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FREIGHT RATE 'MONITOR' PARES COSTS

'Copters Learn Blind Flying

A new blind flight system for helicopters will now enable the craft to operate in remote areas completely on instruments regardless of weather and visibility.

By means of "electronic road maps" the helicopter pilot can take off, fly to any spot inside a 100-mile area, make an instrument approach to within 10 feet of the ground and land without looking outside the helicopter cabin.

The result of a joint research study program conducted by two U. S. aircraft companies, the new electronic flight aids are keyed to city or country use.

Rural application is expected to bring a new accuracy and efficiency to such important operations as crop dusting, where precise paths must be charted across fields and orchards.

In addition, military applications of the flight instrument system are many because reconnaissance, evacuation, courier, artillery spotting and other vital battlefront helicopter missions must be carried out regardless of the time of day or the weather.

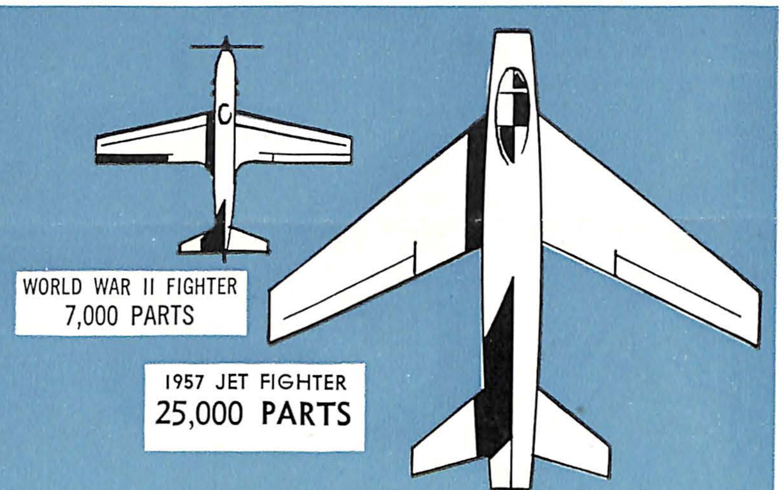
The self-contained instrument landing system was investigated for a year by engineers of the two aircraft companies prior to recent flight demonstrations.

A "master" and two "slave" ground radio transmitters are used which are set up in a triangular arrangement. The three stations transmit a pattern of stationary waves that occupy precisely known and stable geographical positions, forming navigational position lines or "electronic highways."

Position lines are detected by receivers aboard the two helicopters used for the program, and the position information is computed and then displayed by plotting boards. A plotting board consists of a stationary navigation chart of the area and a moving pen that tracks the helicopter's position at all times.

Pilots can "fly the pen" and follow the navigation-position lines displayed on the board, deviating from one line or direction to another as necessary, much in the manner a motorist follows a road map to go from one city to another.

The aircraft company study is expected to be followed by further advances designed to extend even further the helicopter's operating capabilities.



BUILDING PERFORMANCE

Performance requirements of modern military fighter planes involve the design and engineering of more than 3½ times as many parts as did World War II fighters. But aircraft industry "know-how" and greatly increased scientific and engineering staffs have held engineering lead time from prototype "go-ahead" to first flight, to slightly less than two years.

PLANES

Industry Handily Builds Both Types, High And Fast, Low And Slow

While the major concern of aviation over the years has been how to fly faster and higher, the Army is interested in reversing the trend to lower and slower flying aircraft.

The apparent surface simplicity of this aim is deceptive. It is not a question of mere retrogression to the relatively primitive aircraft types of yesteryear. It is, instead, a question of having planes which can fly low and slow, but which are also capable of the high performance rating on range, payload and speed which are axiomatic in the aircraft designed today.

The necessity for low, slow flight is basic to the Army's combat mission, requiring contact with the enemy and domination of the ground. Army aircraft ideally should go no higher and faster than is necessary to remove the blocks imposed by terrain. This may be no more than a few feet above it.

However, to get the greatest number of men, or amount of equipment from the greatest distance in the shortest space of time to the Army's focal point of interest in any given battle, its aircraft must have the maximum range, payload and speed potential consistent with the ability to fly low and slow when necessary.

These aircraft must offer true ease of maintenance under battlefield conditions. Planes for the Army must have a short take-off and landing capability—the specific requirement is for a ground run of about 250 feet. The plane must be prepared to perform even if the ground is in rough, unprepared or plowed fields, with 50-foot high obstacles needing clearance at the end of the runway.

Thus, the aircraft industry is developing not only high-speed, high-altitude aircraft, but is also undertaking diligent research and development in the field of STOL and VTOL types. The result? American-built airplanes to suit every military, as well as every civilian purpose.

Savings To Go To Taxpayer

By Harry R. Brashear
Director, Traffic Service
Aircraft Industries Association

Development and production of today's aircraft and missiles cuts across the entire industrial complex of this nation. These vastly complicated weapons, capable of performances that pale the ideas of science fiction writers, require the diverse and unique products of thousands of suppliers located in every state of the Union.

The bomber that rolls off an assembly line in Kansas or the missile produced in California is the culmination of the highest scientific and engineering techniques mated to manufacturing skills.

This vast network of suppliers is brought together by a highly developed system of freight transportation. A single airframe manufacturer receives an average of 6,000 individual shipments each month—generators from Colorado, rivets from Connecticut or electronic systems from Texas.

