



planes

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AMERICAN AIR POWER IMPROVED SINCE 1948

Industry Better Able to Expand Production Now

Available data attest to the wisdom of Congress in starting to rebuild America's air power just two years ago when it passed the Supplemental National Defense Appropriation Act of 1948. While the strength of our air arms and the rate of aircraft output are below the minimums authorities believed safe, conditions are better in every respect than in 1946-47 or 1939.

In 1946-47 our Air Force could muster only 34 groups with only one or two qualified for combat, and Naval Aviation was equally inadequate. The aircraft industry had plunged deeply into the red and its actual survival was in question.

The situation brought about the reports of the Finletter Commission and the Congressional Aviation Policy Board. The Congress backed these reports by prompt passage of the Appropriation Act in the spring of 1948, and by subsequent steps in increasing appropriations for air power.

As a result the Air Force, while still far below the 70 groups desired as a peace time minimum, now has the equivalent of 52½ groups with many of them having the best and most modern planes in the world. Naval Aviation, while still inadequately equipped, has placed new jet fighters and attack planes in operation.

The change in the aircraft industry is illustrated by the following figures showing the number of planes delivered:

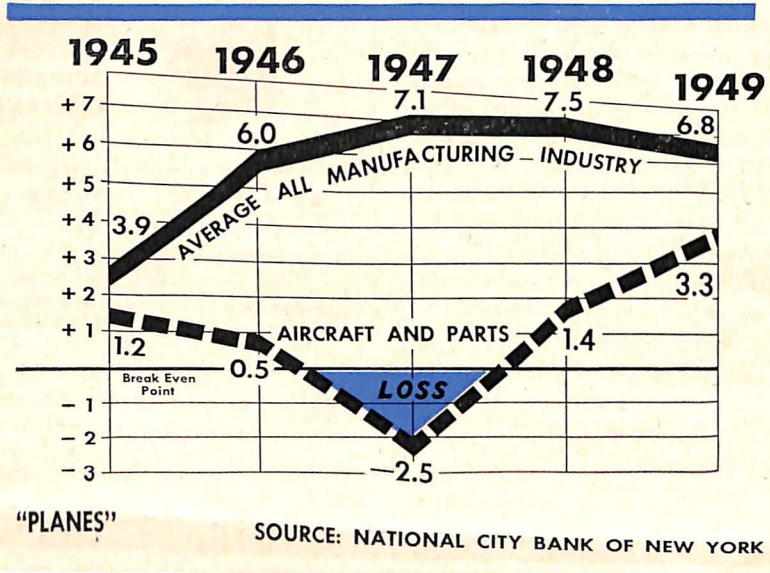
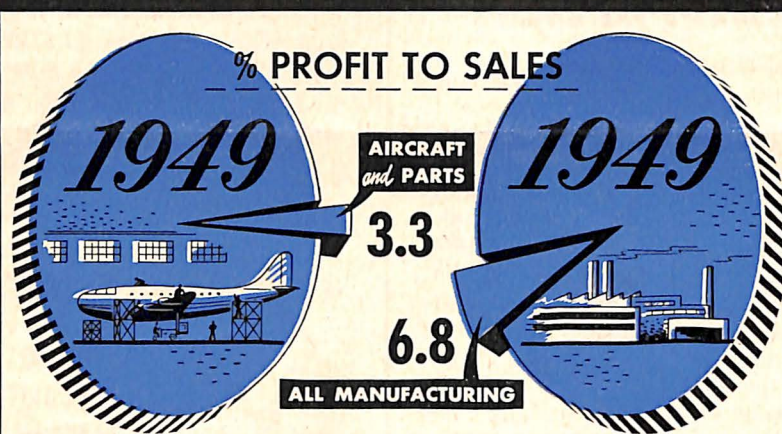
1939	2,141
1944	96,318
1946	1,669
1949	2,544

The current production rate is slightly higher than in 1949.

