AIA planes

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OFFICIAL PUBLICATION OF THE AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA

Airlines Spokesman Predicts—

VAST AIR TRAVEL INCREASE THROUGH 1950'S

Industry Brains Reduce Need For Critical Materials

Aircraft engineers are engaged in a nationwide program designed to reduce—and in some cases to eliminate—a number of critical metals now needed to build jet engines.

These essential metals—most of them little known to laymen but more valuable than gold to aeronautical engineers—are alloying elements used to give strength and heat resistance to jet engine materials.

Temperatures Up to 2,200°

Without them, or substitute materials which contribute equivalent or better performance and reliability properties, the blazing inferno of gases inside of America's powerful new jet engines would cause their mechanisms to melt, lose strength and deteriorate at temperatures which go as high as 2,200°.

With them, engine manufacturers are able to build tremendous power into new engines. A typical new jet powerplant has the equivalent of two-and-a-half times the horsepower of the *combined four engines* on a World War II heavy bomber. This amazing power is produced in a package weighing, in this case, only about 3,500 pounds—less than that of one engine and propeller on the same wartime bomber.

Little-Known Materials

Among the materials that make this possible are columbium, cobalt, tungsten, molybdenum, chromium and nickel. They come from such foreign areas as the Belgian Congo, the Canadian wilderness, Turkey and the Far East. Even today, the flow of these critical alloying agents into the U.S. is a trickle; in an all-

(See INDUSTRY CUTS, page 2)

Subcontractors Build Over Half of U.S. Plane

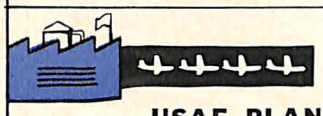
More than half of a typical patrol bomber produced by a major U.S. aircraft manufacturer is built by other companies.

As an example of the emphasis placed on broadening the production base, this company reports that 51% of the bomber is built by 4,000 suppliers, including 3,000 small businesses.

Subcontracting approximates 30% of this company's total output.

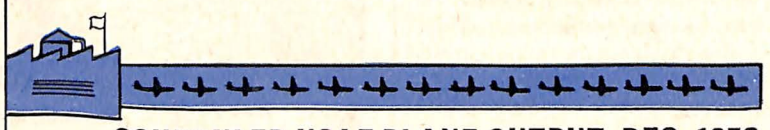
PLANE PRODUCTION GAINS MOMENTUM

USAF PLANE OUTPUT, JULY 1950



USAF PLANE OUTPUT, JULY 1951

USAF PLANE OUTPUT, JULY 1952



SCHEDULED USAF PLANE OUTPUT, DEC. 1952

Aircraft production for the United States Air Force will reach a peak by the end of 1952 of nearly seven times the production of July 1950. Production of fighters and bombers in July 1952 was five times greater than in July 1950, when the Korean War began. Weight of fighters produced in July was six times that of July 1950—and weight of bombers was seven times that of two years before.

"PLANES" Source: Air Force Secretary Finletter

Spares, U.S. 'Invisible' Air Force, Insure Constant Aircraft Readiness

The aircraft industry's military production effort in the two years since Korea is not measured alone by the 10,000-plus planes delivered to the nation's air arms—but also by the equivalent of several thousand additional planes manufactured as spare parts.

Without these spare parts, combat-readiness of the nation's air forces would be reduced immeasurably in the course of normal wear and damage to operational aircraft. Damage to aircraft, of course, is sustained at an even greater rate in wartime. Just as the automobile industry has to maintain volume production of automobile spare parts, the aircraft industry must build quantities of replacement parts to keep U.S. military aircraft in flying condition.

Every month, hundreds of manufacturers feed millions of complete components and small maintenance parts into pipelines of supply that flow to U.S. air bases around the world. Spares production on this scale eliminates the need for using parts from operational aircraft in order to keep other planes flying.

A major West Coast airframe builder is currently shipping spare parts to the Far East at the rate of about a quarter-million parts per month. This company alone has produced the equivalent in spare parts of 1,000 planes since November, 1950, shortly after the Korean War started.

