Curtiss-Wright

”First In Flight”

Publication

(1949)

The following pages were scanned from a 36 page booklet which was published in 1949 by Curtiss-Wright Corporation to celebrate the 20th, 30th, and 40th anniversaries of the founding of its various primary component companies. It traces the history of the company’s various divisions and highlights its various achievements and contribution to aviation over the years.

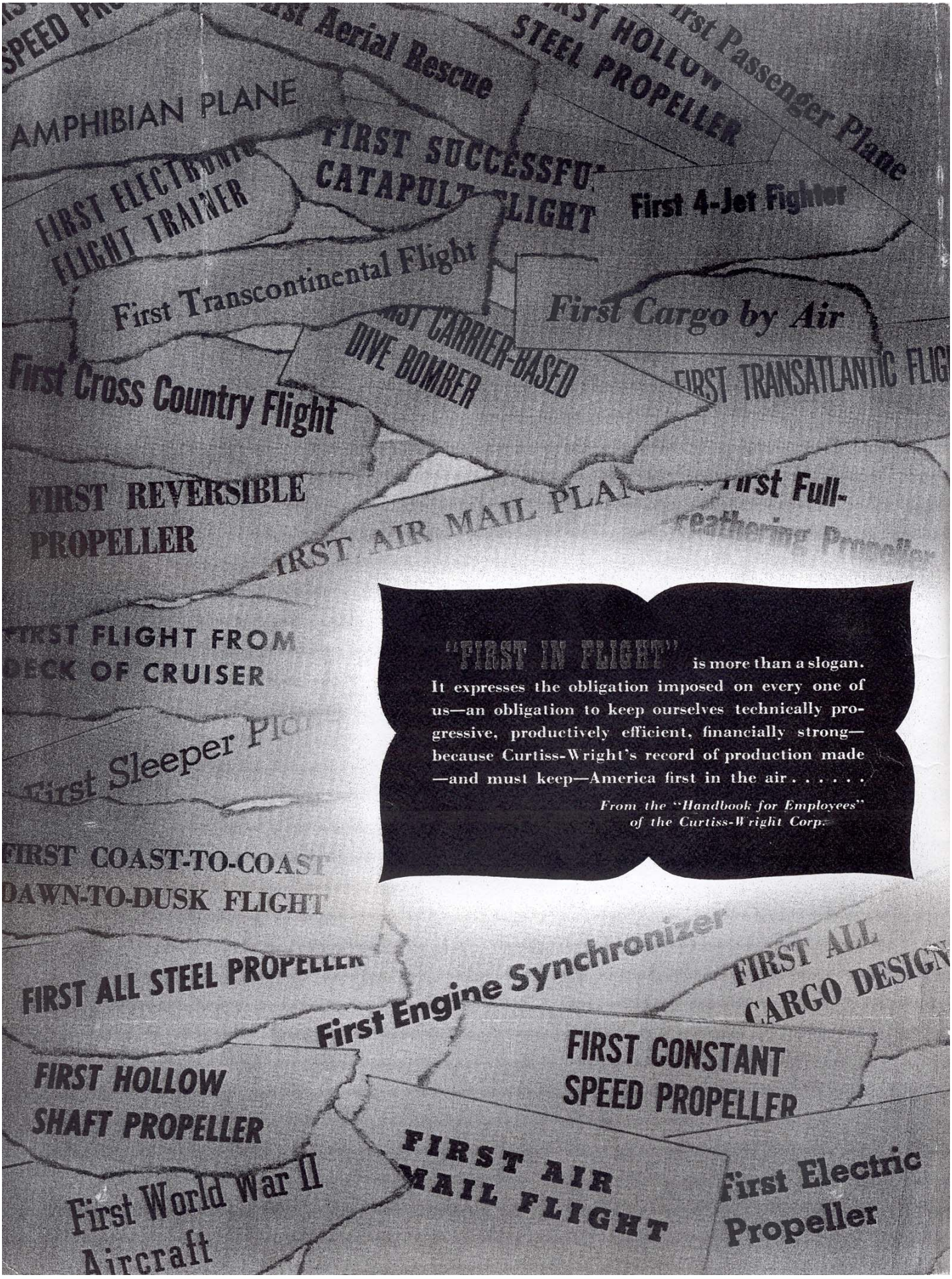
In 1949 Kirt Hine would have been halfway through the 20 years he spent with the company (1939-1959).

I found the publication, which was a Xerox copy of an original, for sale on the internet. As a copy, the quality of the photos in my scans is not as great as it would have been if I’d been able to find an original.

Page 15 (of my document, not the original publication) indicates that “Curtiss-Wright’s Propeller Division is the largest commercial and military propeller producer in the world.” The reverse pitch propeller, perhaps Kirt’s proudest achievement, is mentioned on pages 16, 22, and 33 (of my document).

Ted Hine
February 2010
Louisville, CO


First in Flight
F. V. WALSH
Curtiss Wright



"FIRST IN FLIGHT" is more than a slogan. It expresses the obligation imposed on every one of us—an obligation to keep ourselves technically progressive, productively efficient, financially strong—because Curtiss-Wright's record of production made—and must keep—America first in the air . . . . . .

From the "Handbook for Employees" of the Curtiss-Wright Corp.

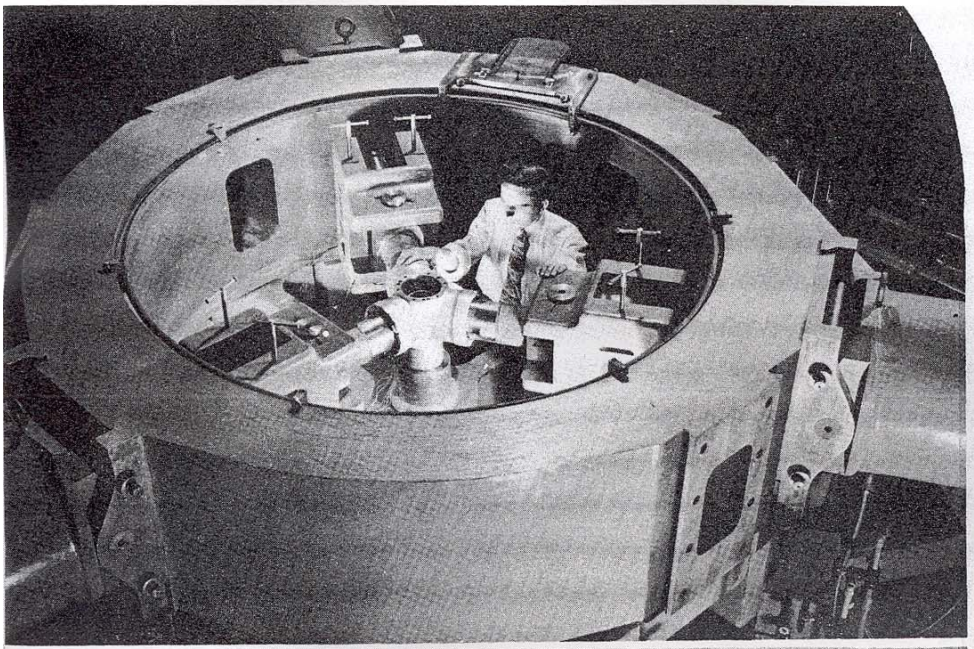
20th Anniversary CURTISS-WRIGHT CORPORATION

30th Anniversary WRIGHT AERONAUTICAL CORPORATION

40th Anniversary CURTISS AIRPLANE COMPANIES

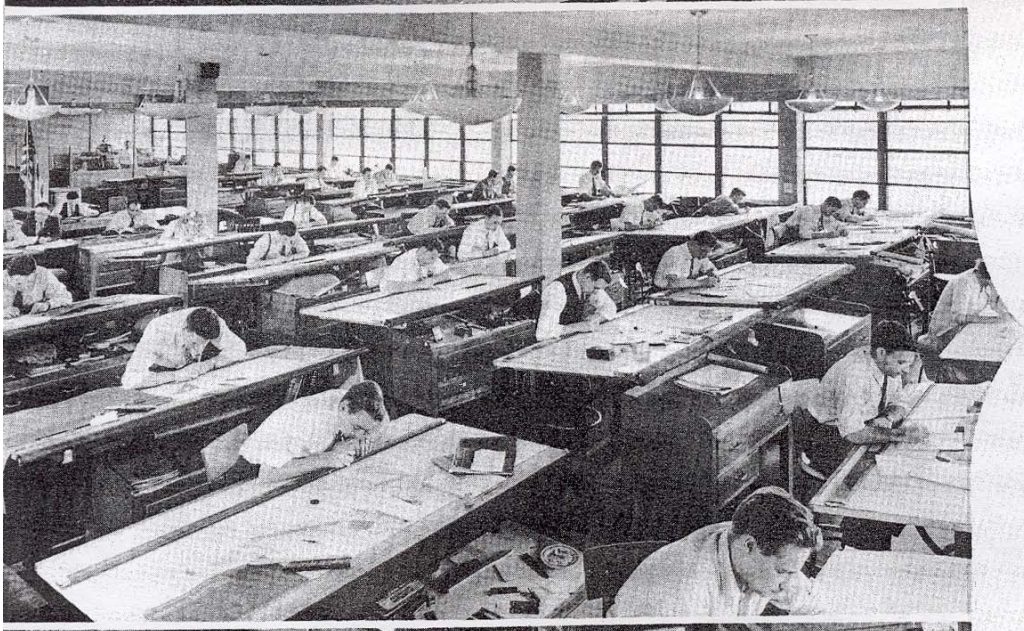
CURTISS ★ WRIGHT CORPORATION

30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.



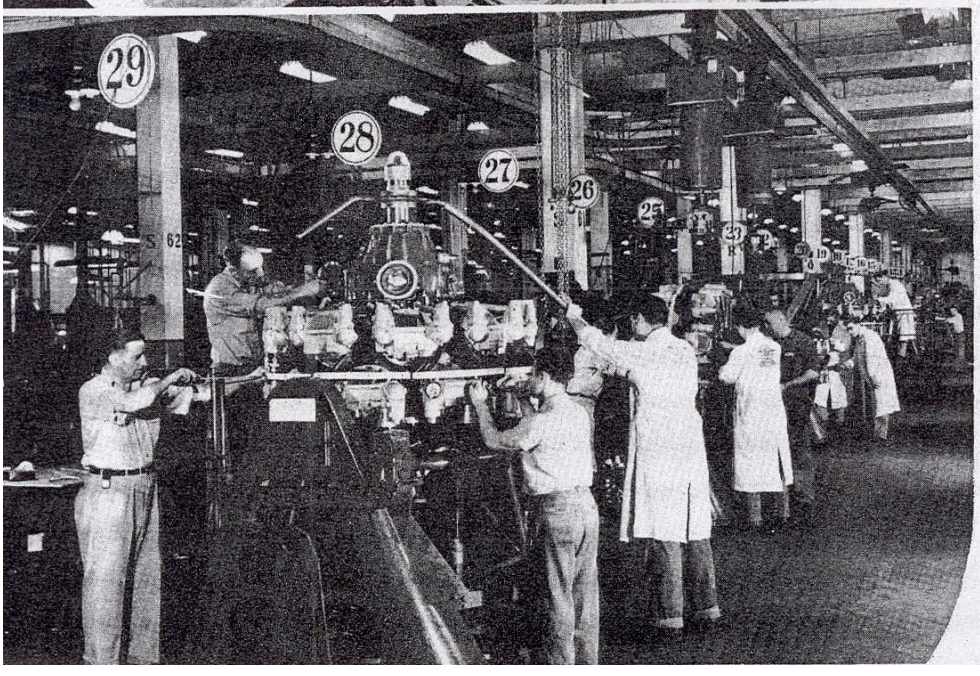
Research

A new propeller assembly under precision tests at a Curtiss-Wright research laboratory. Research, from which will flow the aviation products of the future, is a never-ending job at Curtiss-Wright. Out of doors marked "restricted" today flow the aviation "firsts" of tomorrow.



Design

From the research laboratories to the drafting boards — the second step that will lead to a new era in flight. Here a small army of experts translate the proven ideas into working drawings for the production lines.



Production

Quantity with quality, precision-built engines moving smoothly along a mass production line. This Curtiss-Wright concept strengthened America's air arm in two World Wars. Today, these same techniques are at work, insuring peace through air power.

AN AMERICAN HERITAGE

THE YEAR 1949 marks the twentieth anniversary of the Curtiss-Wright Corporation, the thirtieth of its Wright Aeronautical Corporation and the fortieth of the Curtiss airplane companies.

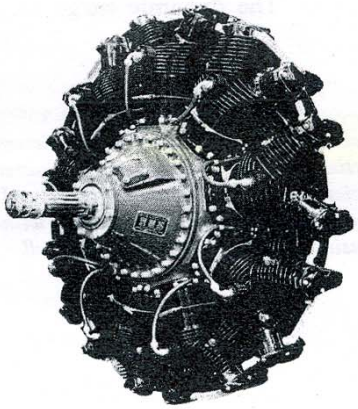
These dates span all but six years in the history of man's conquest of the air. Today, the peace and economic recovery of the world rest upon the advancement of that American heritage—air power. It seems timely, therefore, to report on the contributions Curtiss-Wright has made to bring aviation to its present high stage of development and to record the increasingly important share in our nation's air future entrusted to the engineering-production team with the longest continuity of manufacturing experience in the industry.

Because of its unique position as an integral part of the national defense every American, as a citizen, has a stake in Curtiss-Wright. And Curtiss-Wright is equally proud of this further unique distinction—that one out of every one thousand Americans has a direct stake in Curtiss-Wright either as stockholder or employee. It is particularly appropriate, therefore, to address this report to the American people.

This booklet has been designed to describe in a brief way, the important part this organization has had in the advancement of modern aviation, the distinguished contribution it made to victory in two world wars, what it is producing today and what it is planning for the future.

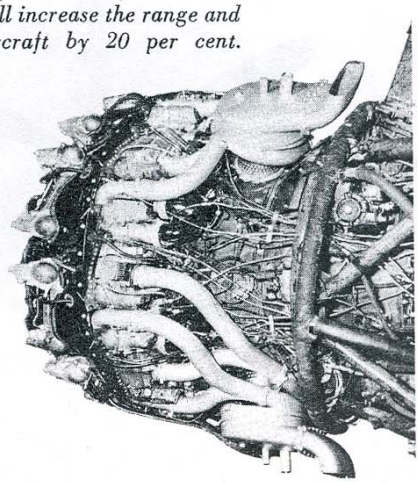
The story of Curtiss-Wright is the history of American aviation. It began on the wind-swept dunes of Kitty Hawk in 1903. The founders of the first Wright company built the engine and the airplane which enabled man, for the first time, to propel himself through the air in a heavier-than-air machine. They built the first airplane for the United States Army. The Curtiss company designed and built the first airplane for the United States Navy.

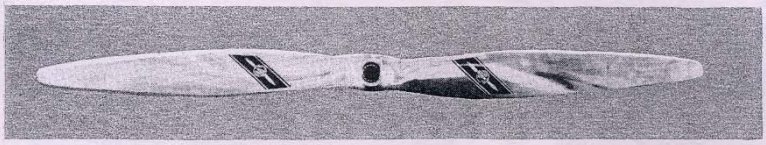
The Wright Whirlwind engine launched the "Air Age."



The Wright Cyclone powers today's airliners and military planes.

The new Wright Turbo-Cyclone "18" Compound will increase the range and power of aircraft by 20 per cent.



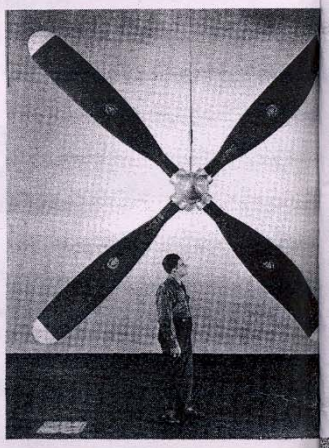


An early Curtiss single-piece propeller forged from aluminum alloy.

Step by step, from this humble start, the advancement of modern aviation has been paced by the pioneering of those who have carried on in the names of Curtiss and of Wright.

The end of World War II signalled the end of an era in aviation. The promise of atomic power, the emergence of jet and rocket propulsion, the application of electronics to control of flight, the changing shape of metals and materials were already outlining the greatly expanded field of future flight that lay within reach of these new scientific advances.

Dynamic Progress Ahead



Curtiss-Wright electric, four-bladed hollow steel propeller used on heavy bombers and big transport planes.

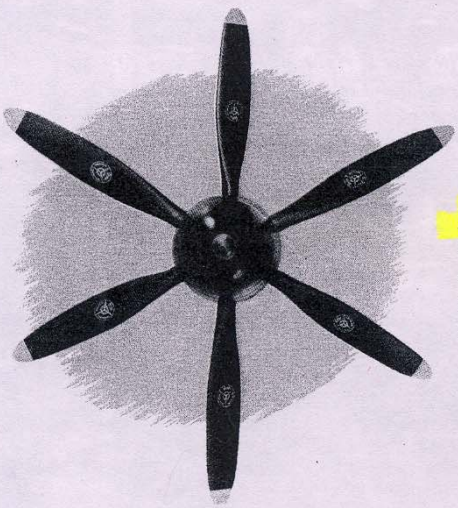
In the next ten years development of these new power sources can advance both the form and effect of aviation farther than any progress we have achieved in nearly a half century's development to date. This is the challenge the aviation industry faces today.

How is this challenge being met by Curtiss-Wright?

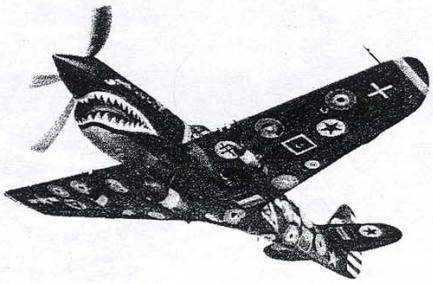
One answer is evidenced by the projects moving from the company's research laboratories to today's production lines.