These figures show graphically that the industry is in better shape to expand in case of an emergency than it was in 1939 or 1946. Clearly, however, much time would be required for the industry of 1950 to reach a volume similar to that attained in 1944. The editorial in this issue also points up some continuing financial problems of the industry.

New combat aircraft of America's air arms hold virtually all the recognized world's performance records. Airplanes of the Air Force and Navy such as the F-86, holder of the world's speed record, the P2V, which made the longest recorded non-stop flight without aerial refueling, and the B-45, the world's first operational four-jet bomber, have been assigned to combat units and are ready for any emergency that may develop.

Aircraft Manufacturing Profits Far Below Most Other Industries



Aircraft manufacturing profits consistently are far below those of practically all other industries. Compiling the figures for 27 aircraft and parts companies, National City Bank of New York found that in 1949—best year since the end of the war—they had a net profit margin of 3.3% on sales. At the same time, for all the 1,710 manufacturing companies included in the survey the average profit margin was 6.8%. The chart also shows that the wide spread has prevailed throughout the past five-year period.

New Manufacturing Methods Pushed In Drive to Cut Costs of Airplanes

Great advances are being made in the joint Air Force-aircraft industry program to improve the efficiency of modern complex aircraft and at the same time substantially reduce the cost of manufacturing.

Background of this program was described in the February, 1950, issue of *PLANES*.

Progress of the program is signified by the fact AMC has approved the letting of 10 methods development contracts. It now has under consideration a list of 19 other high priority undertak-

ings proposed by the Manufacturing Methods Committee of the Aircraft Industries Association. These were selected as the most important from an original list of 200 submitted by the industry.

The Manufacturing Methods Committee points out that money spent for the development of a new process or a new time-saving, cost-cutting, accuracy-improving machine may mean the saving of millions of dollars in the final cost of turning out airplanes.

—See METHODS page 8—

Test of "Swarmer" Operation Shows Equipment Needs

Written especially for *Planes*

By Maj. Gen. William H. Tunner
Deputy Commander, Exercise SWARMER

Exercise SWARMER was a test case. In seeking solutions to the problems resulting from employment of air transport alone to establish and sustain—over a protracted period—a friendly force deep in hostile territory, SWARMER was planned and executed, using only those transport aircraft readily available to the Air Force in its MATS and do-



Maj. Gen. Tunner

mestic Troop Carrier organizations.

Once the initial mass air assault—an air drop of paratroops and parachuted equipment—had obtained its objectives, SWARMER demanded for its success continuous, day and night, all-weather, mass air supply to allow friendly forces to build up manpower and materiel strength to mount and sustain the offensive against entrenched "aggressor" forces in this first real test of a true airhead operation.

Shortage of Aircraft

Certainly it became evident that continued consciousness of the shortage of transport aircraft must be kept uppermost in mind. Hence, all military planning must take cognizance of the fact that with a given number of airplanes, the maximum output should be attained.

This necessarily resolves itself into careful pre-planning of loads by logisticians to permit a higher utilization of transport aircraft; and, once pre-logistic planning is achieved, a refinement in transport techniques by air transport experts.

These techniques require quick turn-around of aircraft at both ends of the line, and the urgent need to keep aircraft in the air and not on the ground but maintaining at all times a deep consciousness of the ever-threatening hostile air interception possibilities.

Guaranteeing Reinforcements

The solution to the turn-around problem is not easy; it requires a clearcut organization with one

—See AIRLIFT page 4—

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.

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

Aircraft Industry Profits And Enterprise

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

The chart appearing on page 1 in this issue of *PLANES* compares graphically profit ratios in the aircraft industry with those for other manufacturing corporations. This chart shows that the aircraft industry's profit in 1949 was only 3.3 percent on sales, according to the National City Bank of New York, whereas the same ratio for some 1700 manufacturing corporations in all industries combined was 6.8 percent. The chart also shows that throughout the past five years the profit margins in aircraft have averaged far below those of industry as a whole. Much the same situation prevailed during the war, according to the National City Bank's data. However, the situation before 1939 was quite different. Then, the industry's earnings were at levels fully comparable to those of other industries.