To provide these spares at the right places and at the right times,

(See SPARES, page 3)

Says Present Jets Aren't Profitable On Airline Routes

Written Especially for PLANES

By

Vice Admiral Emory S. Land
President, Air Transport Association

In 1960, United States scheduled airlines—operating on domestic and international routes—should carry more than 45 million passengers, an increase of 84% over last year. They should fly more than 25 billion passenger miles, an increase of 92% over 1951. They should transport more than 127 million ton miles of mail and more than 478 million ton miles of cargo.

Jets in Late 1950's

A reasonable assumption would be that even before 1960—by late 1957 or early 1958—United States scheduled air carriers will have some jet aircraft in service. While these jet transports probably will not exert a strong influence on the domestic rail-air travel market, their impact on overseas travel should reach substantial levels by the beginning of the 1960's.

Jet transports, at this stage in their development, however, are not yet considered economical for commercial airline operations. Consequently, the airline equipment which we anticipate will carry the increasing air traffic throughout this decade will be almost wholly of the proved and economical conventional types.

Improved Economy

As jet transport design and development continue in the immediate two or three years, we expect to see improvements in fuel economy and operating dependability which will give jet-powered aircraft greater competitive capabilities. By the end of this decade, advances in jet design and experience should result in availability of jet transports that can operate, over some routes, as economically per passenger mile (or per ton mile) as present aircraft.

Since, however, the U.S. scheduled airlines are privately-owned and self-supporting, the forecasts of air traffic growth throughout the 1950's are based on the use of the most efficient and profitable aircraft now

(See AIRLINES, 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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Buying Planes In Europe

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

An essential element of the free world's mutual security effort is creation of Western European military production sources, enabling our overseas allies to provide more fully for their own military needs.

This program is being amplified by so-called off-shore procurement, financed with American funds, and is part of a broad-scale rearmament and mobilization effort aimed at deterring Soviet aggression. The threat is of such proportions that half measures, easy answers and mild sacrifices are not sufficient.

The United States aircraft industry has been called upon to cooperate in this program by turning over to European allies some of its basic trade secrets, classified technical information and fundamental patents.

In addition to furnishing designs, blueprints and technical data, this nation's plane builders have been asked for assistance and advice in training personnel. Once production gets under way, American manufacturers will face the necessity of maintaining a constant flow of change orders, test results, information on methods improvements, design changes and specification changes to foreign producers. Moreover, the U.S. aircraft industry must—if the program is to be carried to a successful conclusion—cooperate in the solution of the peculiar production problems of foreign manufacturers.

Quite obviously, there will be a severe tax on the facilities and the time of domestic aircraft producers—a far greater tax, for example, than would be required even in the case of technical assistance to a domestic licensee accustomed to American production procedures and standards.

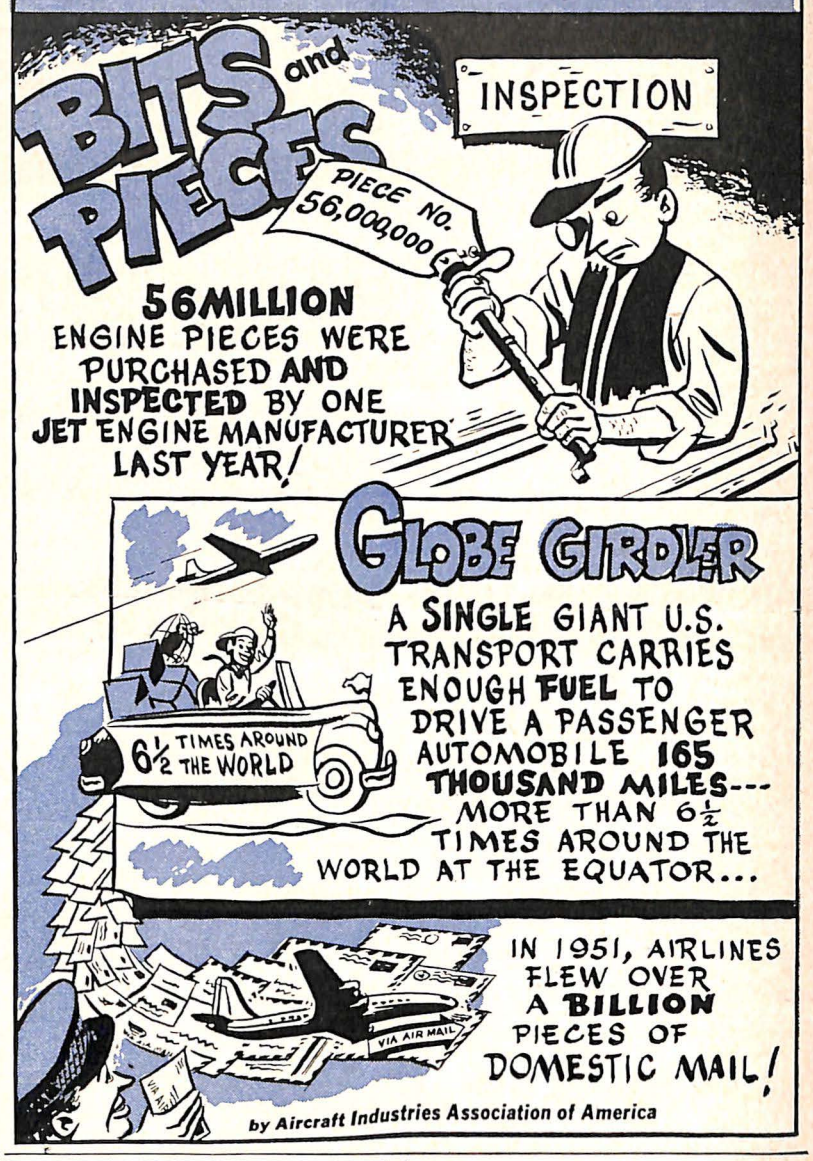
Granted the necessity for off-shore procurement (and the United States aircraft industry endorses the program's principle in these uncertain times), it would seem logical that the problem be approached through channels which offer the greatest savings to the American public and the maximum protection to companies whose proprietary rights are involved.