But success in aviation cannot be measured solely in terms of technical achievement. Aviation manufacturing, peculiarly dependent upon government policy and procurement programs, has been an industry of peaks of prosperity and valleys of depression. That Curtiss-Wright has carried through two world wars and two post-war periods of major adjustment is a business record to be proud of. From the depth of the depression Curtiss-Wright has gone steadily forward. It has increased its net worth from $24,500,000 in 1932, to more than $110,000,000 today. It has paid to stockholders $78,000,000 in cash dividends. It has accumulated working capital adequate to meet today's higher financial requirements which enables the company to engage in the profitable development of essential aviation projects which others, lacking such necessary capital, may not be able to carry forward.

The dynamic surge of aviation today calls for a new



Dual-rotation propellers were pioneered by Curtiss-Wright. Designed to increase the efficiency of high altitude, high speed planes, they utilize more horsepower without increasing the diameter of the propeller.



The 15,000th Curtiss P-40 fighter, with the insignia of the 28 nations which used it during World War II.

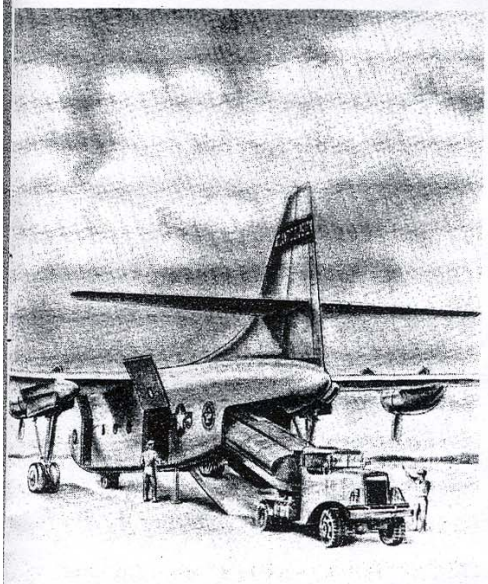
approach, new concepts and the new application of proven ideas in many different fields.

At the top of Curtiss-Wright's management team is the Executive Committee headed by Paul V. Shields as Chairman and composed of recognized business leaders with broad experience in financial and management affairs.

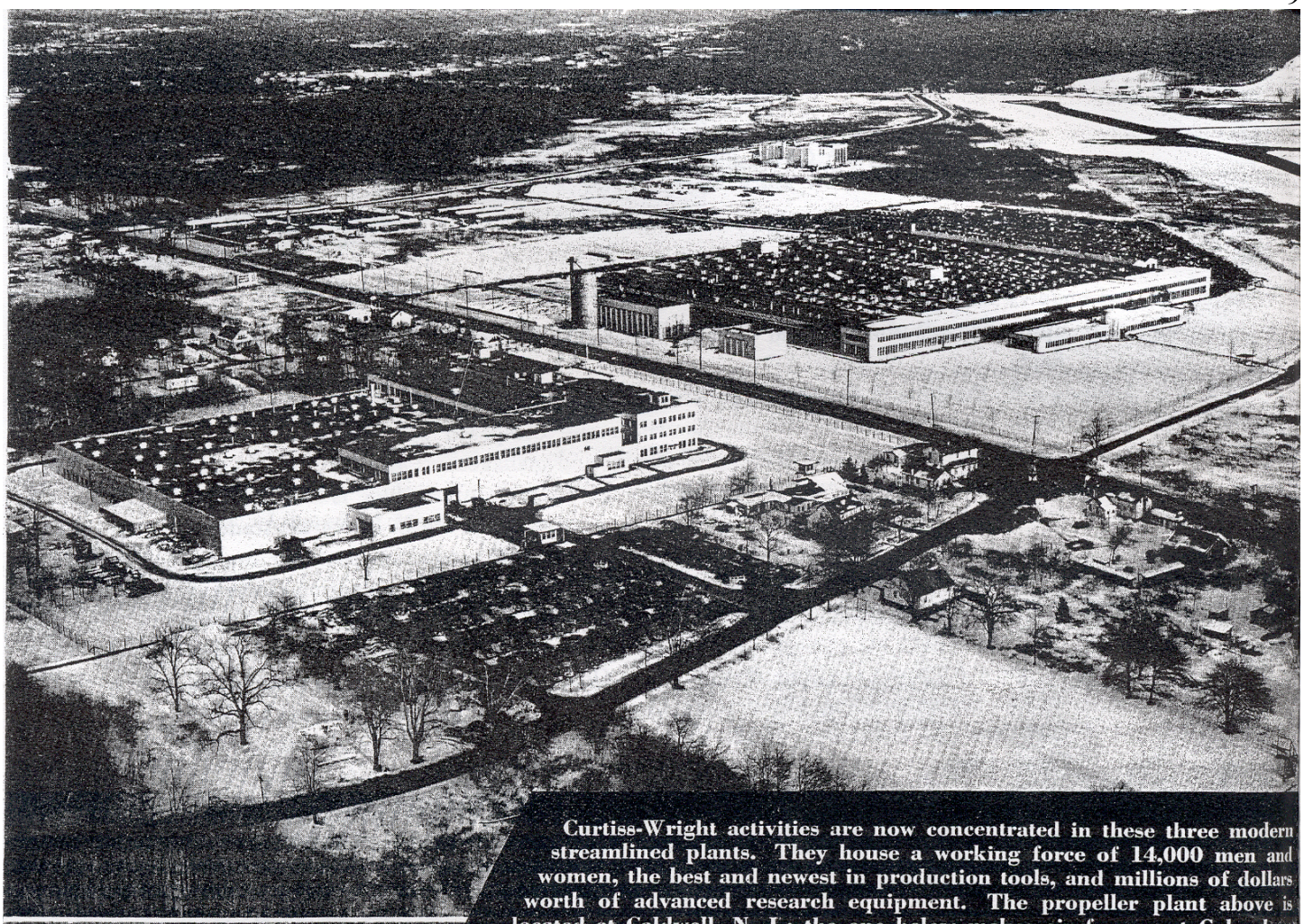
Executing the program formulated by the Executive Committee is the operating team led by William C. Jordan, President. A graduate of the U. S. Naval Academy at Annapolis, he has been filling top management and production posts for twenty-five years. As production executive of the Steel Products Engineering Company for more than fifteen years, he has been closely associated with the aircraft industry and the military air services. A year ago he took over the management of Curtiss-Wright's Airplane Division at Columbus, Ohio, and was later transferred to the Wright engine-building Division as General Manager and was elected a Vice President. In December, 1948, he was elected President of the Curtiss-Wright Corporation.

The operating team is streamlined for production and sales, and is supported by tried and able engineers, top flight research technicians and experienced production executives. This latter group is constantly being strengthened by the addition of executives of proven abilities and broad experience capable of planning and carrying out the broad-visioned programs for the future.

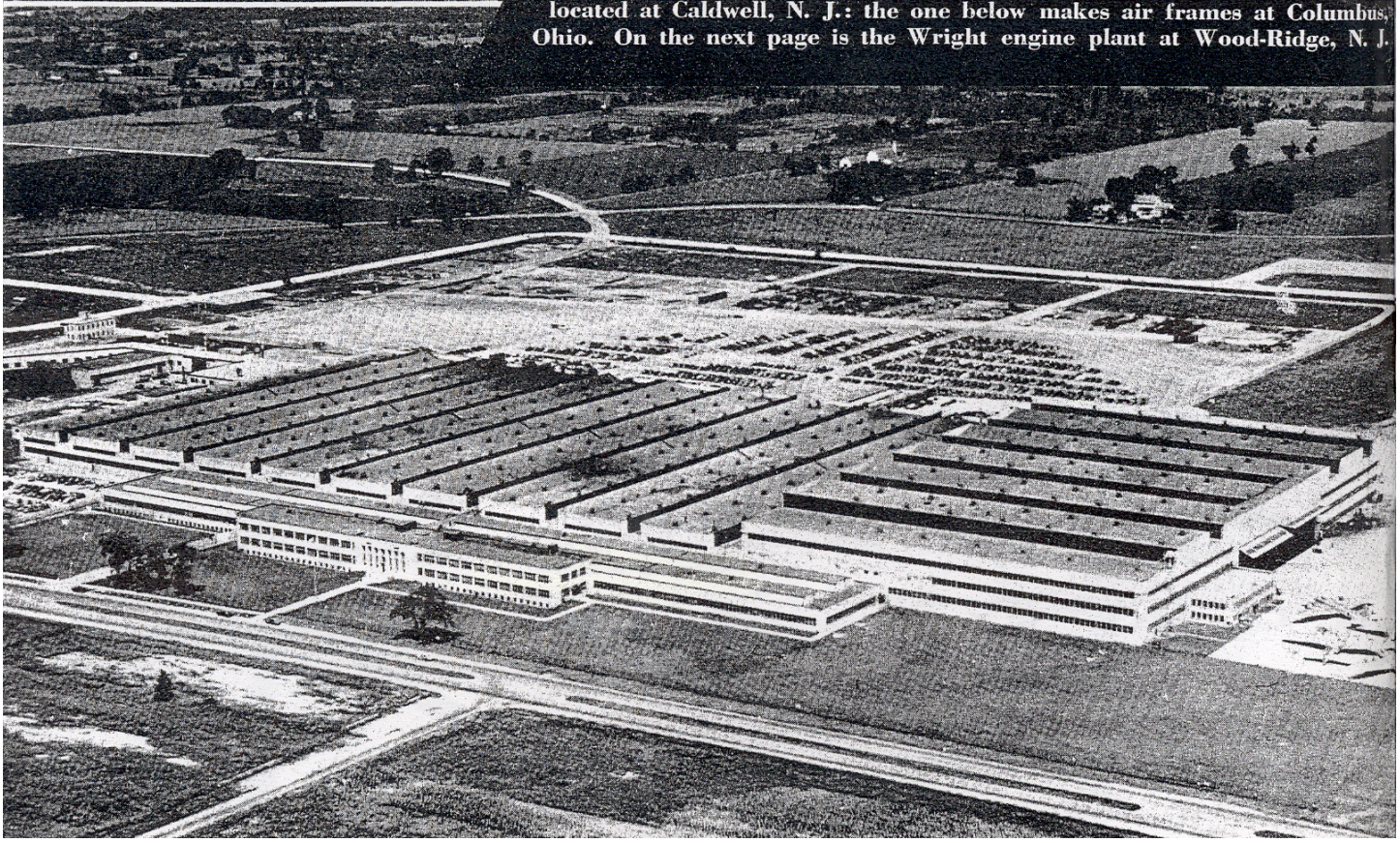
To them has been entrusted the priceless heritage of Curtiss and of Wright. The record of those who have carried on in these names is a tribute to the faith and courage, to the talents and abilities, of thousands of loyal Americans. Many of them have given more than twenty-five years, some their lives, in devotion to the cause. How ably they have preserved the priceless heritage bequeathed to America by those great pioneers can be read in the skies today with confidence that the names of Curtiss and of Wright in the future, as in the past, will mean "first in flight", America first in the air.



The Curtiss-Wright "Sky Truck" — the first plane specifically designed for carrying cargo.



Curtiss-Wright activities are now concentrated in these three modern streamlined plants. They house a working force of 14,000 men and women, the best and newest in production tools, and millions of dollars worth of advanced research equipment. The propeller plant above is located at Caldwell, N. J.: the one below makes air frames at Columbus, Ohio. On the next page is the Wright engine plant at Wood-Ridge, N. J.



CURTISS-WRIGHT *Today*

TODAY, the aviation business is a baby giant. Just forty-six years old, it has grown with incredible speed from the three-man Wright bicycle shop to a billion dollar industry employing hundreds of thousands of men and women in its varied branches.

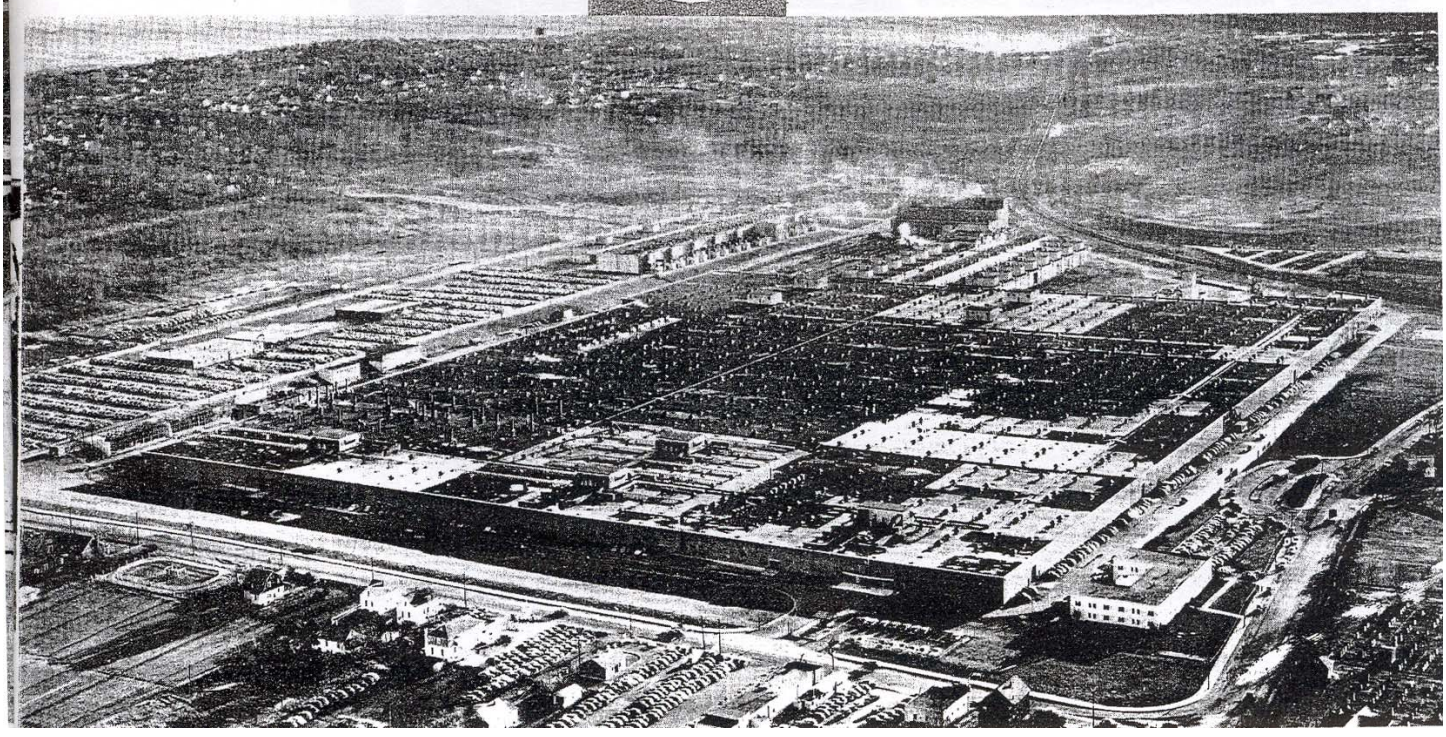
This size and speed require an iron control. Today's airplane is like a delicate Swiss watch hurled through the air at a faster speed than sound. Its engine must produce more power than the biggest locomotive while weighing less than a pound per horsepower.

Its air frame must be light yet tough and strong enough to fly at incredible speeds carrying men and cargo. Its propeller blades, three times the height of a man, must be so delicately made that a woman's handkerchief could throw them out of balance.

Modern plants of vast complexity are needed to produce these masterpieces of engineering. Production lines, capable of transforming a rough casting into an engine part measured to one ten thousandth of an inch accuracy, are required. More than one hundred thousand tests and inspections are made on a single engine, calling for delicate instruments and skilled personnel. The coordination of an untold variety of projects and materials is a daily task in aviation.

Moreover, if the peaceful tenor of American life is to be maintained, the aviation industry must shoulder the heavy responsibility of producing these aircraft in quantity, and must produce them first.

Today, Curtiss-Wright is eminently qualified to play its part. Its three modern plants and 14,000 employees are specialized for the



continuous production of the three aviation musts—engines, propellers and air frames.

The Airplane Division's 2,500 employees in the new Columbus, Ohio plant, leased from the United States Navy, are now producing the tremendously fast, jet propelled, radio controlled target plane.

It is continuously busy with the overhaul of war-weary Army and Navy transport planes. It has just produced 10,000 droppable fuel tanks for the Armed Forces and is producing more. It has cracked the engineering problems and completed design on the Sky Truck of the future, a giant cargo plane.

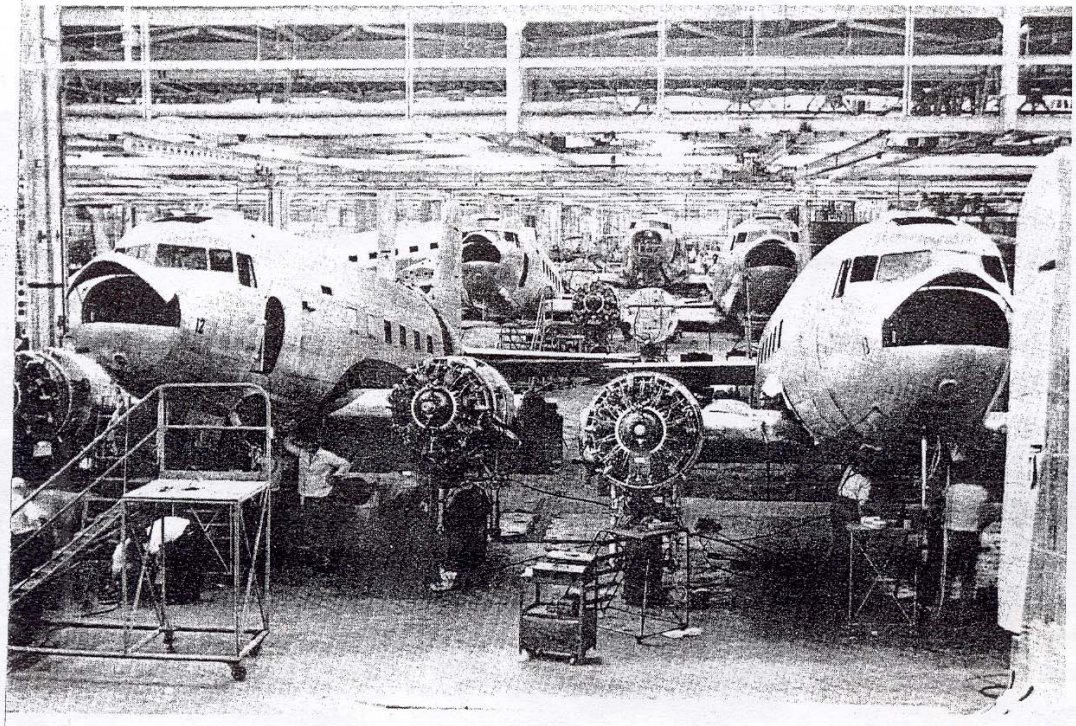
The Propeller Division at Caldwell, N. J., is now turning out half the total quantity of propellers that industry is building to meet military and commercial requirements. Its more than 3,000 employees are at work with the most modern equipment in the largest plant of its type in America. They are now producing in quantity an outstanding Curtiss-Wright "first"—the reversible pitch propeller. The United States Navy has just doubled its orders for this division's revolutionary development in pilot training on the ground—the Electronic Flight Simulator.