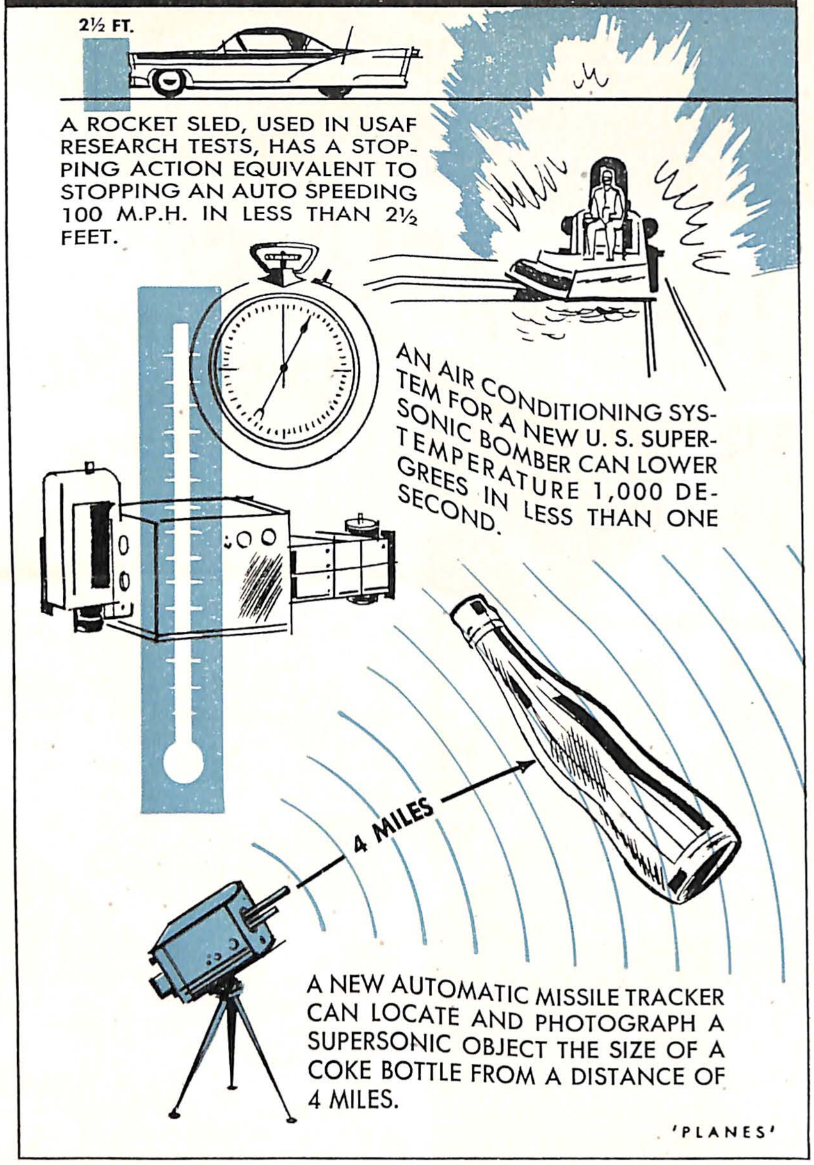
The management of these freight shipments places a heavy responsibility on the traffic managers to secure the most economical and efficient means of transportation. The freight costs inevitably are reflected in the cost of the aircraft and missiles, and the aggressive "shopping" efforts of aircraft industry traffic managers are responsible for keeping this item at a minimum.

Freight charges and classifications of freight are governed by the Interstate Commerce Commission, an independent federal agency created in 1887. The Traffic Service of the Aircraft Industries Association appears before the Commission regularly to guard against discriminatory or inequitable traffic and freight rates on aviation products. For example, in a single rail traffic rate case, evidence submitted by the Traffic Service resulted in an ICC report which recommended changes in freight rates that will save more than $3,000,000 annually in shipping costs. This is a savings that every taxpayer shares in since it means a lower cost for air power.

The burdens imposed on the traffic manager in seeking economical competitive transportation have been largely caused by changes in legislation since the original act and the

(*See ICC on page 7*)

Plane Views



The Art of The Impossible— Making Missiles Reliable

The electronic system of a guided missile contains approximately 12,000 different electronic components, and each component has at least two electric connections. Every effort is made by the missile manufacturers of the aircraft industry to make each component failure-proof.

In the electronic system alone, it is estimated that each missile has 36,000 to 37,000 items which must function properly if the missile's flight is to be successful.

And in order to insure satisfactory operation of three out of four missiles—using an arbitrary figure—the failure of any single electronic item must be limited to once in about 100,000 times.

To obtain the predicted degree of missile reliability, great care is taken in design, manufacture and storage of the missile and its component parts. If a new and untried component is necessary, it is put on trial, and a jury of experts must pass on it. Each component is tested individually and then again after its incorporation into an assembly. Finally, each missile system is checked out.

All this effort has only one aim: reliability of the weapons needed for protection and deterrence against aggression.

The question often asked is why parallel circuits and duplicate components are not used to increase reliability. For one thing, the added weight would probably cause the missile to abort. For another, parallel circuits and duplicate components require switching devices. And experience has shown that switches and relays function improperly far more often than any other missile components.

Reliability is thus achieved only after overcoming seemingly insurmountable obstacles — and the aircraft industry overcomes these obstacles daily in building U. S. air superiority.

Fog Gone?

The blinding "ice fog" caused by engine exhaust fumes in the Arctic and Antarctic may be a thing of the past. Scientists have developed a unit which eliminates the moisture content of the exhaust before it enters the atmosphere. Also developed recently is an electronic "fog meter," which automatically measures comparative results of light transmitted through, and scattered by, the fog.

PLANES

Planes is published by the Aircraft Industries Association of America, Inc., the national trade association of the manufacturers of military, transport, and personal aircraft, helicopters, flying missiles and their accessories, instruments and components.

The purpose of *Planes* is to:

Foster a better public understanding of Air Power and the requirements essential to preservation of American leadership in the air;

Illustrate and explain the special problems of the aircraft industry and its vital role in our national security.

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

Competition and Progress

By Orval R. Cook

President, Aircraft Industries Association

The overriding characteristic of the aircraft industry today is its volatile technology. An aircraft or missile is technically obsolete by the time tooling is ready for volume production. They have been outmoded by new designs based on the hard-won knowledge of research and development programs. Technological progress springs from intensive competition among companies in private industry. The dissipation of any competitive factor in building air power, such as putting development work in government arsenals, universities or other non-profit organizations, is unnecessarily risking the slim technical lead we have today.