In many instances, U.S. manufacturers already have agreements with foreign manufacturing sources, as well as service centers and trained technicians in foreign countries. It would therefore seem both economical and equitable to use, whenever possible, these established and experienced sources for off-shore procurement and for local supply of American-built equipment. At the same time it would appear most logical to utilize existing commercial agreements between U.S. companies and foreign nationals as the primary media for achieving the objective, and to avoid whenever possible the creation of duplicating commercial or foreign government-owned facilities.

As European production sources are created, design and development work must progress in America in order to assure continued superiority of our military weapons. Extreme importance should be attached, in this industry's view, to the health of the competitive economic system which in the past has supplied superior American military aircraft to the free world. Under the off-shore procurement program, adequate compensation should be given for creative design engineering and production planning by American companies, as well as for actual production operations abroad.

The foregoing clearly leads to the conclusion that the American manufacturers concerned should participate in negotiations prior to the granting of private production rights to specific foreign producers. Certainly the greatest frugality with tax dollars and the least disruption of normal international trade can be achieved through discerning use of presently established commercial channels and through recognition of the private licensing agreements in existence.

PLANE VIEWS



Industry Cuts Need For Scarce Metals

(*Continued from page* 1)

out war, the trickle could dry up completely.

As a result, top engineering brains in American industry work incessantly to reduce the requirement for these metals. They have made progress in four different areas: (1) by substituting less critical materials, (2) by improving quality control thus reducing the amount of scrap and rejects, (3) by adopting new manufacturing methods requiring the smallest quantity of unprocessed materials, and (4) by improving salvage methods and returning salvage to the mills for re-melt and reuse.

Recent[illegible]ents in the industry [illegible] it possible, in some [illegible] reduce the requiren[illegible]t by approximately [illegible] iscoveries have led to [illegible] umbium. New specific[illegible] ave been written fo[illegible]s—which eventually s[illegible] large savings in nickel, [illegible]d molybdenum. Titaniu[illegible]s called the future "w[illegible]" of the aircraft industry[illegible] ested in new alloys wh[illegible]ther reduce the need fo[illegible].

A Nut & Bolt Worth $1 Saves $1,000,000

By standardizing spare parts, aircraft manufacturers have gotten down to the "nuts and bolts" of saving tax dollars. In fact, one standardized nut and bolt will save over a million tax dollars this year!

Industry and military teamwork in introducing standardized parts in the aircraft industry has replaced thousands of individual company-made engine and propeller hardware parts with relatively few standard designs. Because of large orders on these standard parts, builders and buyers of powerplants and propellers for military aircraft will use some 78 million fewer "hardware" parts in 1952.