The Engine Division at Wood-Ridge, N. J., another streamlined modern plant, has more than 7,500 highly skilled employees at work on the production of seven cylinder, nine cylinder and eighteen cylinder Cyclone engines for both military and commercial use. They are manufacturing component parts for a turbo-jet engine and are flight testing a recently developed model of the Wright T-35 "Typhoon," a turbo-prop engine.

This division's most recent, publicly announced engineering achievement is the Turbo-Cyclone 18 "compound" engine, a new type of power plant that is adding 20 per cent to the efficiency of today's airplane engines.

Supplementing these planes, engines and propellers now in actual production are the widespread and expanding research facilities located at each of the Curtiss-Wright plants. They are producing too, but in a different way. The fruits of their design and inventive genius will come out of the test cells and into the air tomorrow.

This is the Curtiss-Wright giant.



Heavy transport-type planes are now being completely overhauled for the Navy at Curtiss-Wright's big plant in Columbus, Ohio. These overhaul operations, which require 15,000 man-hours a plane, call for a complete take-down, reassembly and retest of the airplane.

BRIDGE TO THE FUTURE

CURTISS-WRIGHT'S financial position has been improved steadily since the early 1930's. This is an unusual record in an industry that has generally been characterized by severe peaks and valleys of business activity.

It is an excellent illustration of the necessity for sound and experienced financial management in aviation. V-J Day, it will be remembered, was to launch the new Air Age. The industry's optimism was almost overpowering, as was the public's. Private planes, mass produced like cars, were to swarm across the skies. Airfields were to blossom outside each village in the land.

The expected boom didn't materialize. Many new companies were forced out of business. An over-expanded industry watched idle plants eat into its reserves. Many companies showed, and are still showing, red figures on their books, with a resultant weakening of their financial positions.

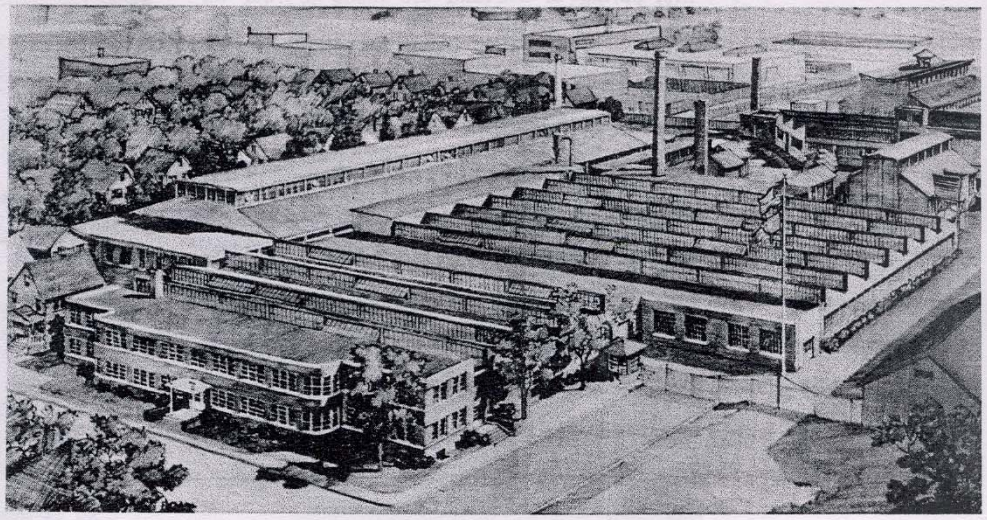
To the veteran Curtiss-Wright team this over-optimism was not surprising, for it had been through this kind of thing before.

Instead of expanding, Curtiss-Wright consolidated its position and built for the future. Nineteen scattered plants were cut to three compact, modern plants, of which one is leased, each designed to contribute its vital part—engines, propellers or air frames. An army of more than 180,000 war-trained employees was reduced to the approximately 14,000 highly skilled and experienced men and women who make up the production team of Curtiss-Wright today.

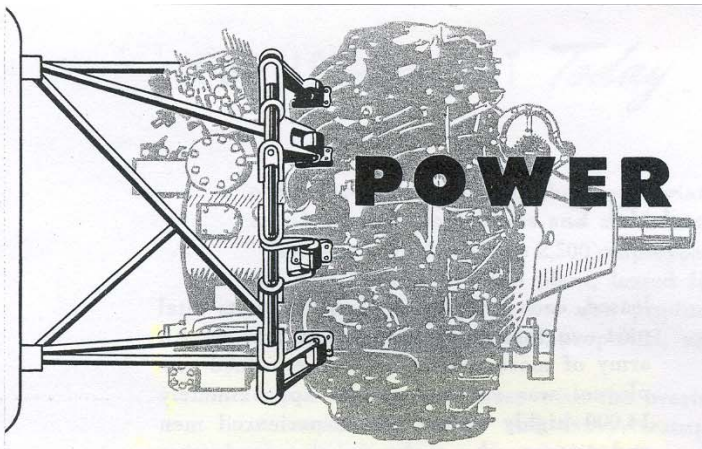
Included in today's pattern of the Curtiss-Wright organization are three subsidiaries, not in the aviation industry. All three were going concerns when acquired by the company. They are the Victor Animatograph Corporation, Marquette Metal Products Company and L.G.S. Spring Clutch Corporation.

Victor, founded in 1923, manufactures 16 millimeter motion picture cameras and projectors. Marquette manufactures textile spindles, fuel injectors and governors for diesel engines, electric and hydraulic windshield wipers for the automobile and airplane industries. L.G.S. is the maker of a versatile clutch that has many industrial uses.

Almost alone in the aviation industry today, Curtiss-Wright is prepared with adequate working capital to meet the higher production costs of the present and to contribute to developments that will produce "firsts" in the forms of the future.



The Marquette Metal Products Company, Cleveland, Ohio, is one of three Curtiss-Wright non-aviation subsidiaries. Its products include textile spindles, fuel injectors for diesels, and windshield wipers. Other subsidiaries are Victor Animatograph Company and L. G. S. Spring Clutch Corp.



POWER

ENGINE DEVELOPMENT has paced the progress of aviation throughout its history. The name "Wright" is synonomous with power in the air. From the home-made engine built in the Wright bicycle shop, through four decades of flight, the reciprocating engine has been the master of the skies.

The Wright Whirlwind was the engine of the Twenties, taking Lindbergh across the Atlantic and Byrd across the Poles. The Wright Cyclone set the pattern of commercial flying in the Thirties, being used in the Douglas DC-2's and 3's. It was the great transport and bomber engine of the war.

If war broke out tomorrow the greatly advanced Cyclone 18 of today would once more do its part in powering America's air forces over the battle areas of the world.

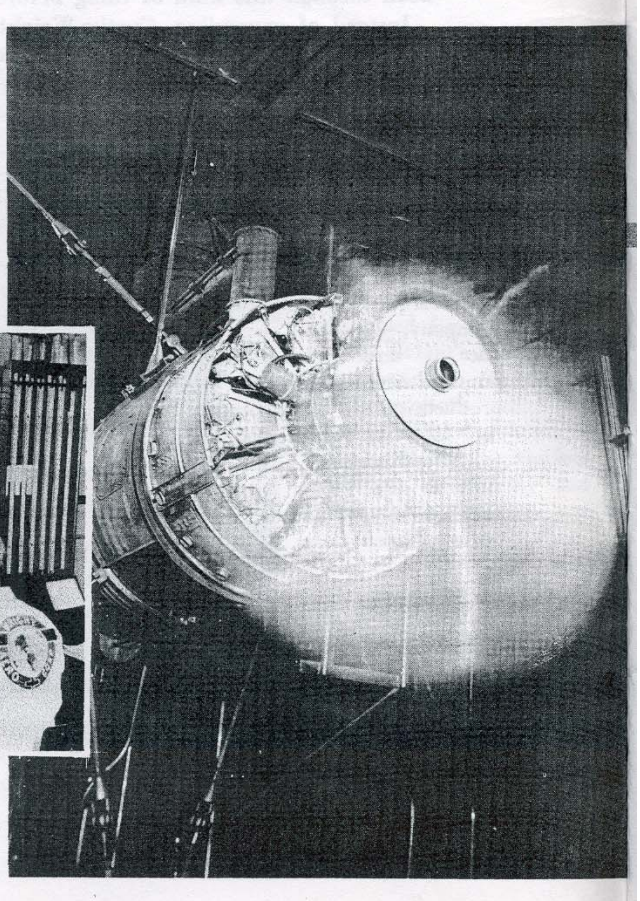
Today, this same engine is the power plant on over 30 leading airlines of the world. Four of these 2,500 horsepower giants power the 60 passenger, 51 ton Constellation, pulling it with the power equivalent of over 100 automobiles. It is an outstanding commercial and military heavy-duty engine of today.

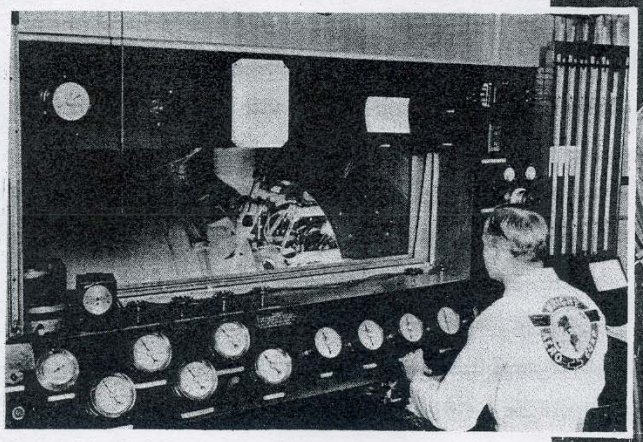
CYCLONE IS BASIC

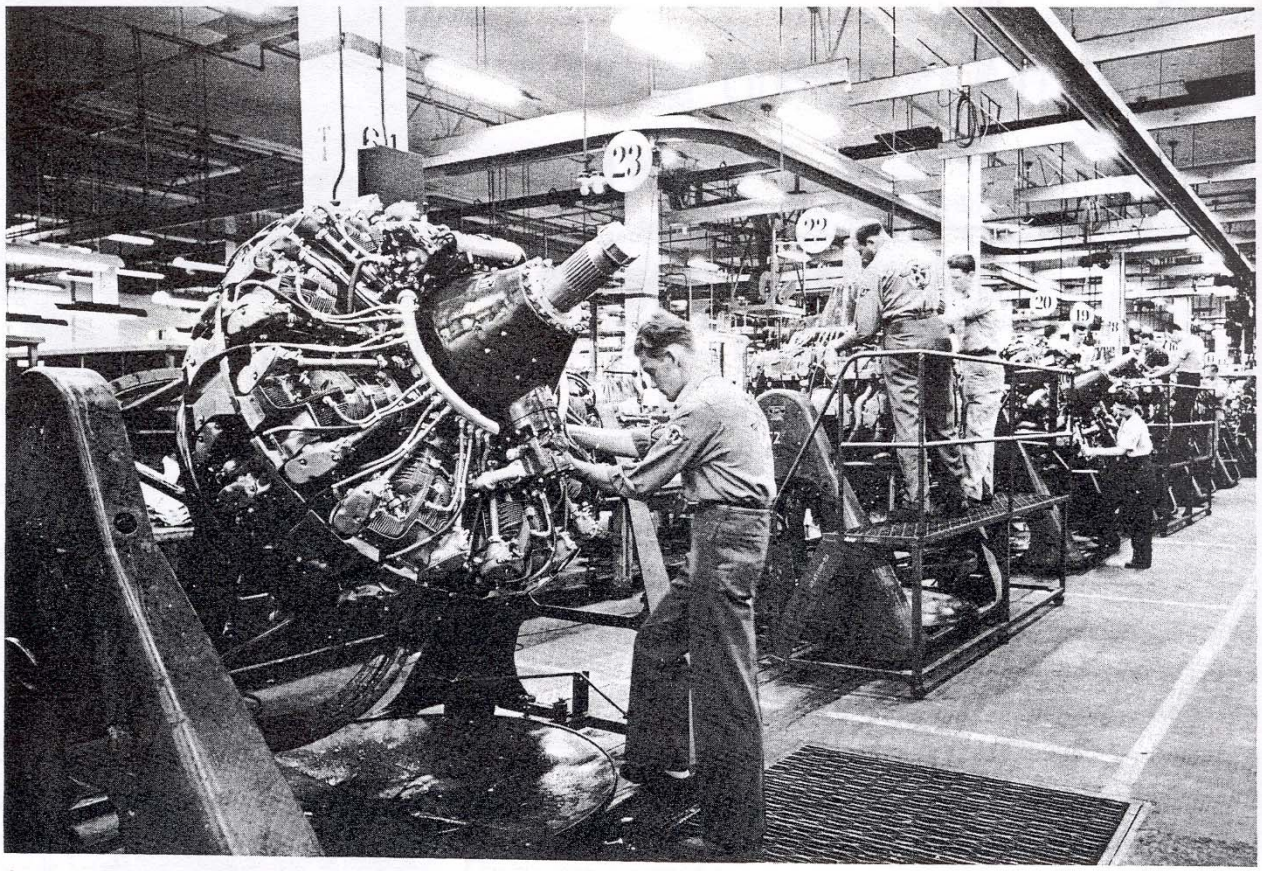
Propulsion of aircraft is now entering a new era. New forms of power are on the Curtiss-Wright drafting boards and in the testing laboratories. But only last year General Carl Spaatz, in his official report as retiring Chief of Staff of the Air Force, pointed to the great need for continued development of today's standard power plants and propellers. Despite the advances in new forms, his report said, the reciprocating engine remains the most economical form of aircraft propulsion and will be the basic form for heavy planes and trainers for some time to come.

He was referring to military aircraft, but his sound analysis also applies to commercial craft. Airliners and transports are now flying at speeds ranging from 250 to 350 miles an

In the test cells, (right) engines and propellers first spring to life and are made to roar on for hour after hour, night and day. Skilled technicians, (below) check and recheck performance on these intricate panels of instruments.







On moving assembly lines Wright produces engines that power planes used in every country on the globe—except Russia.

hour. Another 200 miles an hour and several more years of development are required before the reciprocating Cyclone joins other Curtiss-Wright "firsts" in the Smithsonian Hall of Fame. When it does, other Wright engines now in test stage, will be powering supersonic flight.

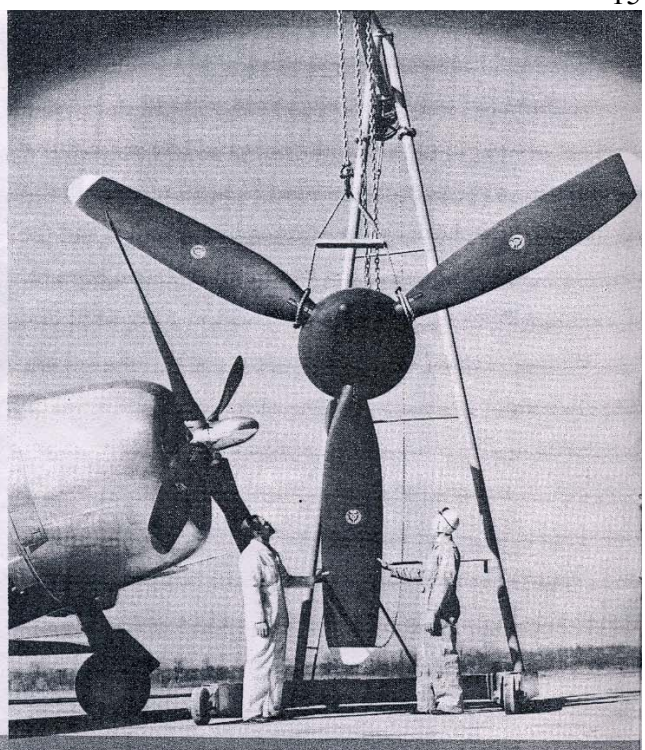
As if to prove the point, Wright Aeronautical recently brought out the Wright Turbo-Cyclone "compound" engine. Its engineers were dissatisfied with their progress over the past decade—increasing engine efficiency by 100 horsepower a year. So they produced the "compound" engine, which increases the range and power of an aircraft 20 per cent, 500 horsepower in a single step.

It combines the Cyclone with one of the new forms—a turbine. These turbines, which work on the principle of the water-wheel, pick up exhaust gases that used to be wasted and spin them into more power for the plane. This is no drawing board dream or laboratory test—it is currently in production. The Navy has recently awarded the company a $32,000,000 contract, a substantial portion of which was for this power plant.

The Engine Division is also manufacturing component parts for turbo-jet engines and is flight testing an experimental model of a turbo-prop—new forms of the future. It is engaged in such continuing operations as engine overhaul for airlines (an engine must be completely taken down, reassembled and re-tested after approximately every 1,000 hours of operation), and making spare parts for Wright engines already in service.

Meanwhile the engineering development and research team is working away at the future. Because Curtiss-Wright alone was in a position to mass-produce bomber engines for war, they had to stop their transport engine production and concentrate on the output of military type engines from Pearl Harbor to V-J Day. Now they are at work again behind doors marked "Restricted—Keep Out".