It is the strong opinion of the Aircraft Industries Association that this function quite properly belongs to industry. The guided missile has the same vital elements as the airplane—airframe, propulsion and guidance. The potential of the guided missile was established in early experiments, 30 years ago, when aircraft were first flown by remote radio control.

The development of the missile has paralleled aircraft development. Research and design problems are the same. The techniques and know-how of aircraft production, acquired over the years by the aircraft industry, have been applied precisely to the guided missiles. So have materials research and discovery, electronics and systems and components jointly employed in both types of craft. Thus, it is quite natural that the industry which brought the airplane to its present advanced estate develops and produces missiles better and cheaper than can government arsenals.

The system of having the development work done by an arsenal or university and then switching production to private industry has a serious drawback. There is a time loss ranging from several months to even a year in accomplishing the transfer. Development and production by industry reduces this time loss. Production engineering teams work with design engineering teams from the beginning of a project. Problems of production are solved while design is in progress, eliminating re-design work because some vital component would be too costly or time-consuming to produce.

The government has never been successful as a producer of aircraft, and there is no reason to believe it can be a successful producer of missiles.

As for the universities, there are excellent services they can render in basic research in the missile field, but the Aircraft Industries Association has long taken the view that they should not engage in development work in missiles. They enjoy a tax-free status, and their principal reason for existence is to teach and they should not unnecessarily be distracted from that purpose.

It is quite true that the aircraft industry expects to produce guided missiles in this growing program. Being most experienced in aircraft, it is naturally the most efficient. Moreover, with a decline in production of manned aircraft in the next few years, it is imperative that this industry replace this business with pilotless aircraft. Otherwise, America would lose a keystone of its national defense structure and a strong, stable aircraft industry. The importance of maintaining a healthy industry has been recognized by national administrations, military leaders and cognizant elements of Congress. Industry has spent hundreds of millions of dollars, and so has the government in building up the facilities for aircraft production, most of which are being applied to missiles. The aircraft industry has assembled strong teams of scientists, engineers and technicians whose talents are being applied to missiles, as well as to manned aircraft. We see no reason why their functions should be duplicated in either government establishments or the universities.

50th ANNIVERSARY—USAF
A Salute From Industry

WHITLEY C. COLLINS, Chairman of the Board of Governors, Aircraft Industries Association, is a veteran of nearly 30 years in the aircraft industry. He began his career in aviation in 1929, when he served as vice president, general manager and a director of the Lockheed Aircraft Corporation. A native of Des Moines, Iowa, he was graduated in 1921 with a Bachelor of Science degree from the Wharton School of Banking and Finance at the University of Pennsylvania. He has been associated with the Continental Illinois National Bank and Trust Company, Chicago, the Collins-Powell Company, Beverly Hills, California, in which he is still a partner, the Elastic Stop Nut Corporation, the Menasco Manufacturing Company, and the Holga Metal Production Company of Van Nuys, California. He was instrumental in organizing the Radioplane Company, now a division of Northrop Aircraft, Incorporated. Mr. Collins has served as President and chief executive officer of Northrop Aircraft since 1954.

By Whitley C. Collins

Chairman, Board of Governors, Aircraft Industries Association

FIFTY years ago, Brigadier General James Allen, Chief Signal Officer, United States Army, issued a memorandum establishing an Aeronautical Division having cognizance over "all matters pertaining to military ballooning, air machines, and all kindred subjects."

The new Aeronautical Division consisted of one officer, Captain Charles DeForrest Chandler, and two enlisted men. Such was the microcosmic beginning of the United States Air Force.

Today, half a century later, the USAF has become the strongest single deterrent against the eventuality of World War III, a worldwide network of men, machines and facilities which make it a vital bulwark of national policy and a factor to be reckoned with in Foreign Offices throughout the world.

The story of the fifty years between the first military application of aviation and the global Air Force which today stands guard over the free world is a rich and rewarding story.

It is essentially the story of a unique partnership which has developed over the years—a partnership between the men who make the airplanes and the men who fly them—a welding of the unique talents of the aircraft industry to the military needs of the USAF.

It encompasses not only the military aircraft which have enabled the USAF to emerge victoriously from three wars but also the civilian aircraft which have made this nation the world's leading producer of airplanes. The paradoxical fact is that just as there are civil applications in the weapons of war, so also are there military applications in the aircraft built for peacetime purposes.

This interrelationship has played an important part in the first half century of the United States Air Force. Undoubtedly, it will continue to do so in the future, whether the world moves toward war or peace — the aircraft destined for one has uses in the other.

IT all began, inauspiciously enough, in the attempt of the Wright Brothers to interest the Army in their new-fangled flying machine. Rebuffed several times, occasionally with form letters stating that the government was not interested in "financing experiments," the Wrights did not succeed in getting Army acceptance of their flying machine until August 2, 1909—two years after the fledgling Aeronautical Division had been established, and five and a half years after their first flight at Kill Devil Hill, Kitty Hawk.

Presaging what later became the science of military specifications, the Army, before ac-

cepting the Wright airplane, insisted that it fly faster than 40 miles an hour; remain aloft for at least an hour with a crew of two; and (importantly) that the aircraft be transportable in a four-wheeled, mule-driven wagon.

In the next few years, there was a hustle and a bustle in the world of aviation, but the visionaries who foresaw the "aeroplane" as a dominant weapon of war were few. In 1910, a .30 caliber Springfield rifle was successfully fired against a ground target by Army Lt. Jacob E. Fickel and Glenn H. Curtiss. The theory of dropping bombs from an airplane was also tried out, with two-pound sand bags. In succeeding months, live bombs were dropped. A Lewis machine gun was also fired from the air.

Despite these experiments, military aviation nearly came a cropper. Because of the public's "tongue-in-cheek" attitude toward machines that would fly like birds, the Congress was disinclined to appropriate any funds for the *crazy fliers*. At mid-year, 1910, the Army had only two officers and nine enlisted men on aeronautical duty.