In the prewar days, when profit margins were at least double current rates, companies in the industry, as a matter of course, financed their own competitive efforts in the commercial field, and they owned their own plants. They looked to NACA for aerodynamical and other basic research and to the military services for only a very few special testing facilities.

Competition in the military field was characterized by development contracts placed by the military with the private companies and by design competitions for military procurements. The size of the contracts placed, and the rate of delivery required, were of an order which demanded no sudden or impracticable private expansion of facilities.

Today, in our post-war uneasy peace, the industry picture is complicated and unclear as to the present, and far more complicated and unclear as to the future.

Today, design, prototype manufacture and flight qualification of new commercial transports are so expensive in both time and money as to be almost prohibitive as a speculative private venture by any single company. Currently, the industry looks to government to help solve this problem.

The costs of developing the supersonic military airplane, its powerplant and its accessory technical and military equipment are so great that much difficulty is being met by the military in providing for competitive developments by two or more private companies in each type class.

Production contracts and required rates of delivery create serious problems as to expansion of production facilities. The utilization of idle government "stand-by" plants and machine tools has been an understandable solution in many cases, although there have already appeared disturbing signs of political pressures which tend to complicate subsequent procurement decisions.

These are the post-war developments which give rise to the imponderables which concern the industry as it tries to visualize its future.

The prewar picture of the industry and its relationships to the military services is so simple that the fundamentals are clear. World War II furnished a full-scale test of the soundness of these fundamentals in preparing the industry to discharge its responsibilities to the services and to the country. The record of its war performance has been written, and the industry feels it can stand on that record.

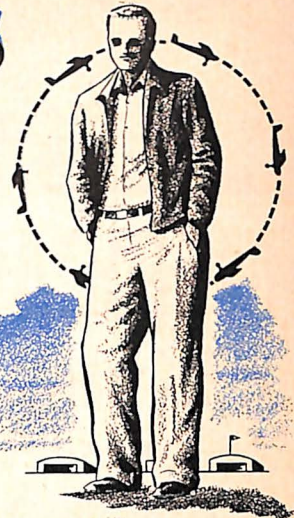
That record is in strong contrast to the catastrophic failure of the nationalized aircraft industry of France in the hour of that country's greatest peril.

That record is also in favorable contrast to the performance of the government-dominated German aircraft industry which, after a good start, proved to have had its initiative and flexibility so impaired as

PLANE VIEWS

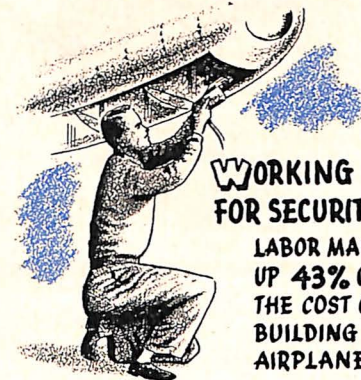
1,874 LOOPS

CARL CRAWFORD, TULSA, OKLA.,
LOOPED HIS LIGHT PLANE 1,874
TIMES IN 5 HOURS. MAY, 1950



WHO HAS SEEN THE WIND?

THERMAL WINDS MOVING AT 150 TO 200 MPH--KNOWN AS JET STREAMS--HAVE BEEN CHARTED FOR 5 DAYS AT A TIME AT ALTITUDES BETWEEN 15,000 AND 40,000 FEET. THE JET STREAMS ARE OFTEN 1,000 MILES IN LENGTH AND 200 MILES WIDE.



WORKING FOR SECURITY

LABOR MAKES UP 43% OF THE COST OF BUILDING AN AIRPLANE.

"PLANES"



DON'T RUN OUT OF GAS!