POWER IN HARNESS

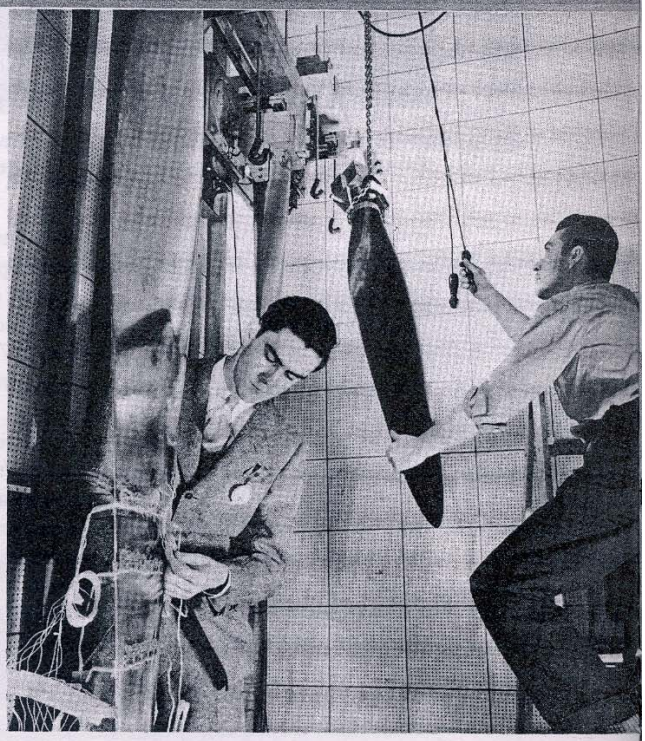


These gigantic Curtiss-Wright propellers are the biggest in the world, propelling the U. S. Air Force's biggest bomber — the B-36. Their diameter is 19 feet.

A POWERFUL ENGINE without the means to apply its power usefully is like a whirlwind. Much energy is released but no useful work is done. That's why the Wright brothers, before they could think of powered flight, were forced to make a crude propeller of wood and glue and test it in the world's first air tunnel, built from old wooden crates.

Curtiss-Wright's Propeller Division is the largest commercial and military propeller producer in the world. It is continuously producing three and four-bladed hollow steel propellers for the military services as well as for the latest commercial transports such as the Boeing Stratocruiser, the Convair 240, the Douglas DC-6 and the Lockheed Constellation. The 19-foot hollow steel propeller for the Air Force's six-engined Consolidated B-36 super-bomber is the largest aircraft propeller in production in the world and is exclusively manufactured by Curtiss-Wright. This division recently received an additional $15,600,000 contract to supply propellers for the Boeing B-50 giant bomber.

It is now producing two revolutionary



Propellers must absorb, without strain, the force of the world's most powerful engines. The technician (left) is conducting a test which will record the propeller's vibration.

"firsts" in the control of flight. Both point to entirely new directions in aviation's future. Propellers have always been thought of as a means of advancing a plane in its flight. The new reversible pitch propeller now being produced at the company's Caldwell plant is designed to act as a brake as well. The importance of this development to aviation safety can hardly be over-estimated.

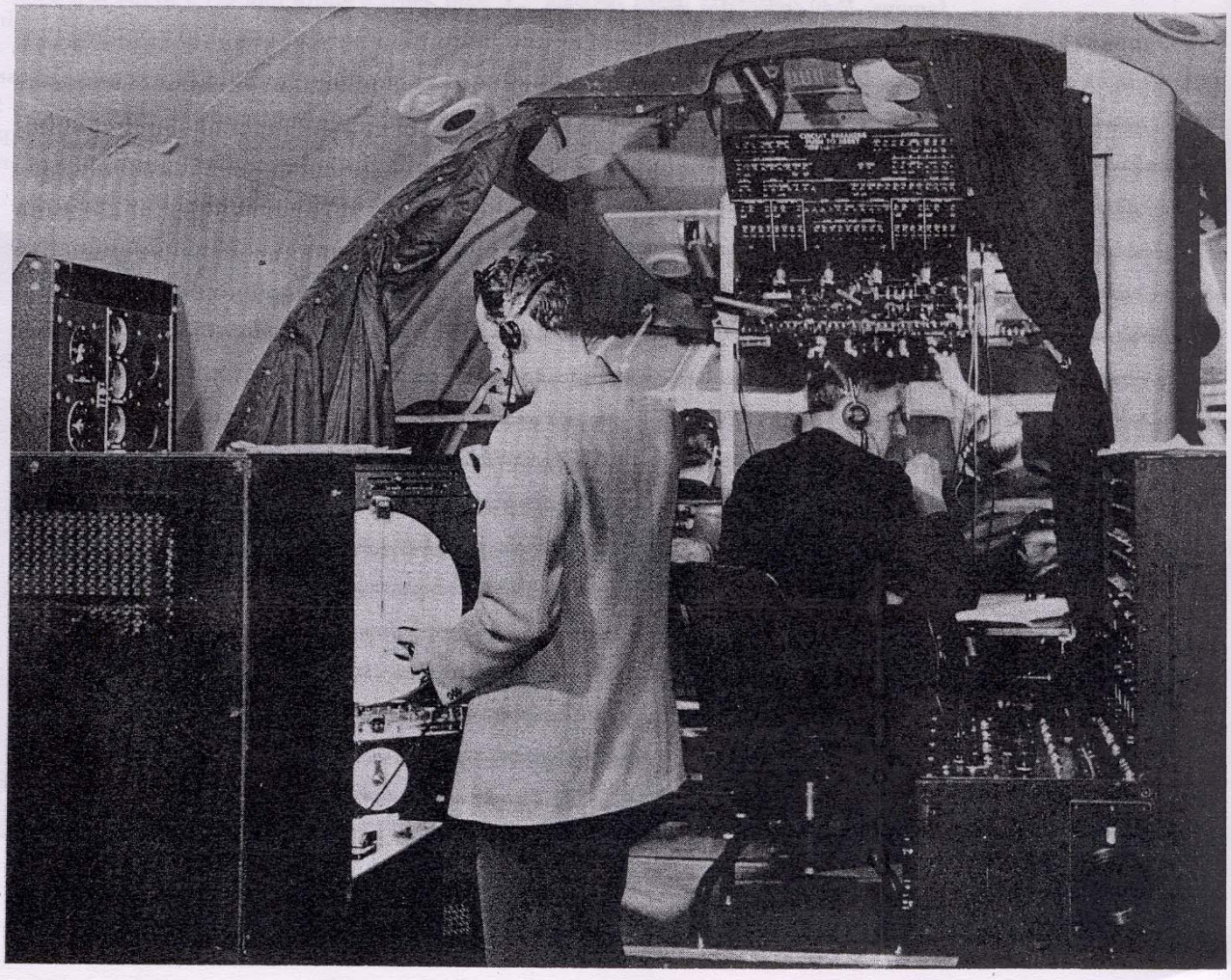
Flight "On Ground"

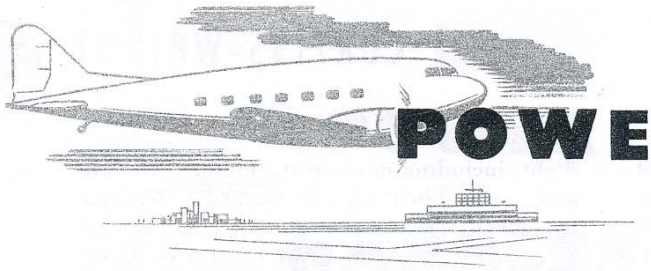
The second development is the recently completed Electronic Flight Simulator, a remarkable engineering device that may easily revolutionize flight training. The Simulator is a major new application of electronics to the field of aviation.

It resembles in every detail the cockpit of an airplane and simulates every condition of flight, including movement, sound, vibration, and actual "feel" of the controls. Without leaving the ground entire flight crews can be faced with all problems of control in flight, and can be trained to master emergencies without danger to personnel or equipment. As a trainer, the Electronic Flight Simulator can train four times the number of pilots in the same time and at a fraction of the cost heretofore involved.

Since a year may elapse before new planes on order are delivered to commercial airlines or the Armed Services, the Flight Simulator saves hundreds of thousands of dollars by pre-training pilots. Pan American is now using the Simulator to train its crews for the new Boeing Stratocruisers. The Air Force and the United States Navy have already placed a $2,500,000 order for these trainers.

This is the new Curtiss-Wright Electronic Flight Simulator, a device which trains pilots on the ground to meet and solve all problems and conditions met in actual flight. It resembles the cockpit of an airplane in every detail.





POWER IN USE

MOST GLAMOROUS of the flying triumvirate is the airplane. These beautiful man-made birds have caught man's imagination in peace and war. They are the body of the aircraft, attached to its harnessed power. Their shape determines how power will be used.

Again Curtiss-Wright traces its roots back to the beginning of powered flight. Glenn H. Curtiss, whose "Red Wing" flew in 1908, was a pioneer along with Orville and Wilbur Wright. It was his company that produced the greatest number of planes in World War I.

In the second World War, Curtiss-Wright alone was ready with a fighter plane that could be mass-produced. That's why its famous P-40 was the basic fighter plane when war broke suddenly upon us. It fought in every combat area of the world.

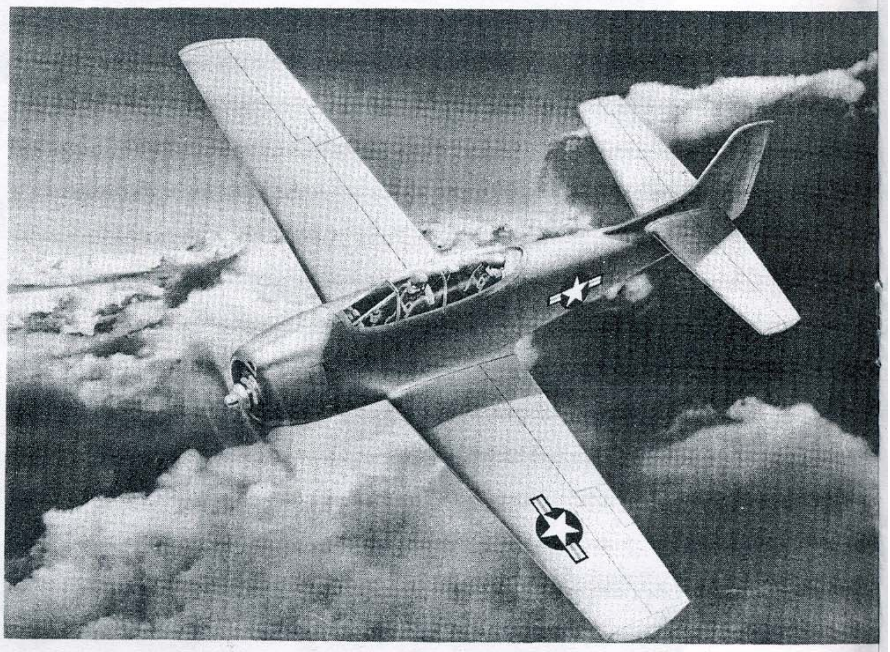
Today the modern Columbus plant stands ready for any emergency. Streamlined down to a compact, efficient unit, its skilled workers and engineering team have been kept intact and at work.

An extensive overhaul of war-weary Navy planes, each involving 15,000 man hours of work, is a full year's job and is continuing.

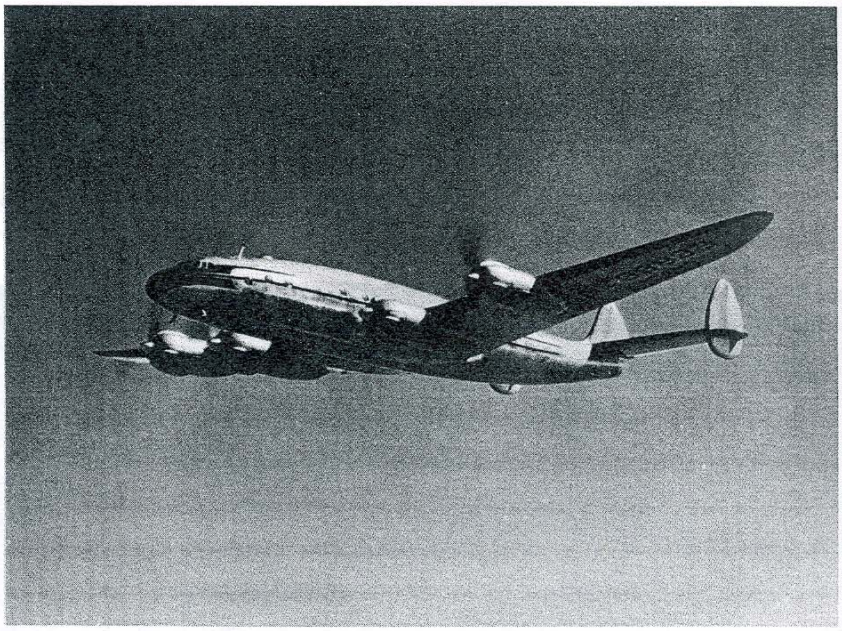
The plant is producing the fastest radio controlled plane in the world. Still under security wraps, it is the only target ship fast enough to be used with the new jet powered planes. Marked "Top Secret" is this division's work on a control mechanism or essential steering device for the Flying Stovepipe—the guided missile.

The Airplane Division has also received a $3,000,000 contract to recondition 100 Curtiss C-46 twin-engined transport airplanes for use by the Air Reserves. It currently has several subcontracting orders, including one totalling $1,350,000 for participation in the Boeing B-47 stratojet bomber program.

But the commercial plane of the future, which as in the last war, can be adapted to military use, has also been a constant pre-



Artist's sketch of the new North American T-28, the Army Air Force's newest trainer, powered with a Wright Cyclone 7.



Curtiss-Wright products fly the world's airways. Four Cyclone 18s power the record breaking Lockheed Constellation, many of which are also equipped with Curtiss-Wright propellers.

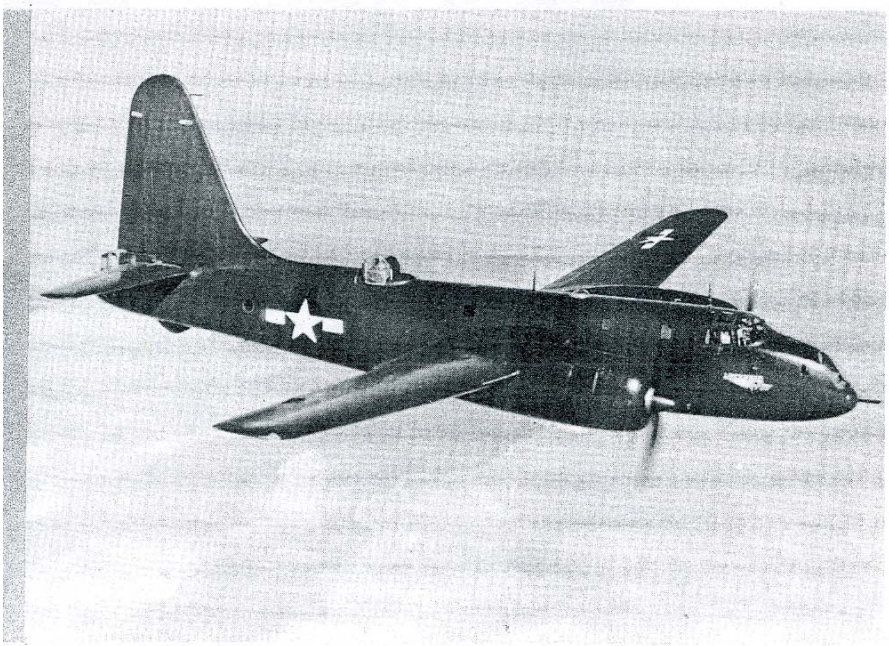
occupation of the Columbus Division. Picking out the essential of the problem, they have completed plans and an actual giant, wooden "mock-up" of a Sky Truck.

Every big plane in the air today is passenger or bomber. These have been converted to carry cargo. But that's like taking the back seat out of a car and piling a truck load of machinery into it.

The Curtiss-Wright CW-32, a "Skyway Truck," can handle 800 large size packing boxes, utilize 92 per cent of its cargo space against less than 80 per cent in average planes today, load the capacity of three standard-size 30-foot box-cars. Four big trucks can load and unload their wares into and out of this ship simultaneously.

It could have met an unexpected and desperate need last year—the Berlin Airlift. This magnificent pipe line of the air would have been easier to build and cheaper to operate with aircraft specifically designed for efficient cargo operation.

Less than half the number of Sky Trucks could do the job of the one hundred and sixty converted transports now in use. They would have saved almost 3,000,000 gallons of fuel each month. Sky Trucks could double the cargo moved per ton of airplane and halve the total number of trips.



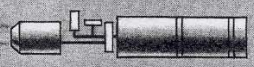
Powered by Wright Engines, the "Truculent Turtle" of Navy fame holds the world's long distance flight record.

CURTISS-WRIGHT *Today*

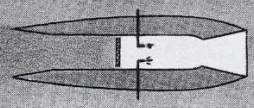
The SPAN OF FLIGHT is

CURTISS PROPELLERS WRIGHT

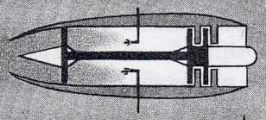
ROCKET
(Research-Secret
U.S. Govt.)



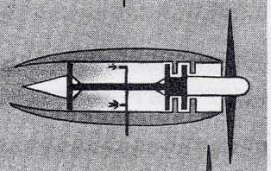
RAM-JET
(Classified-Secret
U.S. Govt.)



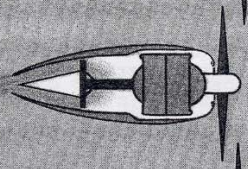
TURBO-JET
(Classified-Secret
U.S. Govt.)



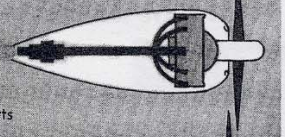
TYPHOON
Turbine with Propeller
(Classified-Secret
U.S. Govt.)