The Wrights and the Curtisses and the Martins and the other dare-devils of the age—pioneers of a giant industry—were gathering all the laurels. The newspapers puffed up their exploits to the point where a casual reader gained the impression that the skies were literally becoming black with airplanes.

The sad truth, however, was that in the Spring of 1911, the Air Force still had only a single airplane—its original Wright model—too dilapidated to fly.

The years 1910-1914 were lean ones for the fledgling Air Force. Meager funds, primitive equipment and antique aircraft—even by the standards of those days—virtually restricted our military aviators to the basic hazards of getting off the ground and returning alive to earth. There was no such thing as a tactical doctrine for aviation. Most military men scoffed at the mere idea of airplanes, although some grudgingly conceded that eventually they might be of some minor use for reconnaissance.

As a measure of how much a stepchild military aviation was, Congress appropriated a mere $350,000 for military aeronautics at a time when Germany's expenditures were in the nature of $28,000,000.

AMERICA, however, was safely ensconced between two broad oceans, and the war clouds gathering over Europe were of little concern to the vast majority of Americans. "Neutrality" was the key word in defining America's position. It was not until May of 1917 that military aviation and the fledgling aircraft industry were given their first big boost by Congress appropriating nearly $11,000,000 for aircraft. This was followed within three months by appropriations of $680,000,000. The U.S., however, entered World War I without having the designs for up-to-date military aircraft—not a surprising fact, in view of the vast indifference to the aerial facts of life by Congress in the years leading up to war.

AS the aircraft industry began to mobilize, one of the biggest orders was placed with Curtiss for production of the JN-4D, the famous "Jenny." This ship was widely used as the standard pilot training ship, but was not used in combat. Everyone agreed that Jenny was "too nice a girl to fight."

In the skies over France, pilots of the opposing powers used to wave gaily at one another in the opening days of the war—for want of anything more lethal to do to each other in their unarmed airplanes. Before long, however, pilots started firing sidearms at the enemy, then rifle fire was exchanged, and finally the observers began firing swivel-mounted machine guns. This worked fine until a few propellers were sheared off by enthusiastic gunners.

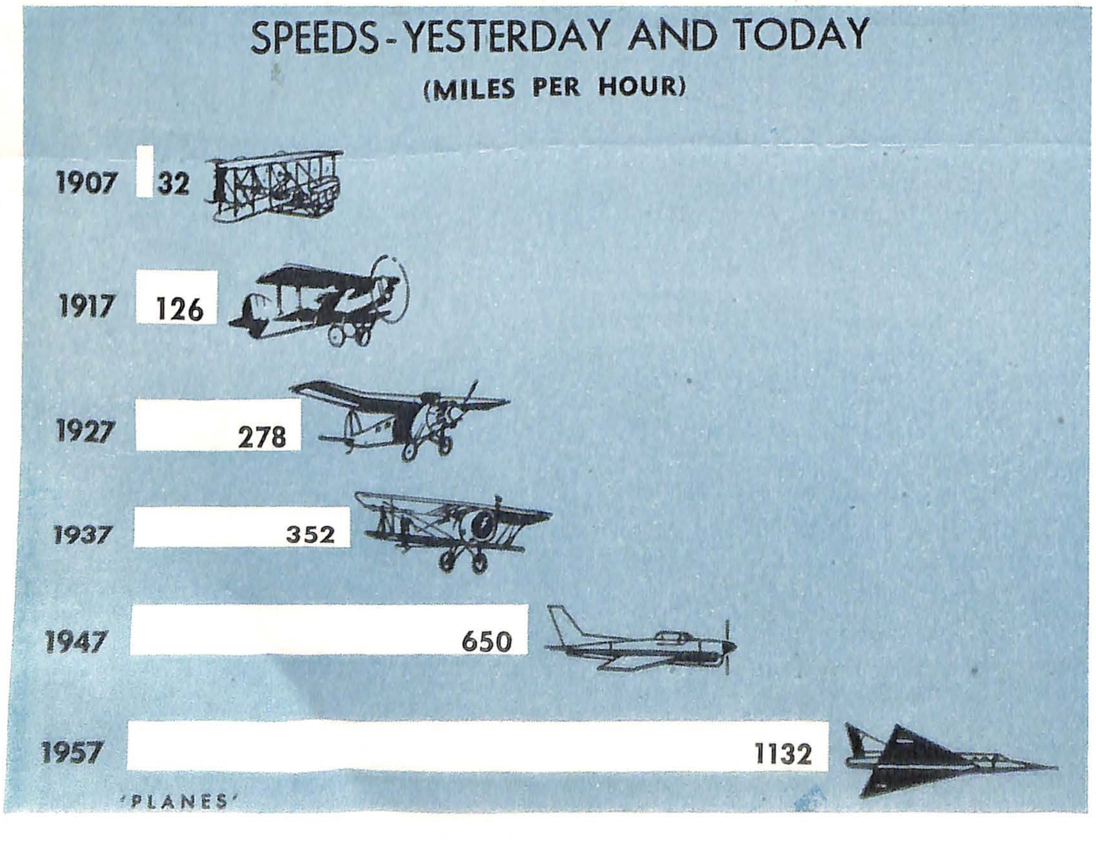
Manufacturing research ingenuity soon overcame this problem, and before long all air combatants were equipped with machine guns synchronized with the engine to fire between the propeller blades.