AN ELECTRONIC FUEL GAUGE FOR AIRCRAFT MAKES ALLOWANCE FOR TEMPERATURE AND PRESSURE CHANGES. EACH COSTS \$3,000 BUT REQUIRED HUNDREDS OF THOUSANDS FOR DEVELOPMENT.

BY AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA

to have been a disappointment to the tactical head of the German Air Force, Reichsmarshal Hermann Goering. The latter expressed this disappointment during interrogation by our Air Force officers after the war when he is reported to have said that:

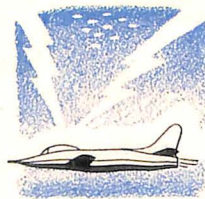
"he envied the Allies nothing more than their financially independent private competitive aircraft industry and its ability thereby to develop new models."

The post-war trends, typified by the markedly lower level of profits and the increased government aid and controls, suggest the need for careful examination of this situation in the light of the lessons of World War II.

PLANES QUIZ ✈️

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

1. Delicate instruments last longer in jet planes than in conventional planes. True. False.
2. Fast flying jet planes can get radio reception up to (a) 1,000 miles; (b) 1,500 miles; (c) 1,800 miles?
3. U. S. scheduled airlines now have in service (a) 800 airplanes; (b) 1,100; (c) 1,500?
4. Most military vehicles can now be carried by air fully assembled. True. False.
5. A jet-powered transport can be started and made ready for takeoff in (a) five minutes; (b) 15 minutes; (c) 30 minutes.
6. Certificated helicopter pilots in the U. S. now total (a) nearly 700; (b) nearly 1,800; (c) nearly 2,500?
7. Jet aircraft can operate up to (a) 35,000 feet; (b) 45,000 feet; (c) 55,000 feet?
8. Hot weather reduces the lifting power of an airplane. True. False.
9. Is flight instruction still available under the G.I. training program?
10. A modern airplane has been developed which can change the angle of its wings while in flight. True. False.



Aircraft Quantity Still 'Deficient' Despite New Fund

Spurred by the challenging remarks of Rep. Carl Vinson, D. Ga., Chairman of the House Armed Services Committee, and testimony by General Dwight D. Eisenhower, the House of Representatives has voted an increase of \$300,000,000 in the 1951 appropriations to procure modern airplanes for the Air Force and Navy.

This increase over the original Administration budget for 1951, if approved by the Senate, would permit the Air Force with its \$200,000,000 share to procure 77 production aircraft — medium bombers, medium and heavy transports, and helicopters — and would further strengthen the Air Force's striking forces by permitting the rehabilitation and modernization of 71 medium bomber aircraft as tankers. The rehabilitation of 228 primary training aircraft also contemplated by this action would substantially improve the flying training program.

The Navy's \$100,000,000 share will provide for the procurement of 95 first-line combat airplanes, everyone of which will be used either directly or indirectly in conjunction with anti-submarine warfare. Although total planes scheduled for Navy procurement during 1951 are increased to 912 by this action, Vice Admiral J. H. Cassaday, Deputy Chief of Naval Operations (Air), in testimony before the House Appropriations Subcommittee, stated that to maintain a first-line, modern air arm based on present operating strengths, there is still an annual procurement deficiency of 435 aircraft.

"This deficiency can only be met by the continued operation of older aircraft," the Admiral said, adding that the deficiencies pertained only to the regular Navy and were in addition to the deficiencies of the Reserves which for the past several years have been programmed to operate with second line aircraft.

Exhaustive Tests

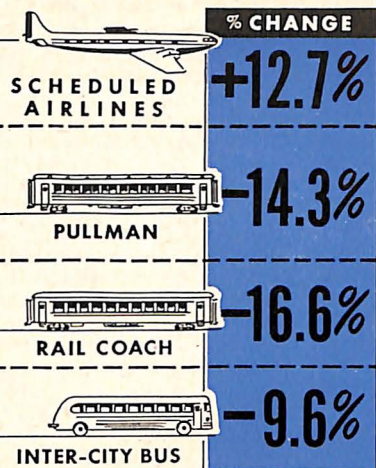
Six million square feet of blue prints were used in designing one of the biggest U.S. airliners now in service, plus more than 2,300 man-years of work.