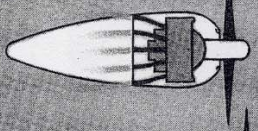
TURBO-CYCLONE 18
Super Long Range Bombers
(Navy) and Transports



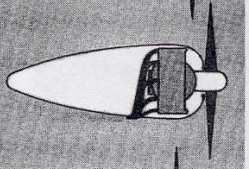
CYCLONE 18
B-29 Super Fortress
Atomic Bomb Planes
Post War Constellation Transports



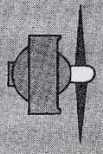
CYCLONE 14
First Trans-Oceanic Airliners
Army-Navy Bombers
Doolittle Tokyo Raid



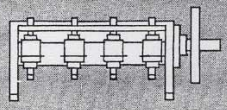
CYCLONE 9
First Modern Transports
DC2-3 Airliners
4-Engined Flying Fortress



WHIRLWIND
Introduced "Air Age"
Lindbergh's Spirit of St. Louis
Admiral Byrd's Trans-Polar Flights



ORIGINAL WRIGHT ENGINE
Kitty Hawk Plane



Miles Per Hour 100 200

SATELLITE MISSILE

ROCKET PLANE

GUIDED MISSILE

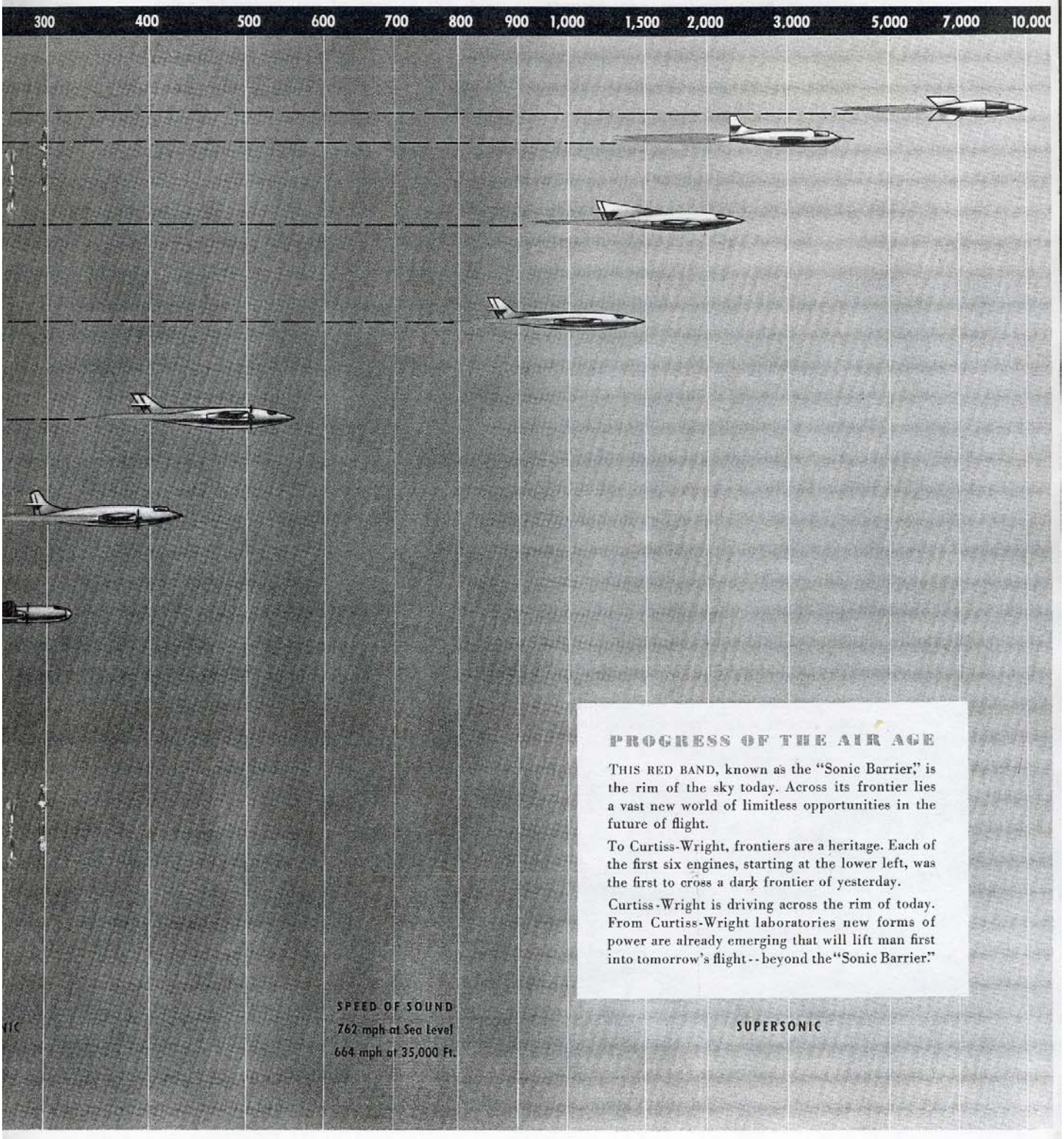
RAM-JET PLANE

SUBSONI

paced by Curtiss Wright

IT ENGINES

CURTISS AIRPLANES

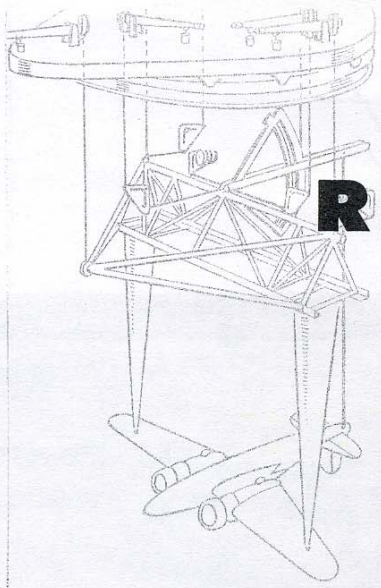


PROGRESS OF THE AIR AGE

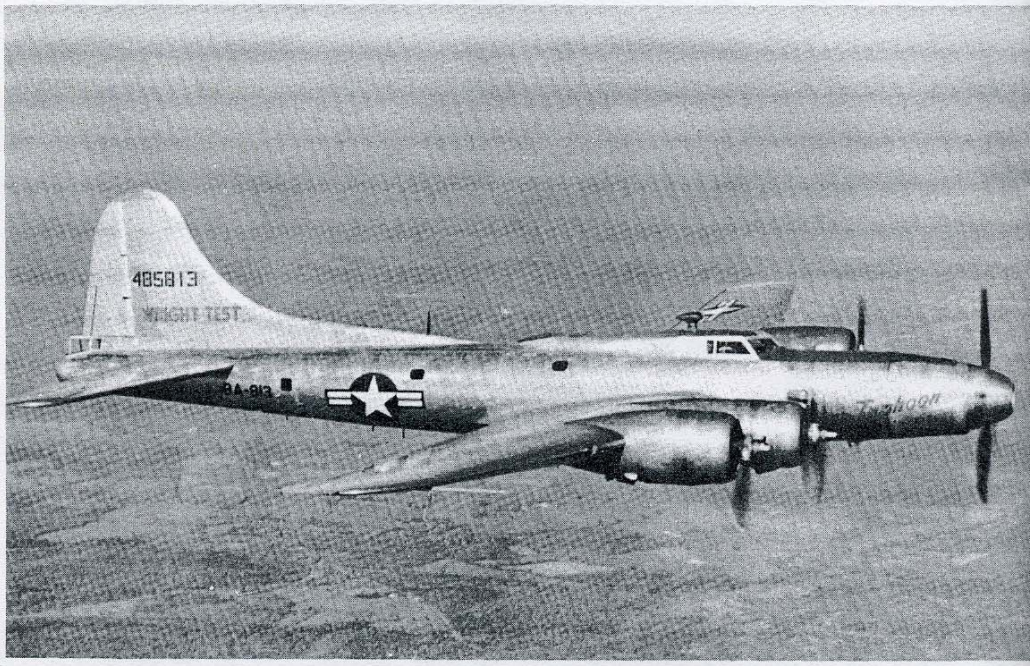
THIS RED BAND, known as the "Sonic Barrier," is the rim of the sky today. Across its frontier lies a vast new world of limitless opportunities in the future of flight.

To Curtiss-Wright, frontiers are a heritage. Each of the first six engines, starting at the lower left, was the first to cross a dark frontier of yesterday.

Curtiss-Wright is driving across the rim of today. From Curtiss-Wright laboratories new forms of power are already emerging that will lift man first into tomorrow's flight--beyond the "Sonic Barrier."



RESEARCH



This is Wright's flying laboratory for turbines. Engines and propellers are installed in its nose for tests under actual flight conditions.

RESEARCH is a never-ending job at Curtiss-Wright. From its test cells have flowed the products that have made so many "firsts" in aviation history. Because of the vast complexities of atomic power, of jet and rocket propulsion, of electronics, of new uses for metals and materials—the dreams of yesterday are in the process of becoming practical realities.

Years of further development lie ahead of each of these before they have attained their maximum usefulness. Yet, already pressing close behind them are new and greatly advanced products which contrast sharply with even these spectacular examples of the present. Curtiss-Wright engineers today have already in advanced stage of testing or in actual operation, propulsion units to advance aircraft speeds into the realm of more than two thousand miles an hour—engines but a fraction of the weight, yet many times as powerful as the great Cyclones of today. Other propulsion units to explore higher altitudes, to move greater loads off the ground, to provide quick acceleration of speed in the air—projects involving new techniques in fuels, metals and controls, are "normal" activities of this division's research activities.

JETS AND GUIDED MISSILES

Today, in the Airplane Division's laboratories are projects to push further a remote controlled, jet propelled, target plane—the fastest in the world. This division is now producing the essential flight control mechanism for guided missiles. Its research engineers and technicians are seeking to refine this

control to enable the missile to be directed with pin-point accuracy at a distant target.

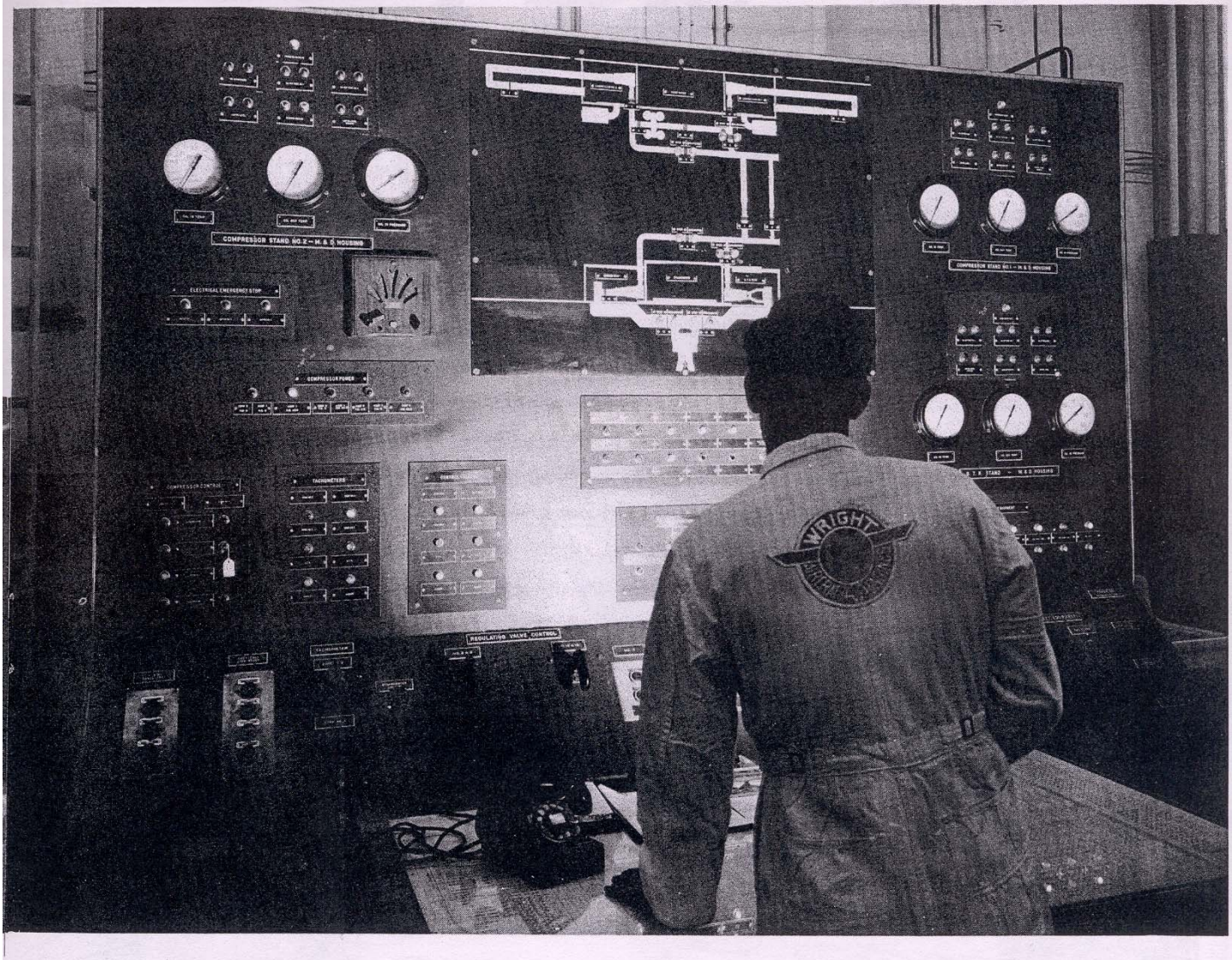
The Engine Division's research team is now at work on the ground and in the air. Its flying laboratory can be seen in the skies. It is a standard four-engined B-17 bomber with the addition, in its nose, of a powerful gas turbine engine, designed and developed by Wright.

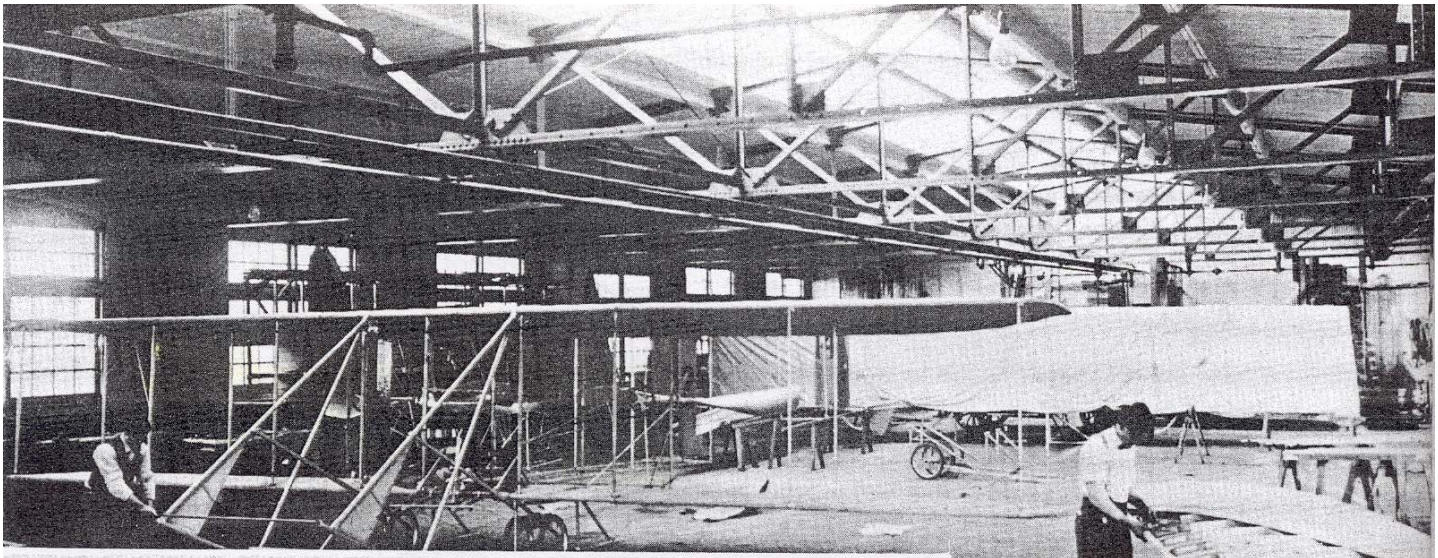
An entire laboratory at the Wood-Ridge, N. J. plant is also devoted to the development of this new type of engine, for Curtiss-Wright was chosen by the government from the entire industry for this work.

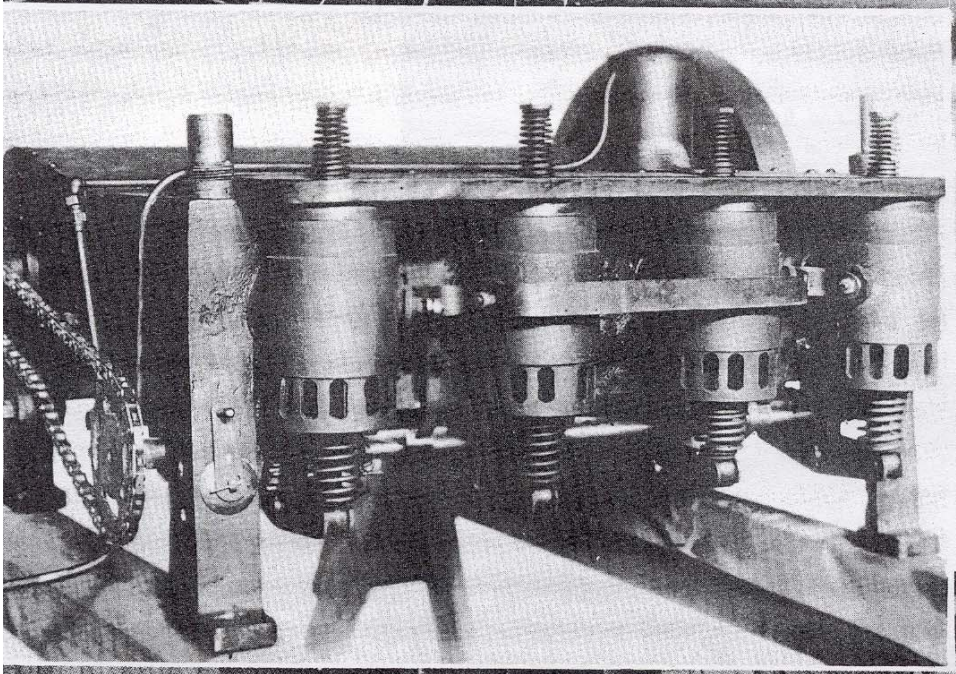
Today's production at the Caldwell Propeller Division plant has placed an enormous work-load on its laboratories and research men. It has opened up a whole new line of thought—the application of electronics to aviation. New uses for electronics in flight and training are almost limitless. Curtiss-Wright has proven the theory of the application of the "brake" while a plane is in flight by the use of the reversible pitch propeller.