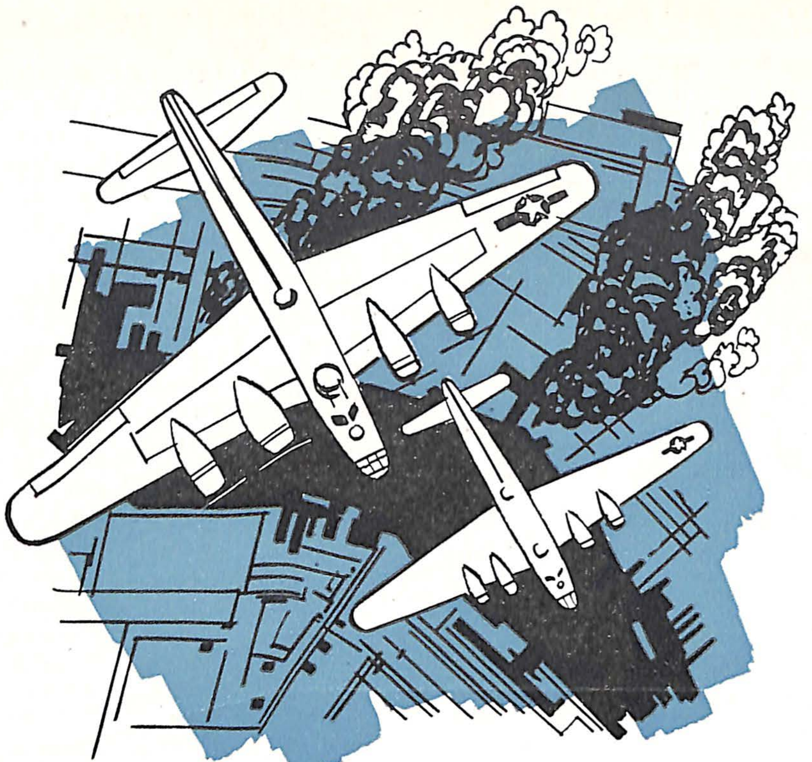
At this point, aerial warfare became of age. The flying gun platform was no longer theory

but fact. General Billy Mitchell, in his War Diary, noted that "from the time that American air units entered into combat on the front our men shot down and received official confirmation for 927 enemy airplanes or balloons. During the same time, we lost, due to operations of the enemy, 316 of our airplanes or balloons. This ratio of three to one was a remarkable thing, and was much greater in proportion than the victories achieved by any of our allies. The reason was that we had remarkable pilots and that our tactics and strategy were superior to any of those employed elsewhere." Mitchell also reported that on Armistice Day, U.S. units were in possession of 740 airplanes. Only 196 of these were American-made. The rest were French, except for 16 manufactured by the British.

The reasons why America's World War I aces wound up on Armistice Day with only a handful of American aircraft are many, but they can largely be explained by two widely prevailing mental attitudes: apathy before the war and over-optimism during the war.

Then, when this nation went into World War I, the impression was widely circulated





that the U.S. could speedily turn out military planes in assembly line volume and "darken the skies over Europe with the turn of a switch." Such, of course, was not the case. It takes time to build airplanes, time to build up tooling, time to secure materials, time to train workers—*time* which cannot be bought by any nation's Treasury. Furthermore, government sponsored research was almost non-existent, and the U.S. consequently entered the war without any designs for up-to-date military aircraft.

Despite these very confused beginnings, once this nation was committed to battle, the genius of American ingenuity and production know-how combined. By the time war drew to a close in 1918 the United States had produced 41,953 aircraft engines and 13,943 aircraft, although only a trickle had reached the battle zone in the brief 19 months of America's war participation.

Most important lesson learned by airmen and men of the young aircraft industry as the nation emerged from "the great war" was, that aviation had passed beyond the stage of the one-man show. Its success could never again depend upon the genius of one or two inspired persons. A successful air force and aircraft industry could grow only as a smoothly integrated team. New and crude as it was in 1917, aviation still demanded a refinement of a multitude of arts and skills.

THE Armistice set off a new chapter in aviation history—the achievements of the 1920's, when all existing records in aviation were broken, only to have the new records broken all over again.

The four years of World War I had proven the airplane to be an efficient instrument, with many uses. In the process by which it became an efficient instrument, aeronautical engineers were busy solving the scientific mysteries which had to be overcome to make planes bigger, faster and more efficient. Propellers had been vastly improved. Struts and other external bracings were now being "streamlined" to reduce drag and increase speed. Much had been learned about wing camber and dihedral and angle of attack. The weight-to-power ratio in engines was coming down through use of light-weight materials. Horsepower was going up.

The early postwar years saw a glut of war surplus planes—and pilots—dumped in the market. This generated the "barnstorming era," which did much to popularize flying, but it also discouraged the market for new aircraft, and forced a series of mergers within the aircraft industry which substantially reduced its productive capacity.

There was, nevertheless, a jump in technical progress which made airplanes safer, more useful and more economical. By 1922, steel was going into the framework of fuselages, and duralumin was replacing wood veneer and doped fabric on the newer planes. The Air Corps set a speed record of 171.7 miles per hour with a new pursuit plane which had radiators recessed into its wings rather than stuck out into the windstream. (A modern jet fighter *lands* at approximately the same speed, which explains why long runways are needed to accommodate jet-powered aircraft.)

Two aerial-minded personalities dominated the 1920's—both of them men of prophetic vision for the future of air power. One was a General—Billy Mitchell; the other was a Captain—Charles A. Lindbergh.

Sparked by the fiery public crusade of Brig. General William Mitchell, of the Army Air Service, two groups of government investigators reported their diagnosis of aviation's ailments. The investigators were a Congressional Committee, headed by Florian Lampert, and a board headed by Dwight Morrow, appointed by President Coolidge. The findings of the two groups were published in December 1925. They agreed generally, excepting on the issue of an independent air force. Their concurring conclusions were:

1. Adequate national defense required a more prominent role for air power with a sustained aircraft procurement program to provide for replacement of obsolescent types.
2. Military air power should be built on the foundation of a privately operated, economically healthy, and technically competitive aircraft industry of sufficient size to support peacetime military requirements and capable of swift expansion in time of war.

These groups concluded that the task of providing technically superior aircraft on a scale required for the military defense of the nation was far too complex for the Army or the Navy. The job for the government in the air power team, the two groups reported, was to create a favorable economic climate that would attract technical skill, capital, management, and productive facilities necessary for the aircraft industry to expand and sustain itself by designing and manufacturing for the military market.