More words were used to report data than are in the Encyclopaedia Britannica. Pre-flight tests included a 40,000-mile run for the power plant, 11,800 simulated landings with the tricycle gear, five years of wind-tunnel tests and 1,900 test hours for the generator system, reports the 1949 Aircraft Year Book, official publication of the Aircraft Industries Association of America.

Flooring of the airplane was tested in the plane factory by the tramping of more than a million feet. Flight tests were made totaling more than 250,000 miles and including 54 flights between Seattle, Tampa, Los Angeles and New York.

AIR TRAVEL GAINS; SURFACE TRAVEL DROPS

1949 COMPARED TO 1948



SOURCE: "PLANES" AIR TRANSPORT ASSOCIATION AND INTERSTATE COMMERCE COMMISSION

METHODS

(Continued from page 1)

Cost of this type of research is comparatively small. Lt. Col. Carl W. Andrews, Chief of AMC's Resources Planning Section, cites the following figures for Air Force sponsorship of manufacturing methods development: 1947, two projects, \$394,000; 1948, eight projects, \$2,313,000; 1949, 12 projects, \$2,600,000; 1950, 38 projects, \$5,300,000.

High Volume, Accuracy

A typical example of the 19 projects now under consideration for contract is development of electronically controlled routing and drilling equipment which could be used on 90% of the sheet metal parts going into an air frame. Replacing present hand-controlled router methods, this would assure uniformly accurate parts and higher volume of production.

Other proposed projects include a method of hydro-forming such very high strength materials as titanium, stainless steel and 75-ST aluminum; better methods of welding thick section aluminum and high strength aluminum alloys; processes to eliminate distortion in the machining of aluminum; non-destructive, low-cost method of inspecting welds—probably by sound reflection measurement or magnetic survey—to replace the present tedious x-ray analysis; electronic routing and drilling equipment; a machine that will taper and contour aircraft metals at the same time; development of close tolerance for rivet and screw heads to eliminate costly shaving and other processes now necessary to obtain absolutely smooth surfaces.

Facts and Figures

Registrations of personal airplanes in rural districts of the U.S. gained 12% from 1948 to 1949, Civil Aeronautics Administration reports.

Stream pollution violations are checked by plane in Pennsylvania where illegal strip mines stain the water black.

Costly Machines Needed to Build New Planes, But They Save Money

Machinery — big, powerful and complex—is required for the production of today's modern aircraft in U. S. factories. Such machinery makes possible improved manufacturing techniques, expandability in event of emergency, and reduced production costs—but it also carries a big price tag which is one of the factors in the high cost of building airplanes today for defense and security.

An outstanding example of tooling cost is the fact that machinery worth \$13,000,000 had to be set up for production of a current six-jet bomber which will be one of the mainstays of the Air Force.

By contrast, the same company needed less than \$6,000,000 worth of machinery to go into production on a bomber which carried one of the heaviest roles in World War II.

Work Loads and Precision

But these modern machines represent more than a difference in dollars and cents—they represent a stupendous difference in work loads and precision. Gone are the days when fuselage skin could be cut with a pair of tin shears. Hundreds of pounds of pressure are needed to shape the heavy-gauge skins of today's airplanes. Electronically-controlled precision mills do the tapering and trimming. Mechanics no longer think in terms of 1/32 or 1/16-inch tolerances. Instead, tolerances of plus or minus .002 are common on wings and fuselages. One jig borer, for example, maintains accuracy to within one-thirtieth of the diameter of a human hair.

Such machinery is a key factor in producing sturdy and dependable airplanes, it simplifies the manufacturing steps, and it literally would be worth its weight in gold if another war should require volume output of fighting planes.