Now in Curtiss-Wright's test cells and research laboratories are the working plans of tomorrow's "firsts" in flight.

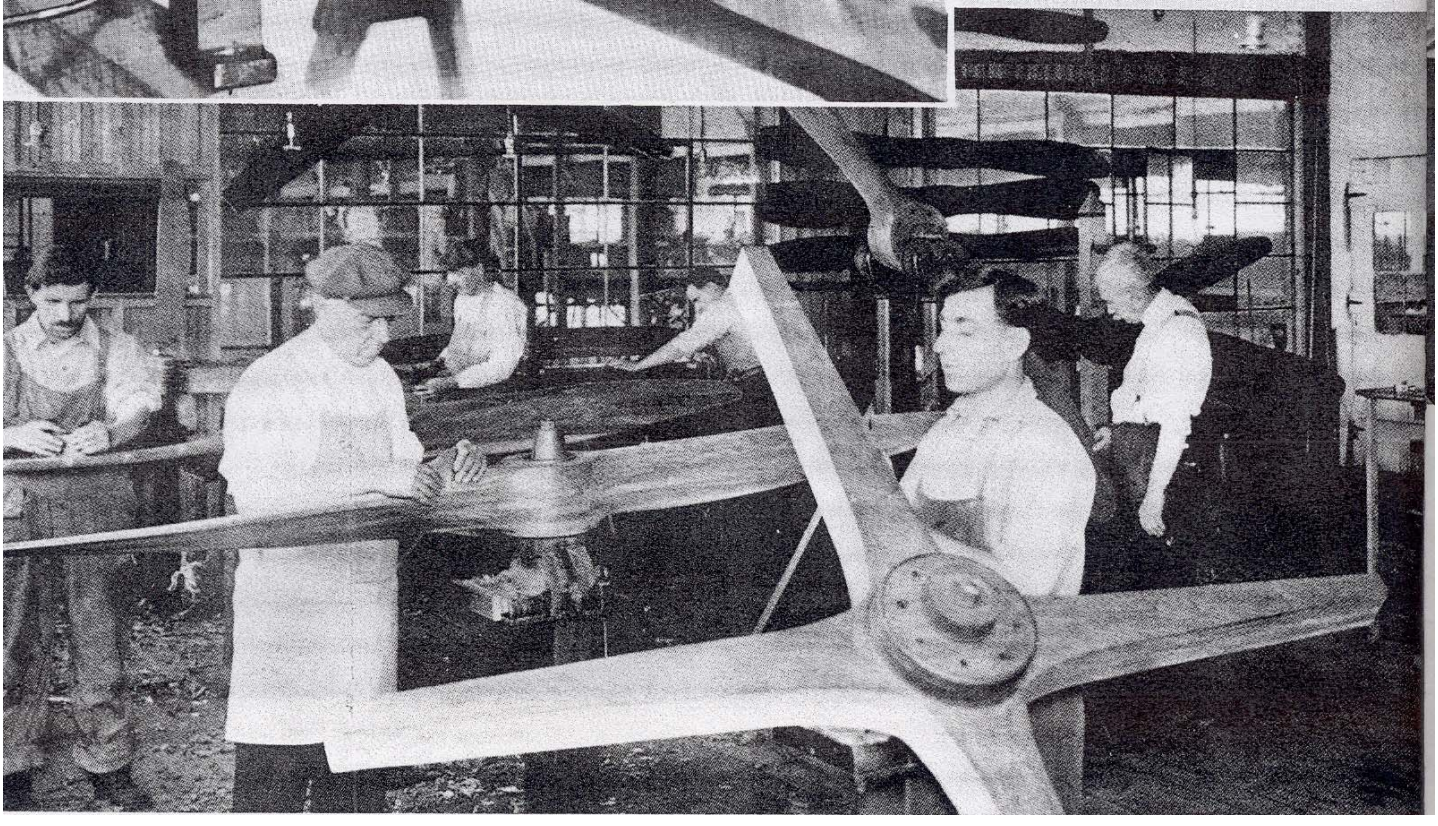
In the control rooms technicians watch, record, and analyze performance of experimental models and finished products.

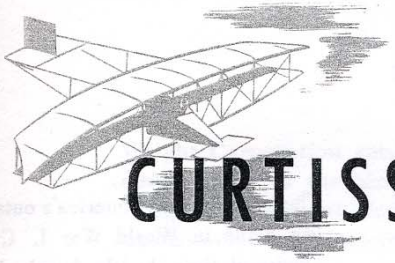






These are the grandparents of today's sleek airliners and jet propelled fighter planes. (Upper left) Plane being built of bamboo and linen at original Wright Brothers plant in Dayton, Ohio. (Center) Original Wright Brothers Kitty Hawk Engine —1903. (Lower left) "Production line" manufacturing wooden propellers in 1921 at Glenn Curtiss plant, Long Island City, N. Y.





CURTISS-WRIGHT *Yesterday*

A WRIGHT air-cooled engine developed in the 1920's changed the entire tempo of modern aviation.

The Whirlwind, a radial 220 horsepower airplane power plant, catapulted flying into a new era. It launched the startlingly rapid growth of commercial aviation and led to the sharp and quick development of the air arms of the Army and Navy.

This engine made possible powerful sustained flights and promised to put aviation on a competitive basis with other means of transportation.

This engine powered the plane that took Charles Lindbergh speedily and safely across the Atlantic in the first trans-oceanic, non-stop flight from New York to Paris. It enabled Admiral Byrd and Floyd Bennett to cross the North Pole in a highly dangerous and historic flight. It also made possible record flights by Chamberlin, Kingsford-Smith, Amelia Earhart and many others.

It fired the imagination of air-minded men and marked the beginning of air transport as we know it today, making globe-girdling routine, shortening distances and, in effect, making the entire world neighbors.

CYCLONE FAMOUS WORLD OVER

The Whirlwind was the precursor of the even more powerful Wright Cyclone, developed while the Whirlwind was still winning world-wide laurels. And today's Cyclone, powering thousands of planes, is still the most famous aircraft engine in the world.

In 1919, just thirty years ago, when the aircraft industry was still reeling from cut backs in production at the end of World War I, Wright Aeronautical was formed.

It concentrated on the air-cooled power plant and just twenty years after Orville and Wilbur Wright flew heavier-than-air craft over the sand dunes at Kitty Hawk, N. C., a plane powered by the Wright air-cooled engine won the coveted Curtiss-Marine Trophy in a contest against planes with water-cooled engines.

Just as the Wright Brothers were the first to fly and the first to get a U. S. Army plane contract, as Glenn Hammond Curtiss was the first to get a U. S. Navy contract, so was Wright Aeronautical the first to prove the efficiency, speed and safety of an air-cooled aircraft engine.

The men who developed the Wright Whirlwind and the Cyclone were no less aviation pioneers than the men from whom Curtiss-


THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Whereas Orville Wright and Wilbur Wright

of Dayton, Ohio

HAVE PRESENTED TO THE Commissioner of Patents A PETITION PRAYING FOR THE GRANT OF LETTERS PATENT FOR AN ALLEGED NEW AND USEFUL IMPROVEMENT IN

Flying Machine,

A DESCRIPTION OF WHICH INVENTION IS CONTAINED IN THE SPECIFICATION OF WHICH A COPY IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND HAVE COMPLIED WITH THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED; AND

Whereas UPON DUE EXAMINATION MADE THE SAID CLAIMANTS HAVE BECOME DULY TO BE JUSTLY ENTITLED TO A PATENT UNDER THE LAW.

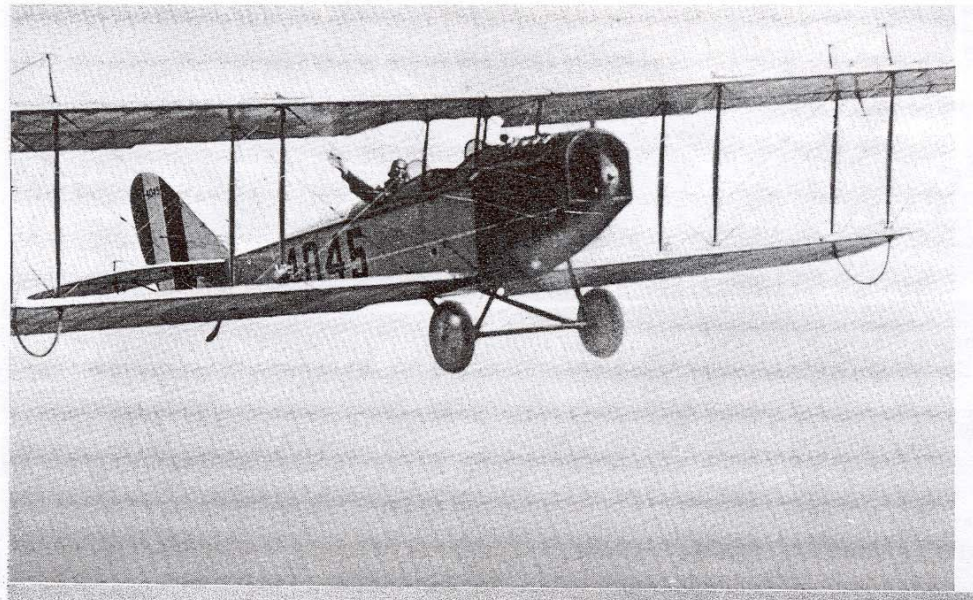
Now THEREFORE THESE Letters Patent ARE TO GRANT UNTO THE SAID

Orville Wright and Wilbur Wright THEIR HEIRS OR ASSIGNS FOR THE TERM OF SEVENTEEN YEARS FROM THE twenty-second DAY OF May ONE THOUSAND NINE HUNDRED AND six

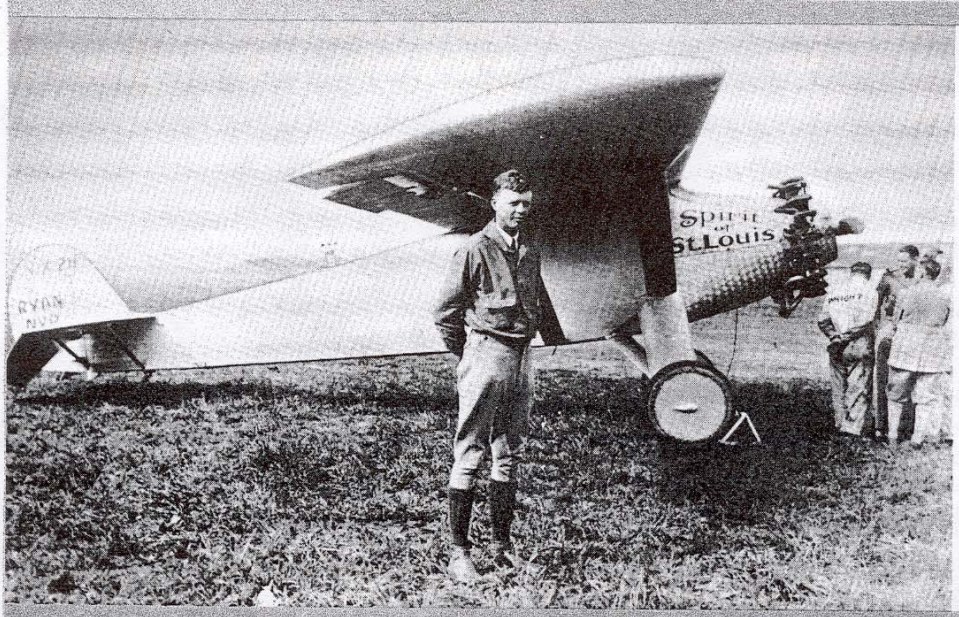
THE EXCLUSIVE RIGHT TO MAKE, USE AND VEND THE SAID INVENTION THROUGHOUT THE UNITED STATES AND THE TERRITORIES THEREOF.

In testimony whereof, I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this twenty-second day of May in the year of our Lord one thousand nine hundred and six and of the Independence of the United States of America the one hundred and thirtieth

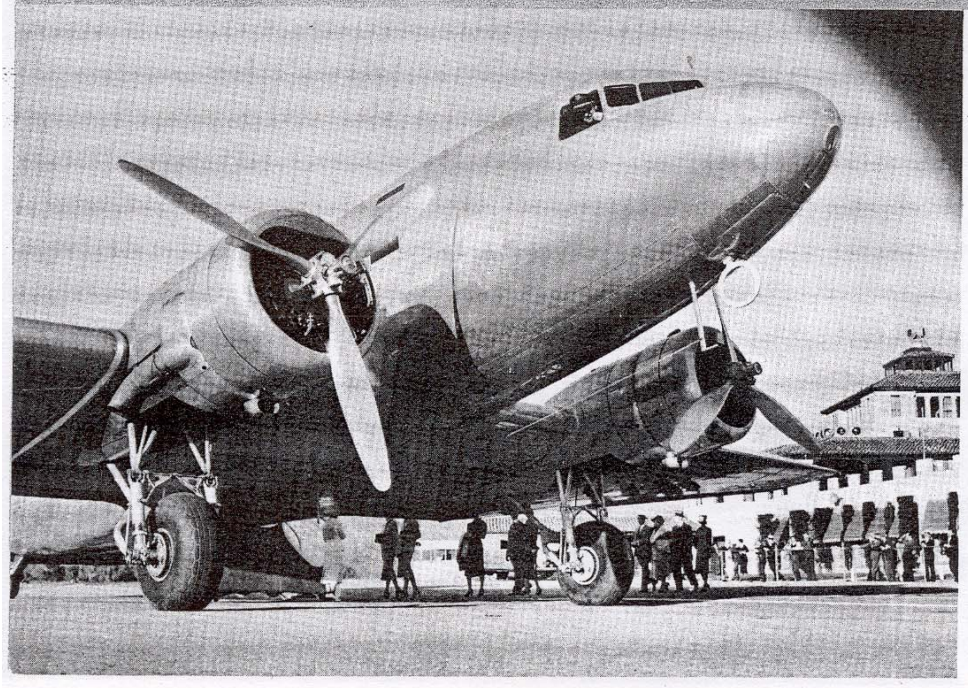
Original patent issued by the United States Government to make a Flying Machine. The historic document was granted to Orville and Wilbur Wright in May, 1906.



The "Jenny" was America's outstanding plane in World War I. Curtiss produced them by the hundreds for the U. S. air forces and thousands of young Americans earned their wings with this plane in the early twenties.



With the development of the Wright Whirlwind in the 1920's, aviation came of age. The world became air minded when Charles Lindbergh flew his Whirlwind powered Spirit of St. Louis on the first, non-stop, transatlantic flight from New York to Paris.



Two Wright Cyclone engines power this DC-3, a skysleeper, which carried its 21 passengers and a crew of three from Los Angeles to New York in the then record time of slightly more than fifteen hours. It was the outstanding transport plane of the Thirties and is still widely used by United States and foreign air lines.

Wright Corporation gets its name. In their development of the air-cooled power plant, Wright management, designers and engineers had to overcome obstacles, avoid pitfalls and leap hurdles just as important, if not as dangerous, as those faced and conquered by Orville and Wilbur Wright and Glenn Curtiss.

The Wrights and Curtiss were intrepid adventurers. They charted courses in an unproven field and by their courage, ability, strength of conviction and persuasion turned the attention of the world to the great and limitless possibilities of flying in the field of transportation.

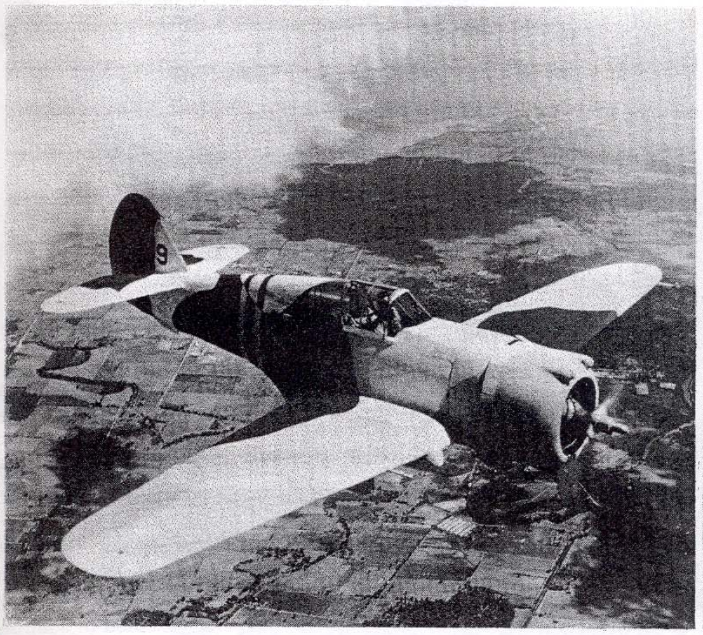
World War I brought Curtiss to the forefront as a builder of warplanes and the company turned out hundreds of the so-called "Jennys" for the U. S. air forces.

Its planes won speed prizes in 1921 and 1923 and in the latter year the first of the famous Hawk fighters was turned out. An Army officer made the first dawn-to-dusk, coast-to-coast flight in a Hawk.

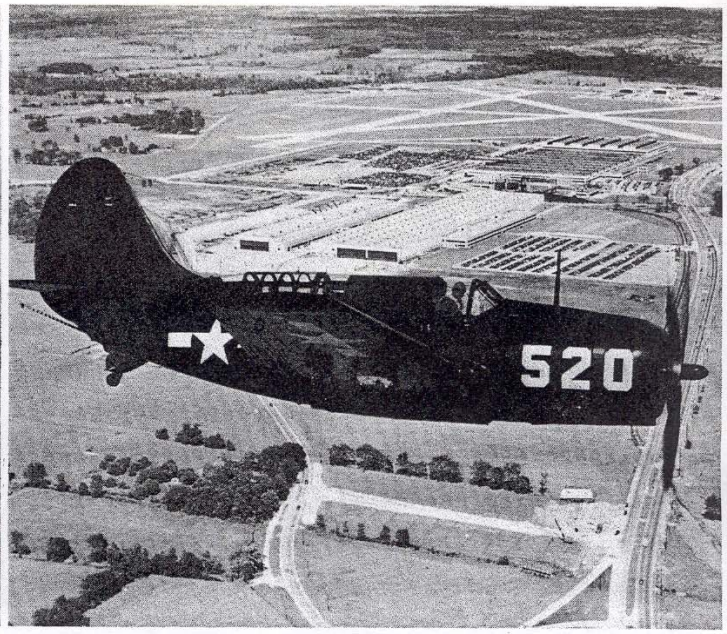
Curtiss Aeroplane and Wright Aeronautical were making their marks separately in the aviation world. But in 1929, they were merged into one company, the Curtiss-Wright Corporation and became a completely integrated aviation manufacturing concern. This company brought about a new era in aviation.