Volume production of the fewer standard items cuts manufacturing costs and results in savings such as the million dollar dividend cited above. The smaller parts inventory required for standardized items also eases engine and propeller production and simplifies procurement of spares by the services.

Other advantages derived from this element of the aircraft industry's broad cost-reduction program are (1) manhour savings on production and procurement and (2) savings in valuable factory space through reduction in the necessary parts stocks.

Over 10,000 Four-Place Utility Planes Built by Aircraft Industry Since '48

U. S. lightplane manufacturers have built more than 10,000 single-engine, four-place aircraft since 1948—a tremendous fleet of light aircraft capable of six-million passenger miles of transportation per hour!

These planes, combined with the nation's private multi-engine fleet (larger than the airlines fleet) and the thousands of two-place lightplanes built since the end of World War II, provide the United States with a vital defense transportation fleet in event of war.

Defense Reserve

This civil non-airline fleet represents a tremendous reserve transportation potential. In case of atomic attack, it has been pointed out, all avenues of ground transportation to industrial centers could conceivably be blocked. In such a case, lightplanes capable of landing on improvised strips, streets, small fields or roads are seen as one of the only ways of getting civil defense workers and medical supplies to the spot—and of removing casualties from stricken cities.

All non-airline aircraft manufactured for civil use since Korea are being operated for essential business, industry and agriculture, and the lightplane industry has a substantial backlog of unfilled orders for civil planes.

Delivery Forecast

Based on current production rates, this lightplane industry will deliver some 3,000 new aircraft this year, having a sales value of $22 million.

The Air Coordinating Committee, a government agency which approves civil aircraft programs for which controlled materials are allocated, has authorized production of 4,637 utility-type aircraft in 1953.

Production on Up Curve

For over a year following the outbreak of war in Korea, materials were not available for non-airline-type civil aircraft—and production, as a result, dropped to a postwar low of 2,302 units in 1951. The present defense materials priority allocations system, however, has provided for a minimum of 3,500 utility aircraft annually—and production is again on the upward curve.

Air Quotes

"For our maximum national security, I would first recommend that the United States become, as quickly as possible, the foremost air power in the world. Nothing could be more important in the air age. This does not necessarily require our having the greatest number of planes. When I speak of air power, I include the vast structure of bases needed to go with it, and I include the flexible forces of naval aviation, on the finest aircraft carriers we can build. . . Finally, all of this must be backed up—for as many years as we shall need it—by a mobilization base of production, in industry, that can be expanded to furnish the equipment we need in case of all-out war."—*Gen. Omar N. Bradley, Chairman of the Joint Chiefs of Staff, May 16, 1952.*

Spares Keep Planes In Combat Readiness

(*Continued from page* 1)

thus achieving the most economical use of the air power dollar and preventing the necessity of "cannibalizing" complete aircraft, an estimated 25% of total U.S. airframe production today goes into output of spares.

Engine Spares

The percentage of spares for engines and other installed plane equipment is considerably higher. For example, at least one extra jet engine must be built for every one installed in a plane. The spare keeps the jet plane in combat readiness at times when its initial engine is fed back to repair stations for major overhaul.

This essential element in building and maintaining air power adds considerably to the cost of planes—but is considered the most economical way of keeping the maximum number of military aircraft in fighting condition over a long period of time. During recent Senate hearings on the 1953 Defense Department appropriations, the Air Force estimated that for every dollar spent to buy aircraft, 60 cents was used to purchase spares.