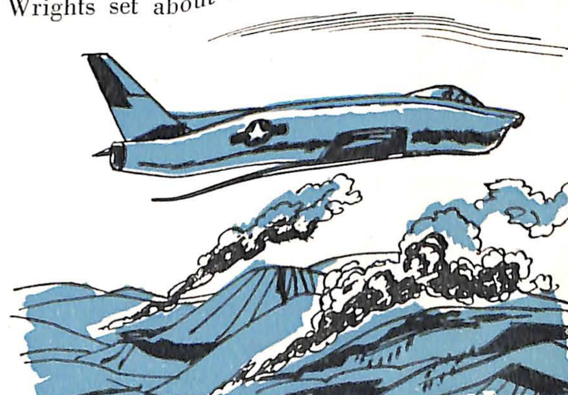
Young Charles A. "Lucky" Lindbergh perhaps more than any other one man gave the enormous impetus to aviation that was needed in 1927, when he made the first solo transatlantic flight in his tiny monoplane, the Spirit of St. Louis, and became overnight an international hero.

By the end of 1928, the nation's airlines had doubled their 1927 flying mileage, trebled the amount of mail carried, and hauled four times as many passengers. Most of the enthusiasm in flying which brought about this expansion can be quickly traced to "Lindy's" transoceanic flight.

The late 1920's and early 1930's produced three important developments in aviation—the air-cooled radial engine, the low-wing monoplane, and the use of all metal construction. Silhouettes of aircraft to be produced during the next 20 years were to be essentially similar.

WHEN the Wright Brothers were convinced that they could build and fly a heavier-than-air machine, the internal gas combustion engine was still extremely crude. As brilliant as these men were in their aerodynamics, engine builders of 1957 feel that the Wrights' power plant was an equally revolutionary accomplishment.

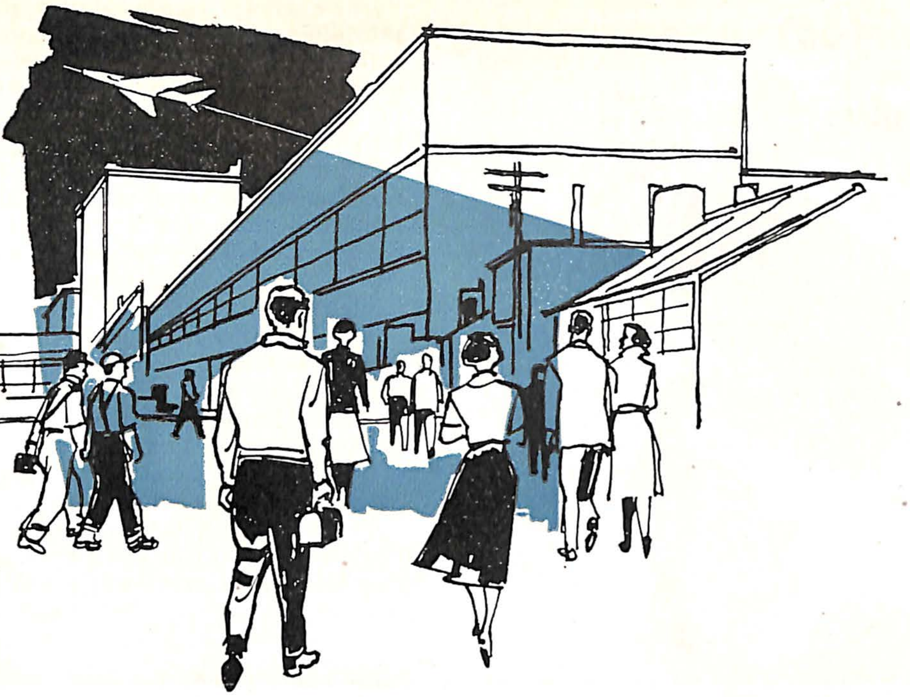
The Wrights had sought aid from the auto manufacturers trying to interest them in the design of an eight-horsepower engine that would weigh not more than 20 pounds per horsepower. The automotive people refused declaring that such a ratio of horsepower to engine weight was an impossibility. So, the Wrights set about to do the job themselves



with the help of their chief mechanic.

When their engine was completed they had achieved another miracle. It weighed 170 pounds and developed 16 horsepower for 15 seconds, dropping, however, to 12 horsepower after 15 seconds. Even so, the performance for its weight was almost six pounds per horsepower under what the auto manufacturers had termed impossible.

The aircraft engine through World War I—and for a long time after—was liquid cooled. But in the early 1920's engine manufacturers began experimenting with air-cooled engines believing that great savings in weight-to-horse-



power could be made. By 1925 air-cooled engines "were in" and the next five years saw U.S. airmen shattering existing standards for both land planes and seaplanes. With this exciting new engine military pilots flew higher, farther, and faster than they had ever gone before.

THE Boeing B-9 was the first low-wing all metal bomber. Design of this plane was the beginning for modern streamlining. The low wing design brought an end to struts and bracings and guy-wires of the earlier bi-planes.

Coupling the radial air-cooled engine, the low-wing monoplane design, and all metal construction together, two famous aircraft evolved: the DC-3 and the B-17. For nearly 20 years the DC-3 and its military counterparts the C-47 and R4D have served the world of aviation.

But perhaps the most earth-shaking military aircraft of the 1930's was the B-17 Flying Fortress, first delivered to the Air Force on March 1, 1937. At that time, a renascent Germany under the megalomaniac Adolph Hitler was already flexing its military muscles, and threatening the West. In Japan, the war lords, fresh from their conquest of Manchuria, were looking toward domination of all Asia. The B-17, which was to prove the ruination of the Axis' dreams of world conquest and dominion, came along not a moment too soon.

Events moved swiftly in the years between 1937 and December 7, 1941, when Billy Mitchell's dread prophecy came true, and the Japanese bombed Pearl Harbor. America was, at this time, the "arsenal of democracy," tooling up and producing aircraft and other weapons of war not only for the U.S. defense, but for the rest of the free world as well.