Take one machine alone as a prime example in the \$13,000,000 tooling up of one bomber factory:

One of the primary needs was large equipment capable of drilling precision holes with distances up to 20 feet apart in the bomber

Aircraft Factory Safety Best in Heavy Industry

INJURY FREQUENCY RATE PER MILLION MAN HOURS WORKED

4.9 AIRCRAFT

7.3 AUTOMOBILES

17.2 AVERAGE ALL MFG.

18.1 RAILROAD EQUIP.

19.5 IRON AND STEEL

26.8 SHIPBUILDING

SOURCE: Bureau of Labor Statistics: 1948 Figures Shown; 1949 Figures not yet Available.

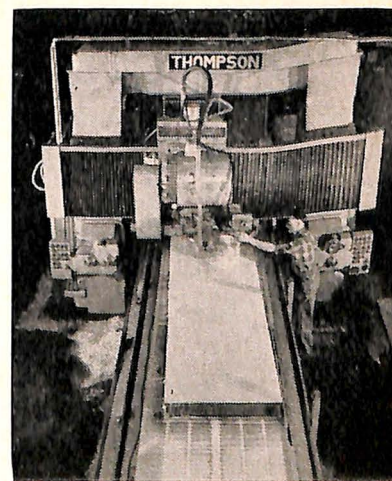
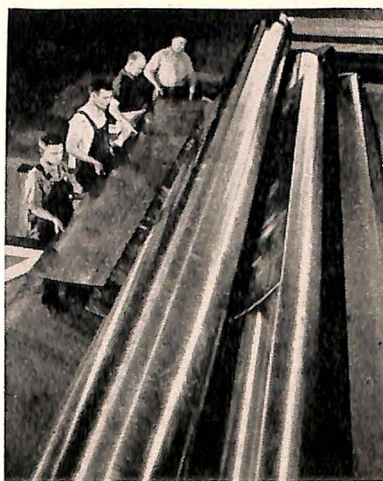
jigs and master gauges. In addition, such fabrication would require milling and planing operations, both vertical and horizontal.

General practices followed by manufacturers in the past would call for the purchase of three separate machines—a horizontal boring machine, a combination vertical and horizontal planer and a heavy duty horizontal and vertical milling machine. However, in a special development, all three operations were combined in one machine.

The price of the single machine was less than half of the total price of the three others combined. Also, use of the single machine saved valuable floor space for other manufacturing operations.

A Washington, Iowa, woman has a private pilot's license, but never drives an automobile.

Modern Aircraft Require Giant Precision Tools



Typical of the specially developed massive precision equipment necessary for the construction of one of today's high speed jet bombers are the machines above. At right: This surface grinder, unique in the aircraft industry, finish grinds sections 16 feet long, four feet wide and three feet thick. At left: Huge pincher-type bending roll is used for contouring wing skins. It handles sheet stock one inch thick, 30 feet long.

Typical Industrial Uses of Airplanes

The Civil Aeronautics Administration compiled the table below in a survey as of January, 1949. No survey has been made for the current year, with exception of pipeline patrol and aerial ambulance operations where exceptionally large gains have been made in the use of aircraft. Altogether, the CAA lists a total of 80 different industrial uses for planes.

Operational Uses	Number of Operators	Number of Aircraft
Spraying ripe fruit with "Stop Drop"	48	136
Plant Pollination	47	115
Crop Defoliation	242	675
Crop Dusting	760	1,883
Crop Spraying	776	1,327
Seeding	423	1,077
Sign Towing	247	338
Mapping and Surveying	87	139
Aerial Photography	225	313
Forestry Patrol	116	206
Highway Patrol	10	15
Power Line Patrol	162	395
Pipe Line Patrol	200	440
Oil Well Service	114	193
Soil Erosion	89	139
Ambulance Service	400	600
Delivering Mail, Newspapers	111	216
Checking Cattle	886	926
Hauling Feed and Equipment	814	868
Mineral Prospecting	45	60
Game Survey	79	118
Coyote Hunting	464	772
Rainmaking	55	74
Mosquito Control	141	255
Air Police	147	204
Forest Fire Fighting	66	133
Antifrost Agitation	26	77