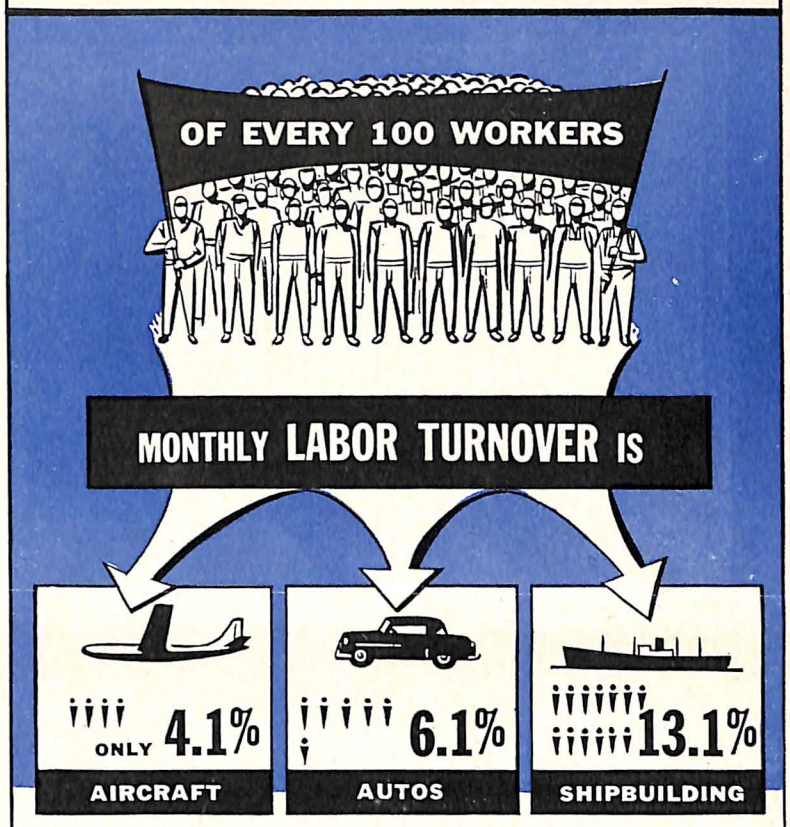
Korean War Crisis

In 1950, the industry's task of supplying the military with plane spares became herculean almost overnight. Most of the planes first sent into action in Korea were World War II types, no longer in production. To build spares for these planes meant that old tooling had to be set up again—and space allocated in plants already strained by the demands for production of new aircraft.

In 50 days, orders for spares for these World War II planes at one West Coast plant jumped from $500 thousand to $23 million.

The crisis in the battle of spares for Korea has largely passed, even though the fight continues However, the industry is continuing intensive work to prolong the service life of planes and engines, thus reducing the number of spares required.

WORKERS STAY ON AIRCRAFT JOBS



The aircraft industry's labor turnover rate is below that of other key defense industries. This is true despite tremendous rate of hiring, production schedule revisions and necessity of large-scale training programs. In fact, labor turnover in the aircraft industry today is below that of World War II when Government restrictions limited turnover on defense jobs.

"PLANES" SOURCE: BUREAU OF LABOR STATISTICS

PLANES QUIZ

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

1. U.S.-built transport planes have long outnumbered foreign types on the world's airways. The percentage of American-manufactured airliners in today's world fleet is: (a) 75%; (b) 80%; (c) 60%?

2. The first trans-ocean helicopter flight—Iceland to Scotland—was made by two USAF helicopters on July 31. The flight set a new overseas distance record for rotorplanes of: (a) 703.6 miles; (b) 815 miles; (c) 920 miles?
3. The average cost of fighter planes has increased 10 times during the past two decades. The cost of modern bombers (average) is: (a) 17 times; (b) 10 times; (c) 15 times, as high as their counterparts 20 years ago?
4. Cost-reduction efforts of a West Coast manufacturer have enabled production of an ordinary steel fitting for aircraft hydraulic systems at a price of only 60c apiece. Yet this single fitting requires: (a) 10; (b) 35; (c) 60, quality and dimension checks?
5. Which of the U.S. military services buy and operate aircraft?
6. An aircraft bombing system is one of countless intricate devices that makes modern military planes complex. For example, the wiring alone in a typical bombing system would stretch from New York City to Washington, D. C. True or false?
7. Manpower experts estimate that the aircraft industry payroll will swell to 875,000 in the next 17 months with the hiring of approximately 235,000 more U.S. workers for warplane production. True or false?

8. The big role of "small business" in building America's air power shows up in the subcontracting program of a major supplier of plane electronic equipment. About (a) 60%; (b) 95%; (c) 85% of this manufacturer's subcontractors are small businesses?
9. During 1944, when aircraft production hit its all-time peak, the aircraft industry was turning out a plane every five minutes. True or false?
10. Recently, 58 USAF jet fighters took off in Georgia and flew to Tokyo—over 7,000 miles—with only seven stops en route. The long hops over water—2,400 miles in one instance—were possible by in-flight refueling—first demonstrated in October of the year: (a) 1918; (b) 1936; (c) 1948?