The company offered commercial aviation the Condor, the transport which for years was used on many world air routes and which was the world's first sleeper plane. It foresaw the need of powerful aircraft for the armed forces of this nation and concentrated on making the Wright Cyclone engine even more powerful.

There were at hand plenty of reasons for this. The Cyclone already was being used to power scores of commercial transports. Douglas Aircraft had selected the engine to



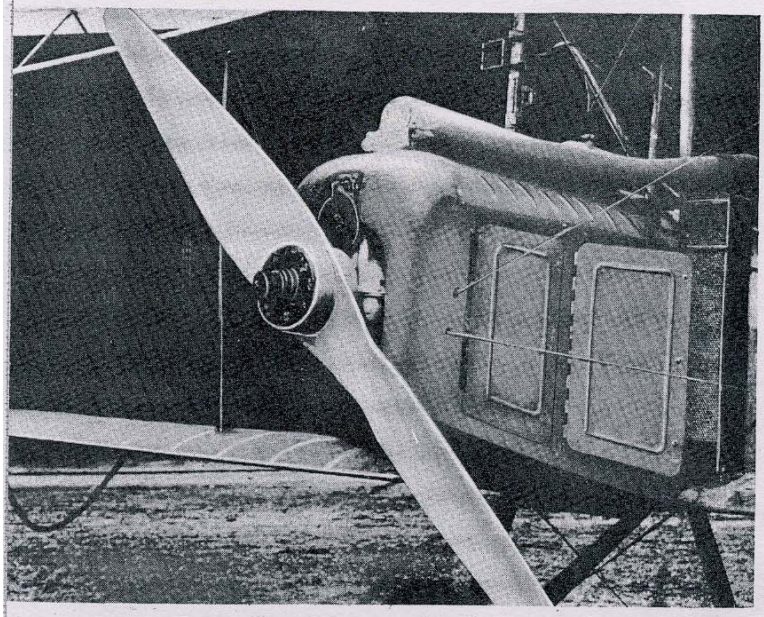
The Curtiss P-36 was the prototype for the fighters of World War II. The Curtiss Tomahawks, Kittyhawks and Warhawks, which fought all over the world, were its successors.



The Curtiss Helldiver was the Navy's "Sunday Punch" in blasting the Japs out of World War II. It is now the United States Navy's standard carrier bomber.

CURTISS-WRIGHT *Yesterday*

power its DC-1 transport plane and later put it into its DC-2 and DC-3 transports. Transcontinental & Western Air introduced the Cyclone-powered DC-2 into coast-to-coast air services. American Airlines later put the Cyclone-powered DC-3s into three-stop transcontinental air service. In the rapid and herculean development of the airline transportation system of the nation, more than 75 per cent of the planes flown on approved routes or by charter, were powered by the Cyclone engine.

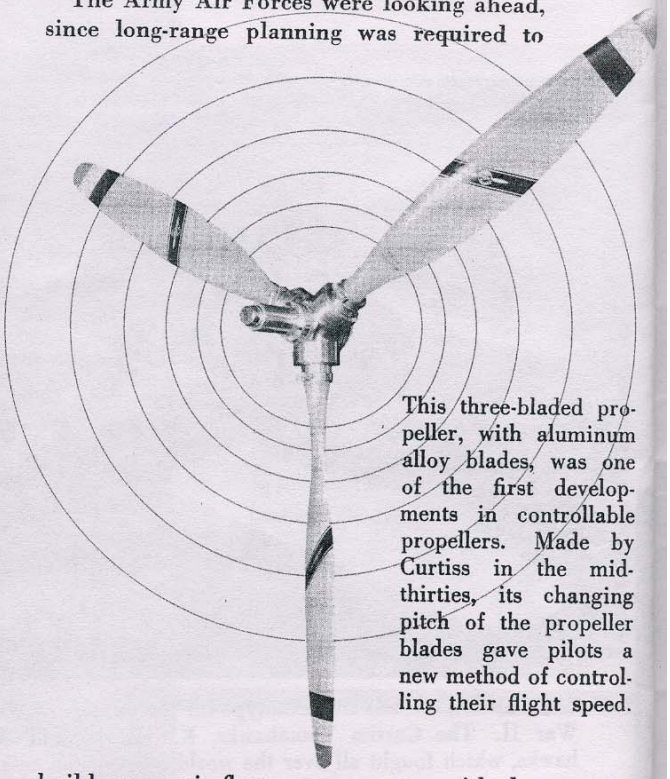


This "whistling-pig" produced by Curtiss in 1920 was the world's first metal propeller.

At this time Curtiss-Wright added to its already great stature by acquiring the highly efficient welded hollow steel propeller blade. Before this, Curtiss engineers had developed the all-metal pitch propeller and later the controllable pitch propeller, both revolutionary advances from the old wooden propeller. In 1933 the company chalked up another important "first" by introducing the revolutionary new feature—"feathering" of the propeller blades to prevent rotation of an inactive engine.

With its Cyclone the accepted power plant, and the propeller the best in the field, two important events occurred in Curtiss-Wright's history. One was the development of the twin-engine Attack type plane, the first of its kind. The second, was the choice by the Army of the 9-cylinder Cyclone to power the new Boeing B-17 "Flying Fortress", that became the backbone of bombing raids in Europe during World War II—that softened up Germany and led to its final defeat.

The Army Air Forces were looking ahead, since long-range planning was required to build up an air fleet commensurate with defense needs. In 1936 Curtiss-Wright was asked to design and develop a Cyclone engine that would be more powerful than the Cyclone for the 4-engine B-17. This new power plant was to be for a giant long-range bomber—that turned out to be the B-29. The engine was an 18-cylinder type, producing 2,000 horsepower and upward—and was the most powerful ever designed up to World War II. Before the war ended this engine's output was increased to 2,200 horsepower.



This three-bladed propeller, with aluminum alloy blades, was one of the first developments in controllable propellers. Made by Curtiss in the mid-thirties, its changing pitch of the propeller blades gave pilots a new method of controlling their flight speed.

The next year the Curtiss P-36 Hawk fighter plane was developed, tested and accepted. It resulted in the largest peacetime aircraft order ever given by the Army Air Corps.

Success then bred more successes. In 1938 in planes powered by Cyclone engines Army Air Forces pilots flew to South America on a good-will flight and Howard Hughes raced around the world in three days and 19 hours.

In 1939, the year that war broke out in fury in Europe, the company produced the famous P-40 fighter plane, an outgrowth of the P-36A, the best of its kind for years. At the same time it was designing the Helldiver and other types of planes for the Navy. Production was moving ahead at an ever-increasing pace as the war in Europe caused the Armed Forces of the United States to speed defense preparations.

Curtiss-Wright played a major role in these early programs. This meant increased manufacturing facilities and work was started on new plants at Paterson, Cincinnati, Columbus, Buffalo, St. Louis and Caldwell, N. J.

Curtiss-Wright was soon ready to answer the call for mass production of planes, engines and propellers. How ably it was to do this is noted in the history of American production for war.

In its far-flung plants with its more than 180,000 employees Curtiss-Wright was the largest single contributor to the battle power of the nation's air forces. Wright engines powered the bombers of the war. Its products figured strongly in every phase of America's air power.

This was its record:

From 1940 through 1945 Curtiss-Wright shipments reached the colossal total of $5,492,275,000. And how these shipments grew in volume as the war expanded is shown by these comparisons: In 1940 shipments were valued at $138,720,000; by 1944, the last full year of the war, they reached $1,716,935,000. In 1945, the year the war ended they still were over a billion dollars, totaling $1,197,705,000.

In 1944, too, the company's output of aircraft, engines and propellers represented

Curtiss-Wright electric propellers with hollow steel blades undergo final testing and inspection. Mass-produced at the Caldwell, N. J. Propeller Division plant, they are currently supplying more than half this nation's military and commercial requirements.

CURTISS-WRIGHT *Yesterday*

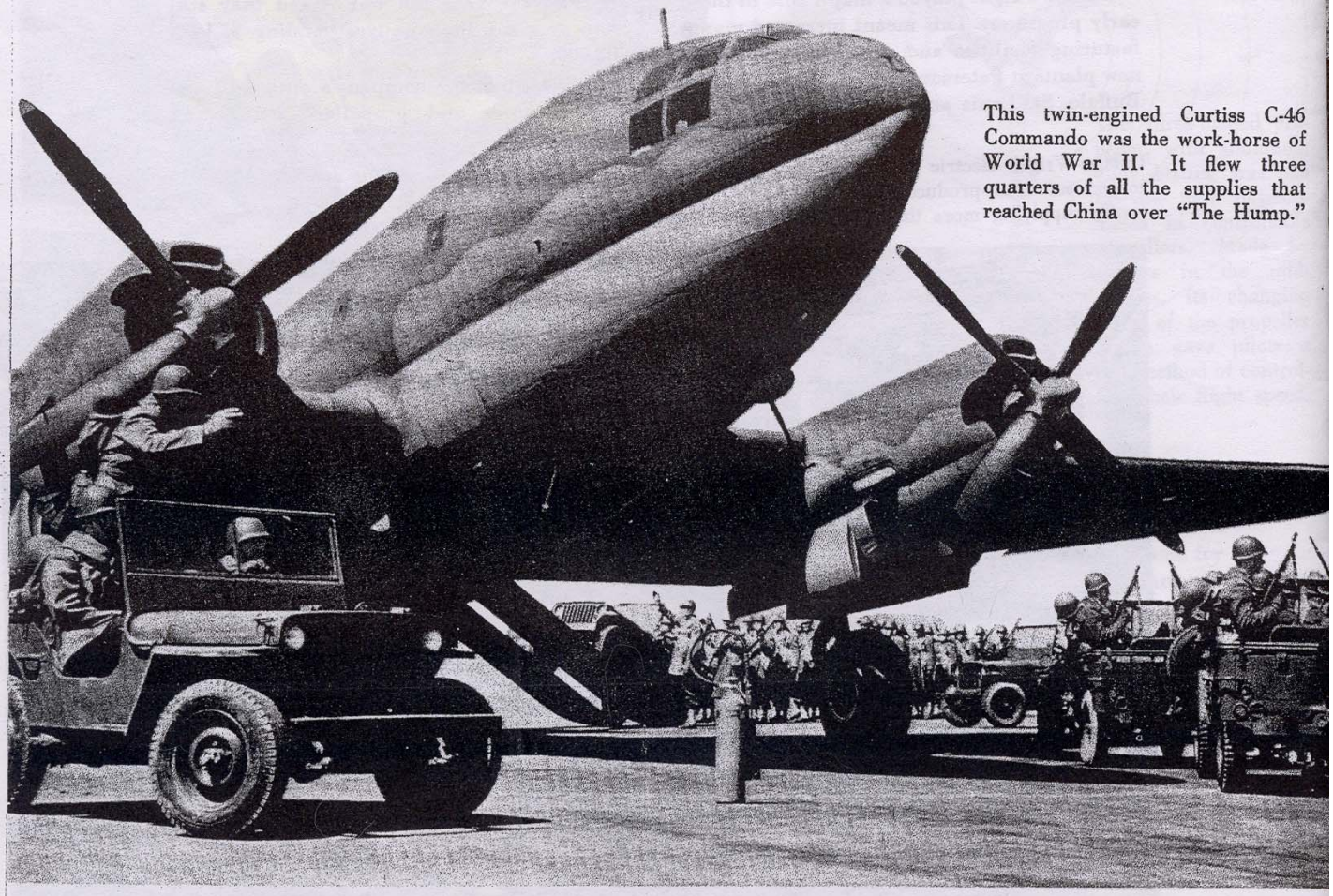
more than one-tenth the dollar volume of the entire aircraft industry and set a new high for one year's production by any one company.

Wright engines or Curtiss propellers were on such fighting planes as the Lockheed P-38 Lightning, the Bell P-39 Airacobra, the Curtiss P-40 Warhawk, the Republic P-47 Thunderbolt, the North American P-51 Mustang, the Douglas A-20 Havoc, the Douglas A-24 Dauntless and the Curtiss A-25 Helldiver.

In addition, the giant Curtiss C-46 Commandos, the work horses of the air, were used by the Army Transport Command to achieve a new record in air transportation by making untold flights over the Himalayan Hump between India and China. Curtiss Commandos of the Marine Air Transport made the first landings on newly-captured islands in the Pacific carrying in supplies and ferrying wounded to safety. The double-door Commandos were used by the Army's Troop Carrier Command in the final thrust at Germany.

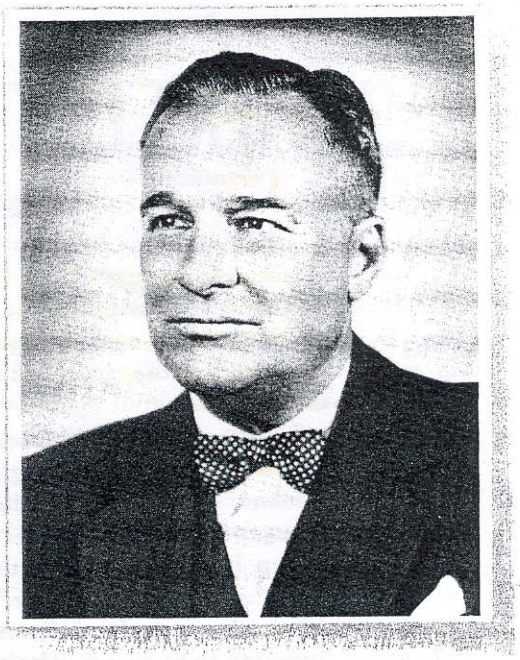
Here is Curtiss-Wright's war-score: 142,840 aircraft engines; 146,468 electric propellers; 26,269 airplanes, including 15,000 fighters for 28 of the United Nations air forces. And too, the Wright Whirlwind engine powered the General Sherman 30-ton tank and the M-7 tank destroyer.

Curtiss-Wright's war accomplishment was due to a know-how in a specialized field. This knowledge came the hard way — through nearly two-score years of experimentation and development; through painstaking effort and minute attention to detail. Accuracy was and still is the religion of Curtiss-Wright designers, engineers and production men and women. The standard of Curtiss-Wright has been and still is "Perfection."



This twin-engined Curtiss C-46 Commando was the work-horse of World War II. It flew three quarters of all the supplies that reached China over "The Hump."

GUY W. VAUGHAN



Upon his retirement after more than a quarter century's identification with Curtiss-Wright, Guy W. Vaughan is rounding out more than 30 years as a dominant figure in world aviation. He has been the guiding spirit of both Wright Aeronautical Corporation and Curtiss-Wright Corporation almost since their inception. A graduate of the automotive industry, he was the first to apply the principles of standardization and mass production to the aircraft field. He first formed the old Wright-Martin Company in 1916, and developed it into the largest producer of aircraft engines in the first World War.

Aircraft output slumped when World War I ended. So confident, however, was Mr. Vaughan of aviation's future that he persuaded the Wright-Martin management to establish a company specializing in aircraft engine development. Wright Aeronautical Corporation was born that year (1919), just 30 years ago. Subsequently however, he left the Wright Company to head up and to reorganize several companies in the automotive field.

When the Wright Company needed a production expert to manufacture the first of its internationally famous Wright air-cooled engines in 1924, Mr. Vaughan was once again summoned from the automotive industry. The result was the modern Wright Whirlwind radial, air-cooled engine.

Anticipating a world-wide expansion of air transport services, Mr. Vaughan pushed the development of the newer, more powerful Wright Cyclone engine series. Elected president of Curtiss-Wright Corporation in 1935, he intensified the entire company's development program and modernized its manufacturing facilities. The Cyclone engine became the standard engine of the world's airlines. The propeller department was expanded into a division. Curtiss-Wright airplanes, engines and propellers won world-wide acceptance and popularity.

When America began rearming in 1940, Curtiss-Wright was asked to produce six types of aircraft, four types of power plants and five types of propellers. Under Mr. Vaughan's direction the company produced and delivered to the Armed Services during World War II the largest output of any aircraft company.

Although Mr. Vaughan has turned over the heavy responsibilities of management to younger hands, he will continue to provide Curtiss-Wright management with counsel based on his broad experience in developing American air power.

CURTISS-WRIGHT *Tomorrow*

AVIATION is moving into a new era of spectacular achievement, compared to which the progress of the past will seem like slow motion.

In forty years of pioneering, the airplane has advanced from a fragile contraption of bamboo and linen to giant sky ships of stronger-than-steel metals.

Step by laborious step they have climbed into the skies a mile, five, ten miles above the earth. Mile by difficult mile they have increased their speed. Their range grew from 100 feet, to the span of the continent, then the oceans and now, with the great "compound" Cyclone, they can girdle the globe with but a single stop.