"PLANES"

Answers to Planes Quiz

- True. Engineers estimate that in one currently flying jet plane the instruments will have 30 to 40% longer life due to reduced vibration.
- (c) High frequency aeriels buried in the fin of a modern jet plane (to reduce drag) gave up to 1,800 miles reception.
- (b) On January 1, 1950, the scheduled airlines of the U. S. had in service almost 1,100 aircraft—more than twice the number in service four years ago.
- True. One mammoth transport, now in production, can carry 94% of all military vehicles, fully assembled. It can carry 200 troops, or a load up to 50,000 pounds.
- (a) Engineers say the time for starting up the engines and checking the equipment of a British jet transport now flying can be assumed at five minutes.
- (a) The last count made by CAA showed there were 659 helicopter pilots certificated on May 1, 1949. New York, California and Illinois lead. There were 3,143 glider pilots certificated.
- (c) Much upper air research is being done but because of inherent difficulties of jet operation in extremely thin air, it is now generally considered that 55,000 feet represents the extreme at which jets in their present stage of development can be expected to function normally. A British fighter holds the jet altitude record of 59,445 feet.
- True. A 10-degree rise in temperature can amount to a reduction in payload of as much as 3,000 pounds.
- Yes. At the last count 25,896 ex-G.I.'s were taking flight instruction at various private flying schools throughout the country.
- True. A new three-engined jet bomber and a new jet interceptor fighter built for the Air Force have variable incidence wings which can be adjusted by the pilot so that the required amount of lift is obtained for takeoff while the fuselage remains horizontal. It permits both takeoff and landing without assuming a nose-up attitude.

Legion Reports On Air Power Of U.S.

A new report — "The Fifties, Decade of Air Decision" — assessing America's air power and recommending measures to insure national security, has been published by the American Legion.

The new publication examines the current status of military aviation, air transportation, research and development, air commerce and the aviation industry. It outlines recommendations to improve these basic factors in American air power to provide for increased national security and greater contributions to national economy.

The booklet was distributed in cooperation with the Aircraft Industries Association of America. Copies are available on request from the National Security Commission of the American Legion, Indianapolis, Indiana, or from the Aircraft Industries Association, 610 Shoreham Building, Washington, D. C.

Facts and Figures

Twenty-eight Ohio counties will sponsor air tours this summer for farmers and soil conservation interests desiring to study good and bad land use and soil practices. The Ohio Forestry Association also sponsors a state-wide aerial tour of strip mines, reclamation and forest lands.

Approximately 300 motion picture films and 150 filmstrips are listed in a new catalog of visual education aids available for loan to educational institutions, aviation and civic groups and other interested organizations. The list is available from Civil Aeronautics Administration, Washington.

Aerial Spraying Now Utilized By Numerous Cities

Towns and cities in half the states of the U. S. are turning to the airplane to rescue them from epidemics of disease and from destructive, blighting and expensive infestations of insects. A major increase in the practice of aerial spraying and dusting of communities is one of the highlights in the steadily expanding use of aircraft for industrial purposes.

First large scale spraying of cities from the air was undertaken in 1948 when 119 communities were covered. In 1949 the number was increased to 265 and a much larger number will be covered this year, it is indicated by early applications for waivers filed with the Civil Aeronautics Administration.

Kansas Leads List

Aerial application of the new chemical compounds is utilized for numerous purposes. In some cases DDT is sprayed in efforts to reduce the incidence of polio and to eliminate hordes of mosquitos and flies. In many other cases, spraying and dusting is used to wipe out infestations of insects. For instance, in semi-arid Kansas where destruction of trees would be an irreparable loss, 74 different communities last year used aerial applications of lethal chemicals to wipe out the canker worm which attacks foliage of trees.

Another example is the Miami, Fla., area where last year aerial DDT spraying was utilized every day for six weeks to combat mosquitos. Public health officials reported there was not a single instance of bad effects from toxicity upon people or animals.