Engineers Studying Properties of Glass For Aircraft Skins

With many components in late-model jets already fabricated from glass fiber laminate, a supersonic airplane having all-glass skin is under serious study by aircraft engineers.

Searing temperatures caused by friction of air passing over a plane at ultra-high speeds break down mechanical properties of present metals. Aircraft engineers are investigating the ability of glass to withstand such extreme heat.

A leading engineer, head of materials and process engineering for a West Coast aircraft company, envisions a future plane with glass wings, ailerons, stabilizers and fuselage, put together with glass rivets and supported by lightweight titanium and stainless steel structures.

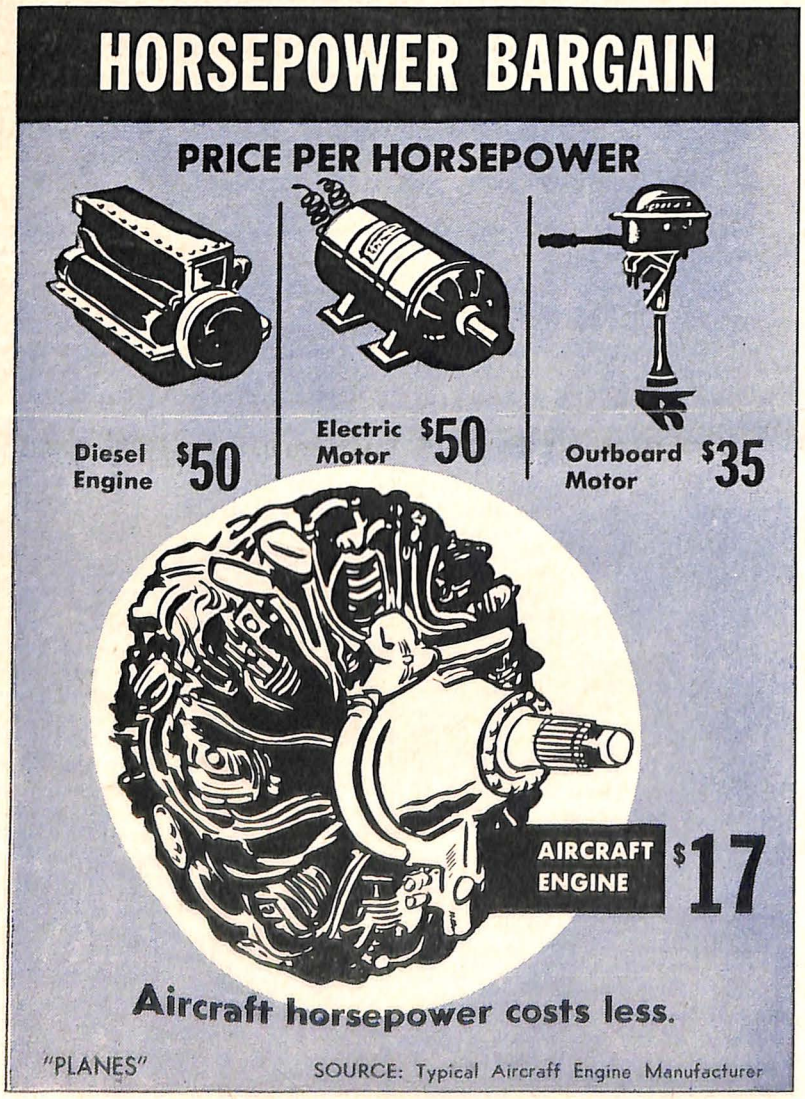
This future model, he says, would be powered by an engine capable of propelling the plane at more than 2,000 m.p.h.

ARDC Booklet

The Air Research and Development Command recently published a booklet describing ARDC's organization, functions and proper lines of contact between the various divisions and laboratories. Copies may be obtained by writing the Director of Procurement, Contractors' Relations Office, Headquarters, ARDC, Baltimore 3, Md.