Not only were the ranks of the Air Force swelled in ever-increasing numbers, but hundreds of thousands of peace-loving Americans took jobs in defense industries. Despite our serious losses at Pearl Harbor, we had used the interval between the outbreak of World War II—September 1939—and the sneak attack of December 7, 1941, to good advantage.

Many volumes, whole libraries even, can scarcely contain an adequate history of air power during the Second World War. One fact stands out: America's tremendous productive capacity, backed up by the know-how of trained cadres of experts in our aircraft factories, made the outcome of World War II inevitable.

In the closing days of the war, by the time the Germans managed to send jet fighters into the air; even though they harassed England with their V-1 and V-2 weapons—the forerunners of today's guided missiles—they were already beaten by the skill and daring of America's Air Force and the industry which backed it up.

World War II was the great proving ground of the airplanes as a weapon of war. From this crucible sprang the global strategy of aerial warfare our military planners are daily perfecting. Among the great American-built airplanes of World War II, which helped to forge global victory, were the Air Force's B-24, the B-25, the B-26, and the B-29; the P-38, the P-47, the P-51 and the P-61. Guarding the sea lanes were Navy's F4F and F4U fighters and the PBY, the TBD, P2V, JM and SB2U bombers.

V-J Day saw the U.S. with the mightiest air armada ever assembled. The tragedy was that this armada was scuttled almost overnight. Air Force personnel strength, which reached a peak of 2,372,292 in 1944, dropped off to 455,515 by January 1, 1946. Aircraft strength fell from a wartime high of 75,000 to about 30,000. The downward spiral continued until by June 1947, there were only 305,827 men in the Air Force, and less than 10 of the 38 air groups manned were considered operationally effective.

THE aircraft industry went into a postwar slump, too. Military aircraft production dropped from a wartime high of 96,000 to 1,669 in 1946. Hundreds of military contracts were cancelled within days of the "Cease Fire." Another period of belt-tightening was underway, ameliorated only by the crying need of the nation's airlines for new equipment which had necessarily been denied them during the war years when all-out military production was the order of the day.

Meantime, the "cold war" between the free nations and the communist slave world threatened always to turn into a hot war, and America was badly unprepared. Then, suddenly, the Russians isolated the city of Berlin, in a showdown with the West, and once again the aircraft proved its use—this time as a political weapon. The Berlin airlift showed the Russians that the U.S. would not be bluffed. It also showed that strategic airlift could supply the needs of an entire city—a lesson of major importance for the future of logistics.

If the "cold war" accomplished nothing else, it proved the folly of lowering our defenses in the atomic age. Slowly but surely during the postwar years, the U. S. rebuilt its aerial strength. The Air Force, by now a co-equal and separate branch of the armed services, began the switchover to great new turbojet and turboprop engines which permitted fighter and bomber pilots to fly their planes at hitherto undreamed speeds.

BY 1950, when Communism decided the time was ripe for overt military aggression in Korea, the U.S. was again tooling up. The Korean air war was decisively in favor of our jet fighters. We knocked the Russian-built MIG's out of the sky at the unheard-of ratio of fourteen of theirs to every one of ours.

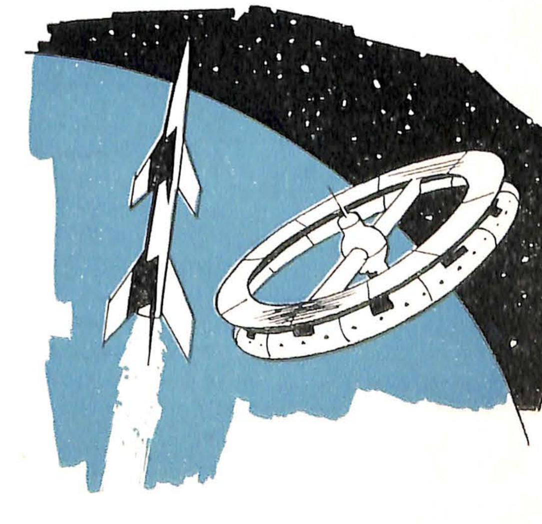
The early 1950's with powerful turbojet engines—and screaming *rocket engines*—saw the sound barrier overcome. Guided missiles were developed and integrated into our inventory. A gigantic continental air defense establishment was inaugurated. Supersonic fighters became an integral part of our Air Force. Mach 2 speeds were built into the powerplants of our aerial weapon systems. Aerial refueling from gigantic tankers extended the range of our heavy bombers to the point where they became truly intercontinental.

Today, work goes forward on the deadly intercontinental guided missiles, both the cruise type and ICBM—the intercontinental ballistics missile. Fantastic altitudes have already been reached by our aircraft, and space flight is no longer merely the idle dream of science fiction writers.

Despite the seeming emergence of a new spirit of conciliation on the part of the Russians, the U.S. today is keeping its guard up, in the knowledge that its deterrent power is the fulcrum between peace and the horrors of nuclear war.

But as the U.S. Air Force reaches the anniversary of its first half century, it is undergoing another period of belt-tightening, as is the aircraft industry which provides its equipment. Budgetary considerations are swiftly reducing our retaliatory capabilities, *even though no accord* on disarmament *has been reached with the USSR.*

As the USAF enters its second half century, let us fervently pray that, once again, time is on our side, and that when and if a showdown comes between the Free World and the Slave World, we will be prepared.



ICC Rulings May Threaten Free Competition, Boost Charges

(*Continued from page* 1)
interpretation placed on the legislation.

Without discussing the motives or arguments for or against the legislation and its interpretation by the Interstate Commerce Commission, the practical effect has been to stifle competition in pricing carrier services. The principle of competitive, free enterprise, with resultant public protection, among the carriers has given way to the leavening influence of economic regulation.

A brief history of the legislation passed since the Interstate Commerce Act became law in 1887 demonstrates the trend away from competitive practices.