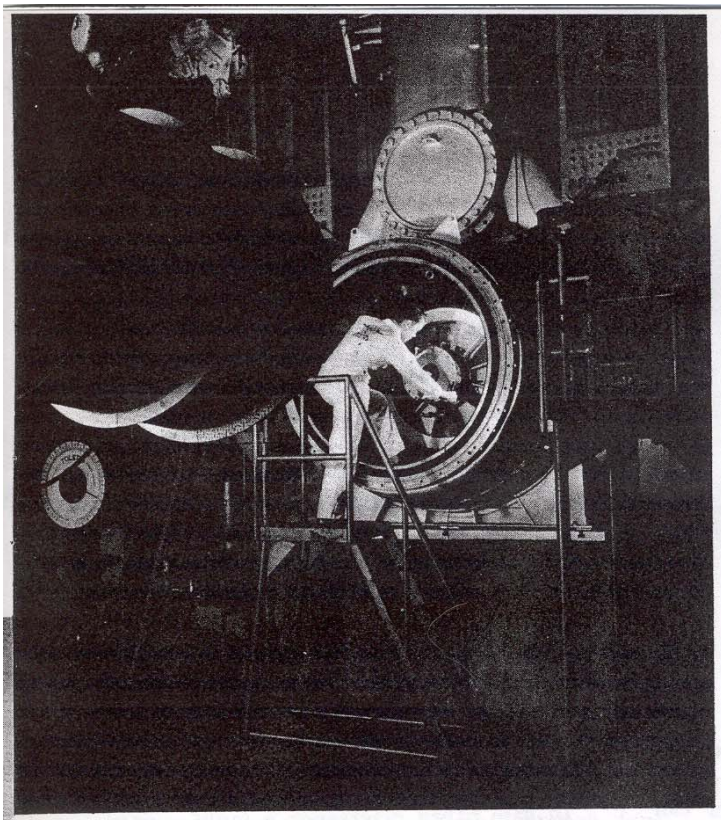
Tomorrow's new era demands, above all else, a concentration on essentials. This has always been in the tradition of Curtiss-Wright, yesterday and today. Each of its famous fifty "firsts" was an essential—the fundamental answer to the need for more horsepower, less weight, greater fuel economy.

Today's challenges are the further development of missiles, a sky truck, radio-controlled planes, electronic simulated flight, the "compound" engine, jet and rocket power plants.

Tomorrow's essentials are now being designed, tested and proven in Curtiss-Wright's laboratories. A closely guarded door, marked "Military Security", hides most of them from the public eye.

Curtiss-Wright's Airplane Division has just completed a new research laboratory for the development of pilotless aircraft components.

From these drawing boards are coming the blue-prints for tomorrow's forms of flight—supersonic planes, jet engines, rockets, and controlled missiles.



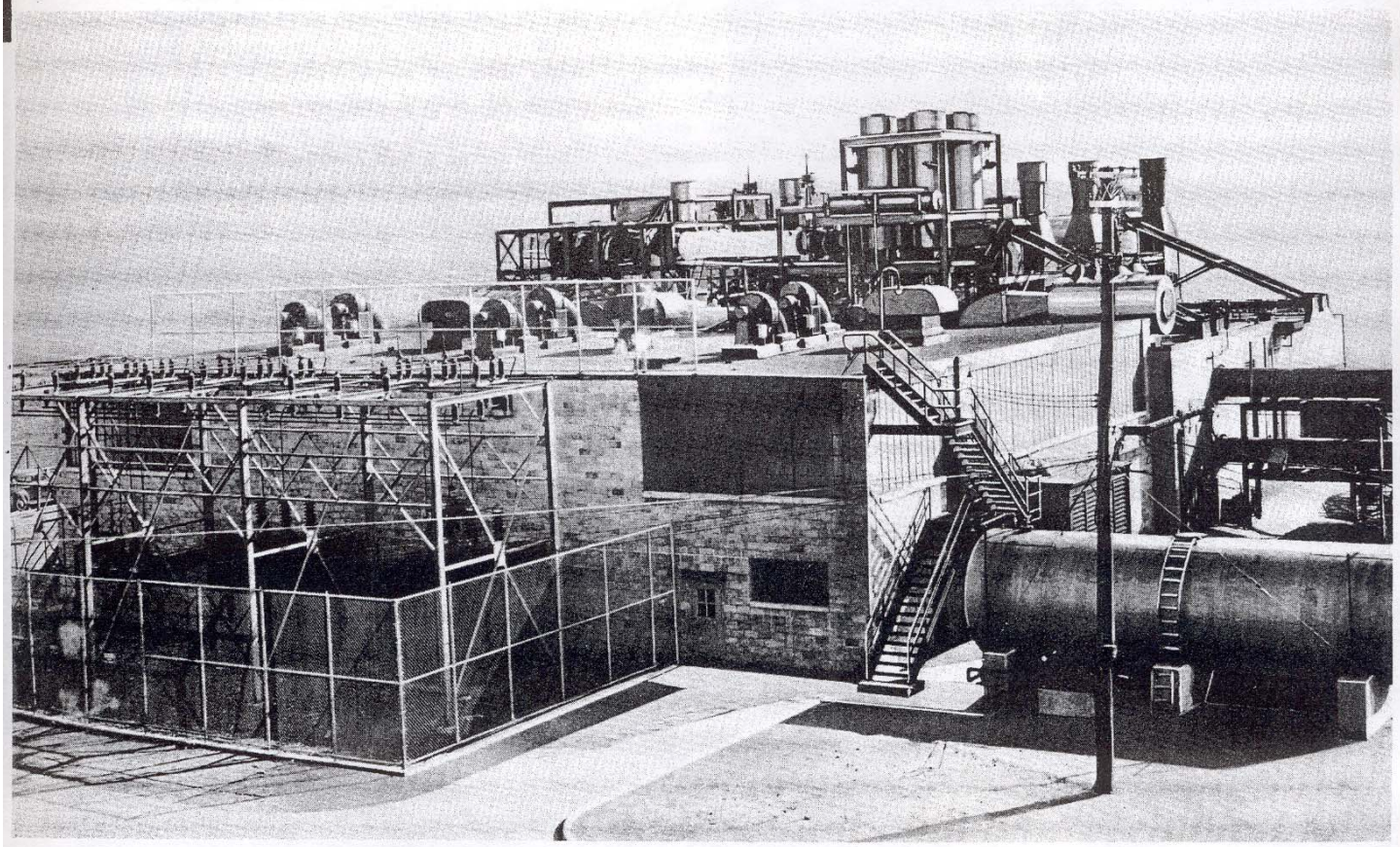
Curtiss-Wright is pioneering the development of the turbine engine in this new laboratory at Wood-Ridge, N. J. Here tests, as shown above, are made on new types of engines like the turbo-jet and the turbo-prop.

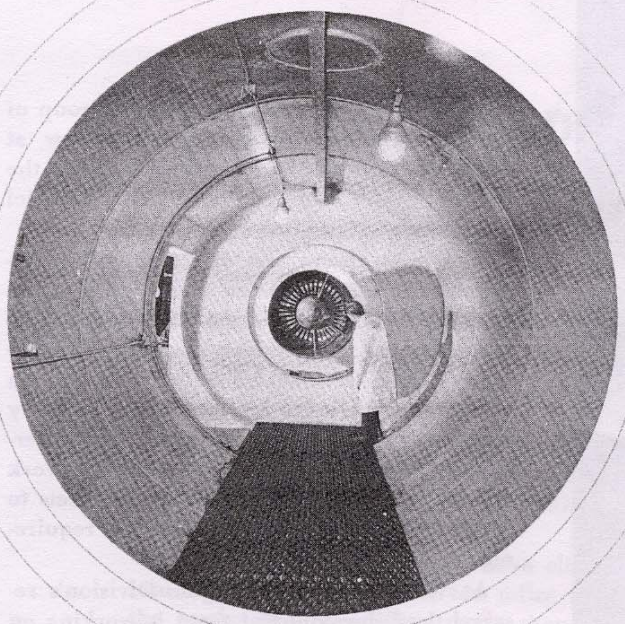
This laboratory, staffed with a new group of specialized electronic engineers, is now at work on fourteen top secret items for the United States Government's Air Materiel Command.

The most recent test of the Airplane Division's engineering team efficiency was the winning by Curtiss-Wright of a contract to build a long range, heavily armored multiple jet fighter. This F-87 was not yet on the production lines, however, when military requirements shifted to a light, fast interceptor plane. This division is now at work on new designs and development projects to meet the country's future military requirements.

At Wood-Ridge, the Engine Division's research and development team is working on new directions of flight in its $3,500,000 turbine laboratory—turbo-jets and turbo-props. Another laboratory for basic research in ram jets is now under construction. This division also has built a wind tunnel for the study of air-flow characteristics of internal passages in supersonic power plants.

In the big turbine laboratory, which has 16,000 square feet of floor space, are such





The turbine in the new type of test cell at left is cloaked in military security. Its potentialities are labeled, "top secret."

advanced testing machines as the dynamometer, which is capable of measuring power up to 20,000 horsepower. This power can be compared to the 2,500 horsepower generated by a Cyclone in the Constellation, one of the most powerful engines in military and airline use today.

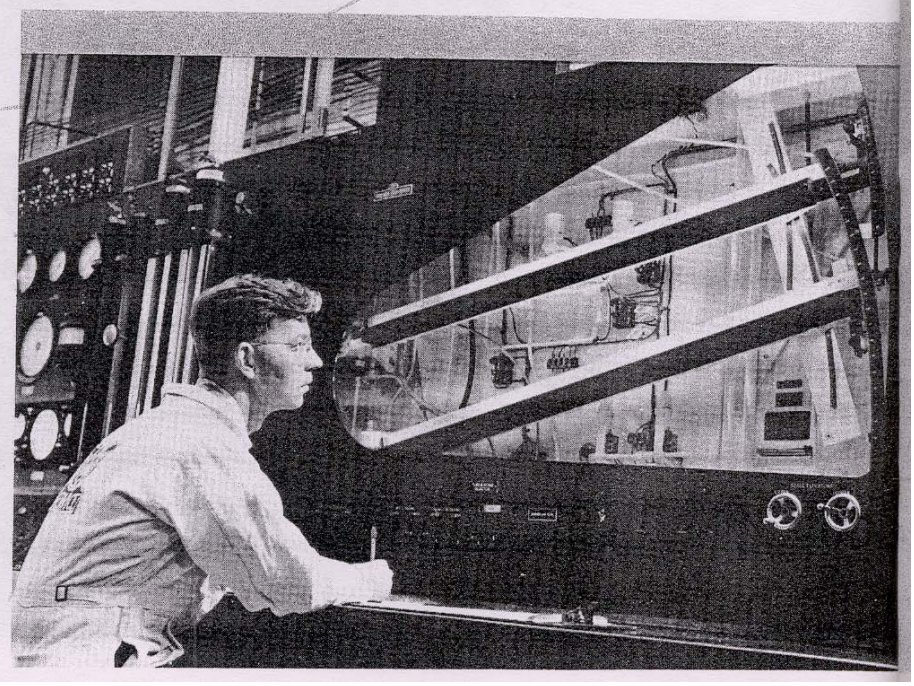
The Engine Division is also participating in the development of the most distant form of aircraft propulsion—atomic power. This N.E.P.A. Project (Nuclear Energy for the Propulsion of Aircraft) is, at the present time, a closely guarded military secret.

Curtiss-Wright's Propeller Division engineers are now engaged on approximately forty experimental and development contracts, with thirty more proposed or pending. These cover propellers for turbo-prop aircraft, turbine propeller controls, more efficient blade design for higher speed, higher powered long range aircraft and studies of supersonic propeller types.

The Propeller Division's research team is also at work on control units for the new gas turbine engine type propeller. Current research indicates that these propellers will be the most efficient answer to flight in this high subsonic 500 to 600 miles per hour range. The swept-back propeller, now in the experimental stage, is likewise designed to meet the new conditions of high speed flight.

In case of an emergency a multi-engined plane could, in the past, descend safely at 4,000 feet a minute. Equipped with Curtiss-Wright's new type reversible pitch propeller it will be able to come down at a 10,000 foot rate—more than twice as fast. As the speed of flight continues to increase, the importance of this "air brake" will grow accordingly.

In the rocket-propulsion section, preliminary tests are already being run on a new series of rocket engines—completely integrated rocket power plants. One of these highly secret rocket engines is being built to power the Air Force's supersonic X-2, to ex-



Engineer at Curtiss-Wright's unique gas turbine laboratory in Wood-Ridge, N. J. checking the volume and speed of air flow in one of the new gas turbine engines. He is reading the engine's performance from an inclinometer, which is capable of measuring up to 400,000 pounds of air per hour.

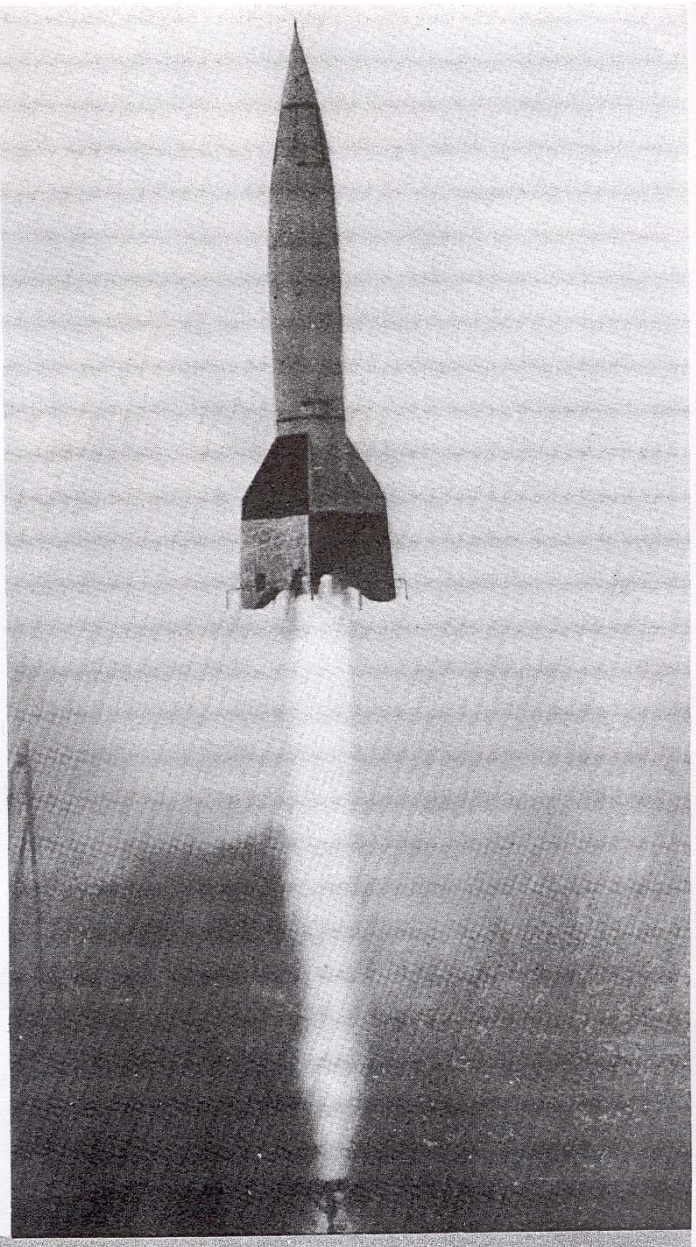
Tomorrow

plore flight beyond the speeds already reached by the spectacular X-1, the first airplane to fly faster than sound. This new Curtiss-Wright engine is but a fraction of the weight and size of the highly efficient Cyclone piston engine, but can develop several times the Cyclone's power.

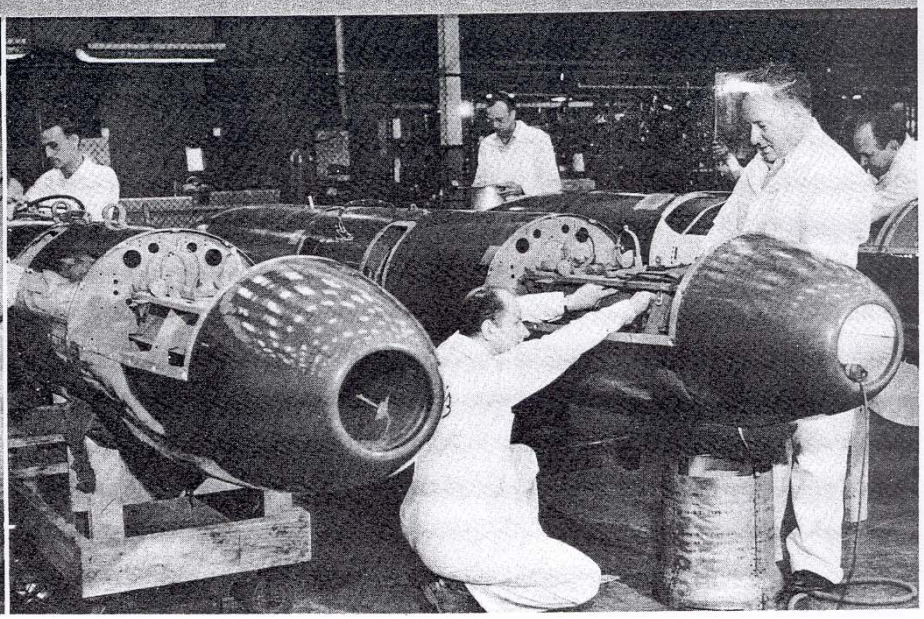
Thus the Curtiss-Wright team is participating in the research, development and testing of every form of future flight. This role of the company in tomorrow is vital to America's future, for new planes and flying power are this country's insurance for peace.

It is, therefore, the recognized responsibility of Curtiss-Wright to maintain the hard core of its production strength. Equally essential, it must maintain its financial strength to sustain research and to be prepared for any demands America may make upon it.

In the vanguard of flight through four decades, Curtiss-Wright faces the future with confidence. It moves into the new forms of flight completely equipped with the three great essentials—men, money and machines. These resources are devoted to a single goal—to keep America first in the air.



(Right)—A guided missile, swifter than the speed of sound, skyrockets into the air. More modern rocket engines, controlling mechanisms for guided missile, ram-jets, and elements for atomic powered flight are currently being developed in Curtiss-Wright laboratories. Below is an experimental testing of the ram-jet. Next to it are men at work on rocket engine assemblies.



Curtiss-Wright

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AMERICAN OVERSEAS AIRLINES
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CENTRAL AIR TRANSPORT
CHICAGO & SOUTHERN AIR LINES
COLONIAL AIRLINES
DELTA AIR LINES
EASTERN AIR LINES
NATIONAL AIRLINES
NORTHEAST AIRLINES
PAN AMERICAN WORLD AIRWAYS
TRANS WORLD AIRLINES
UNITED AIR LINES

AIR FRANCE
AIR INDIA INTERNATIONAL
AKTIEBOLAGET AEROTRANSPORT
AUSTRALIAN NATIONAL AIRWAYS
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