PLANE FACTS

- To build a jet engine in 1947 required 5,250 tools; to build the much more powerful jet engines of today requires 20,000 tools!
- In a modern jet bombers' wing alone, there are nearly 6,000 bolt holes which must be accurate within one- to two-thousandths of an inch—or less than the thickness of a human hair.
- A typical engine manufacturer's base labor rate increased 250 per cent from 1941 to 1951.
- The wings of a late-model plane must have 35 hatches through which mechanics and inspectors can check the intricate machinery housed inside.
- The tremendous advances being made in jet engine performance and frequency of design changes by the military resulted in 2,100 engineering changes between the first and nineteenth new jet engines produced by a major U. S. manufacturer.
- Aerodynamic forces exerted on a supersonic fighter are so great that the plane's power control system must be capable of exerting 100 times more pressure on the control stick than can an average pilot.



Airlines Spokesman Forecasts Vast Air Traffic Increase In Next Eight Years

(*Continued from page* 1)

available. We are assuming that the U.S. aircraft industry will continue to furnish, on schedule, the late-model, high-performance conventional transports now on order There are presently on order 287 planes of this type, which will have a value of more than $250 million.

With airline fleets augmented by these new planes, air transportation should continue to obtain a sharply increasing share of domestic common carrier travel. In 1960, we believe the domestic air carriers alone will transport some 41,250,000 passengers—82% more than last year. It is expected the average passenger trip will increase from about 467 miles in 1951 to some 480 miles in 1960.

There should be an accompanying increase in the amount of cargo carried by the scheduled airlines, resulting in a requirement for more cargo capacity. At the present time, eight all-cargo aircraft are on order by U.S. airlines and are scheduled for delivery by the end of 1953. Greater use certainly can be expected from this type of aircraft because cargo capacity on combination-type planes will become more limited as other classes of traffic increase. It appears probable today that domestic carriers alone, in 1960, will fly some 370,585,000 cargo ton miles (including both air express and air freight), as additional commodity items capable of sustained shipment by air are developed.

In the international and overseas field, U.S. flag scheduled air carriers should, by 1960, greatly benefit from the advent of the jet, which probably will take an increasing portion of the steamship market, especially for transatlantic traffic. At the present time, the airlines are carrying approximately 35% of transatlantic traffic. This could rise to 70% or 80% by 1960.

In that year, the U.S. international and overseas scheduled airlines probably will carry some 4,174,000 passengers aproximately 5,510,000,000 passenger miles In addition, they should fly 28,119,000 mail ton miles and 108,000,000 cargo ton miles. Volume of international airmail, it is believed, will increase at a modest rate through 1960.

These forecasts of air travel increase through this decade are, of course, based on several assumptions. Among them, as mentioned above, is the belief that some jet transports will come into international operation toward the end of 1957 or early 1958 The estimates also assume a continuation of the present rate of acceleration of the national economy under semi-national mobilization, maintenance of the present relative position of current passenger and cargo rates with competitive forms of transportation, and normal population growth.

ESTIMATED RISE IN U.S. SCHEDULED AIRLINE TRAFFIC

Domestic Carriers:	Revenue Passengers	Passenger Miles	Mail Ton Miles	Cargo Ton Miles
1952	26,190,000	12,257,000,000	70,232,000	237,775,000
1955	32,630,000	15,500,000,000	84,278,000	291,000,000
1960	41,250,000	19,800,000,000	99,448,000	370,585,000
International Carriers:				
1952	2,333,000	3,047,000,000	22,629,000	77,673,000
1955	3,003,000	3,934,000,000	24,666,000	89,908,000
1960	4,174,000	5,510,000,000	28,119,000	108,000,000

Answers to Planes Quiz

1. (b).
2. (c).
3. (a).
4. (c).
5. All of them, including the Army, Navy, Marines and Air Force (also Coast Guard).
6. True. The bombing system contains 259 miles of wiring while the airline distance from New York to Washington, D. C. is approximately 215 miles.
7. True.
8. (b).
9. True. The aircraft industry produced 96,318 military planes in 1944.
10. (a). Flight refueling was demonstrated by Lt. Godfrey L. Cabot, USNR, October 3, 1918.

Robot Engineer Cuts Flight Testing Time

An electronic "engineer"—occupying only two cubic feet of space in modern experimental aircraft—is cutting months off the time previously required for testing today's high-speed planes.

During flight tests, the device cascades information from airborne craft at the rate of some 3,000 items of intelligence per second, taking readings from 176 separate points within the plane.

This radioed information goes to engineers at a ground console, where readings are analyzed automatically and additional performance tests directed on the basis of observations made while the plane is still in flight.