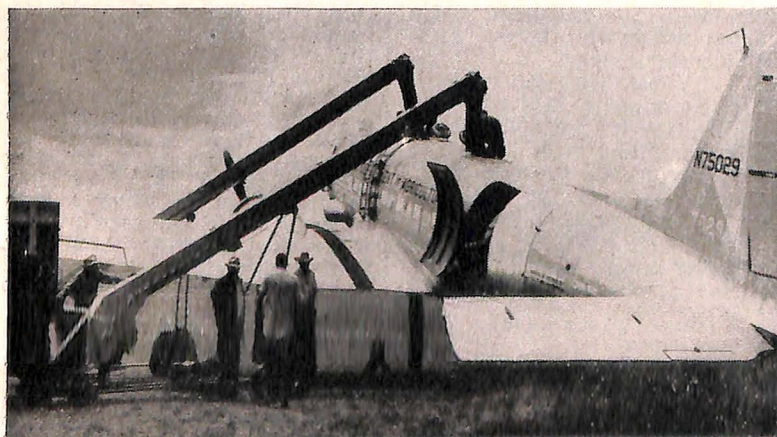
"Another requirement is a vitalized program of research and development to make sure that our Air Force will be supplied the best equipment possible. If we are ever attacked again, we will not be able to buy at any price the knowledge, the techniques, and the tools of air power that we fail to develop today."

—Gen. Hoyt S. Vandenberg,  
Chief of Staff, U. S. Air Force

### Lightplane Operating Costs

Operating costs of 10 types of lightplanes are reported in detail in a new bulletin available from the University of Illinois Institute of Aviation, Urbana.

### Preparing for Western "Hopper Roundup"



A Department of Agriculture plane being loaded with poison bait to be distributed over range-land in the first "all-out" aerial war against the grasshopper plague.

### PLAGUE

(Continued from page one)

Using bran treated with the new insecticides, chlordane and toxaphene, the planes sprayed poison 'hopper bait over 2,700,000 acres in a little more than two weeks.

Government entomologists estimated that 522,000,000,000 grasshoppers were killed during the "campaign" from June 15 to Aug. 3. To emphasize the amazing extent of this accomplishment, they reckoned that the dead grasshoppers weighed 175,000 tons and would have made a pile filling the average city block to a height of more than 400 feet.

David Hall, entomologist in charge of the program, said the treatment saved approximately half the grass in the area—enough to provide forage for livestock producing 16,000,000 pounds of beef. No range was so severely damaged that it will not recover by the spring of 1950.

### Long Range Results

Cost of the eradication program was computed at \$1.00 per acre. On 1,500,000 acres of "primary area" where the infestation was heaviest the program was co-operatively financed, 10% of the cost being borne by ranchers and farmers, 15% by the counties, 25% by the states involved, and the remainder by the Federal Government. Surrounding the "primary area" were several million acres where the 'hopper infestation was not quite so serious. Here the poison bait was furnished free by the Government. The ranchers contracted with private fliers to spray it over their land, usually at about 16 cents per acre.

A half dozen different models of planes were found satisfactory, most of them being light planes which carried from 500 to 1200 pounds of bait, the limiting factor being the size of the bait-carrying compartment, since the 'hopper bait was bulky.

Not only did the aerial campaign prevent extreme damage to forage on the land involved but it eliminated the usual long distance migration of the grasshoppers to other areas and Government experts believe it has forestalled recurrence of the outbreak in 1950 in that region. Many scientists believe the nation's original "dust bowls" were caused generations ago by grasshopper plagues. Aviation has provided the first real weapon to combat such devastation.

## Stability Sought In Aircraft Jobs

Employment in aircraft plants is subject to sharp fluctuations, not through the decisions of management, but as a result of government procurement decisions which in turn hinge upon annual appropriations by Congress. Congressional long-range planning, at least on a five-year basis, long has been urged by the industry.

The number of people working in airframe plants at mid-year stood at 167,441, in contrast to the peak wartime figure of 1,326,345. The President's Air Policy Commission and the Congressional Aviation Policy Board pointed out that unless a stable body of trained and skilled workmen can be maintained in peacetime, effective expansion will be more difficult in emergency.

### Community Aspects

A labor union reports that in one instance 80 tool and die makers were laid off by a West Coast plane factory for a period of approximately three months. At the end of the lay-off, only one of the 80 returned. During that period, the 79 had found employment at other jobs (in some cases at a lower rate of pay) and chose to remain in their new jobs rather than face the uncertain economic conditions in the aircraft industry.

Community aspects of lay-offs caused by varying Government policy involve the shock of thousands being suddenly thrown out of work. Internal company operational aspects involve dislocations which may affect a large part or all of an efficient organization. The effect spreads down through the various tiers of subcontractors and suppliers.

### Long Range Planning Needed to Stabilize Aircraft Jobs