Companion Industries

The widespread increase in the use of airplanes for this type of work is illustrated by the number of communities in 23 states which last year secured waivers from the CAA for that purpose. They were as follows:

Arkansas 1, Colorado 7, Delaware 4, Florida 21, Illinois 31, Iowa 21, Kansas 74, Maine 1, Michigan 4, Minnesota 2, Missouri 6, Nebraska 8, New Mexico 7, New York 2, North Dakota 1, Ohio 1, Oklahoma 10, Pennsylvania 3, South Dakota 4, Tennessee 1, Texas 22, Wisconsin 14, Wyoming 5.

Waivers are secured from CAA by operators of the dusting or spraying aircraft to permit low flights below the usual altitude.

Latest figures available to CAA show that 1,724 operators are using 4,906 planes in crop dusting, spraying, seeding, fertilizing and defoliating.

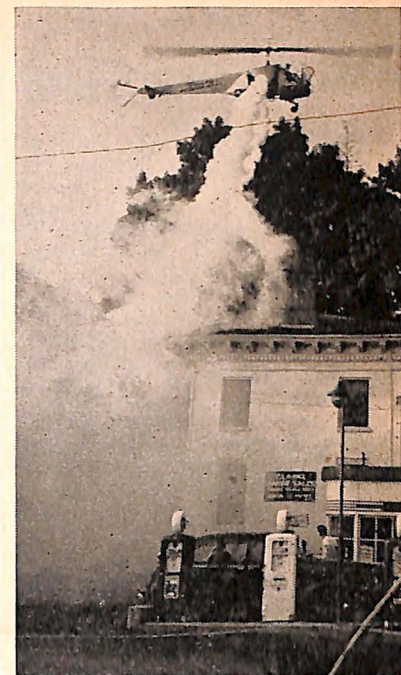
Companion industries have developed also, with 227 companies now making equipment used in such operations and 19 schools giving courses in agricultural flying—some of which are also applicable to the newer techniques of spraying cities.

AIRLIFT

(Continued from page 1)

authority made wholly responsible for the airdrome with its unloading crews, unloading equipment and devices, aircraft parking and dispatching, as well as local de-

Out on the Town



A helicopter skims over Springville, N. Y., (Pop. 3,000), spraying every nook and crevice with DDT-laden aerosol fog to wipe out flies and mosquitos when the community became alarmed by a sharp increase in polio cases. This is one of the many new industrial uses of airplanes and helicopters. In the U. S. 265 communities were sprayed or dusted from the air last year.

fense. Single authority and responsibility is essential to get the aircraft quickly unloaded and back into the air and the landed cargo speeded to the fighting troops.

We know that navigational equipment and techniques assuring a regular, safely spaced, and continuous flow of aircraft are vital; we must have navigational aids which cannot be neutralized by interference. We know that our operational techniques must be designed to guarantee the arrival of aircraft into the airhead, both day and night—and regardless of bad weather. The assault troops, once paratropped, must be guaranteed their bulk reinforcements of men and materiel, and on no account abandoned or sacrificed because of a lack of operational ability and adequacy.

The matter of aircraft design is of real importance. Awkward, unwieldy, and bulky loads (which are inherent in air-transport of present-day Army ordnance) must be carried.

Evaluating Aircraft

Although it is recognized that a lighter aircraft might better be used in the early stages of an airhead operation, when paratroops of men and equipment are the order of the day, a heavier "truck of the air" for landing the larger equipment and the continued mass delivery of troops and supplies during the sustained build-up is an essential. The latter would be particularly useful if it were designed to do both missions.

Our concept of operation must be stabilized, our training standardized amongst all air transport units, our air transport organization streamlined, our all-weather navigational aids and facilities improved, and our transport aircraft—present and future—carefully evaluated in order to bring about this guarantee for continuous heavy, and sustained flow of men and materiel.