One of the prime purposes of the act passed in 1887 was to eliminate pools which allocated carrier earnings. The railroads promptly sought other means to preserve pooling and set up an association for the purpose of arriving at agreements on rates among competitive carriers. The Supreme Court in 1897 ruled this was in restraint of trade and the association was dissolved.

However, in 1906 an amendment to the Act was passed which required the carriers to give 30-days notice for any increase or reduction in rates. The requirement prior to that time had been only a 3-day notice for any reduced rate. This change, in effect, restored the association agreement which had been struck down by the Supreme Court.

Vast Authority Granted

The Transportation Act of 1920 was a vast shift in our national transportation policy. This act gave the Commission power of economic regulation over the carriers, and a provision instructed the agency to make rates in a manner that would assure reasonable earnings to the railroads. Another significant provision with far-reaching effects was the power given the Commission to establish a floor below which the carriers could not go in setting their rates. Previously, the Commission had powers to prescribe only a ceiling to rates.

The greatest change in carrier regulation came in 1940 when Congress passed the National Transportation Policy. The policy states that its objective is to promote safe, adequate, economical and efficient service. But it also granted the Commission power to prevent "unfair or destructive competitive practices." This power changed the objectives of the 1910 act, designed to prevent inordinate increases, and today 90 per cent of the suspension orders of the Commission are issued at the request of carriers seeking to prevent reduction in rates.

The impact of these laws is apparent: Prior to the first general rate increase authorized in 1914 by the Commission, the first class rate between New York and Chicago was 75 cents per hundred pounds. Today that rate is $4.24, a net increase of 465 per cent. In that same period the wholesale commodity index has increased 168 per cent.

The increase in rates widened the difference between charge for carload and less-than-carload shipments. The ingenuity of traffic managers partially met these increases through consolidation of several small shipments to make up a full carload. The savings for a West Coast manufacturer drawing upon an East Coast supplier amounted to as much as $426 per carload.

Freight forwarders are engaged in the business of consolidating shipments, but the price is fixed as close to the less-carload rate as possible. The freight forwarders were brought under the regulation of the Commission in 1940, removing another facet of the free enterprise system from freight transportation. However, shippers were successful in exempting shipper associations from this legislation which retained for them one of the few remaining tools for keeping down freight charges.

Aviation Case Pending

The excellent relationship between customer and seller which has flourished under our free enterprise system is glaringly absent in the relations between carrier and shipper. For example, if a man purchases a suit of clothes from a reputable dealer and finds them defective the seller will make every effort to satisfy the customer. This relationship, brought about by competitive factors, does not exist between shipper and common carrier; in fact, if the carrier attempted to satisfy, in this fashion, a shipper whose goods had been damaged, the carrier would be liable for prosecution by the ICC.

There is now before the Commission a rate case that could add millions to the cost of air power if the ICC grants rail and highway carriers permission to increase shipping costs. The common carriers seek to limit their liability for loss or damage of shipments to $3.00 per pound. If the shipper requires from the carrier liability exceeding $3.00 a pound, he would be required to pay ten cents for each $100 in value that the shipment exceeds the basic $3.00-per-pound liability.

The rail and motor carriers want to be relieved of all liability for their negligent acts that result in damage exceeding $3.00 per pound. The carriers claim the change is not to obtain additional revenue. Their objective is to be relieved of full liability for their negligence unless the shipper will pay a premium.

This case is illustrative of the steady move toward higher shipping costs instigated by the carriers.

Traffic managers today engender most of the competitive incentives that are the surest avenue to improving service and lowering costs. This can only come about by a reassessment of transportation policy that would encourage the individual carrier to manage his operations so that business would be attracted by better service and lower rates.

AIA Export Committee Meets

Foreign aviation officials were honored at a dinner during the meeting of the Aircraft Industries Association Export Committee in New York recently. Maj. Gen. J. M. Weikert (USAF-Ret.), seated at far right, Chairman of the AIA Export Committee, talks with (left to right) D. Le Roy du Vivier, Sabena Belgian World Airlines; Akira Wakasugi, Japan Air Lines; Ted H. Osterman, Lufthansa German Airlines; and Juan H. Marples, Argentine Airlines.

Hurricane Hunters Fly Rugged Planes in 'Atomic Plus' Weather

If 1957 follows the weather pattern of the past ten years, residents of the Gulf Coast and the eastern seaboard can expect nine tropical storms and five full-blown hurricanes between now and December 1—each with an energy force equal to that of 20,000 Hiroshima-type atomic bombs every 24 hours.

The hurricane picture is not altogether black, however, because the Airborne Early Warning Squadrons, whose job it is to track the big blows, estimate their potential strength, and relay warnings to ships and shore installations, stand ready to fly into the middle of the severe storms—even when all other aircraft have been "nailed to the ground."

The Navy "Hurricane Hunters" are credited with saving 93 per cent of the lives formerly lost to rampaging hurricanes by getting the inside track on tropical disturbances long before they threaten life and property. They fly veritable flying laboratories with electronic fingers which take the pulse of storms.

Their equipment has to be rugged in order to fly through extreme turbulence and winds ranging in velocity from 40 to 120 miles per hour, and part of the credit for the savings in life and property accruing from the activities of the Hurricane Hunters must go to the aircraft industry, which builds planes which can take it.

'Hot-Rod' Can't Keep Up With Jet Bomber

One of the strangest "drag races" in the history of hot-rodding takes place quite often at one aircraft manufacturer's airfield. The race is between a V-8 station wagon and a jet-powered heavy bomber.

The station wagon, because of its inferior speed range, is given a "handicap" of about 500 feet—nearly two city blocks—before the mammoth jet bomber releases its brakes. Within half a mile, the bomber is going 70 miles an hour, and it then overtakes the station wagon traveling at about the same speed. Next, the bomber decelerates, allowing the wagon to catch up for a second try.

Object of this offbeat drag race is not to prove that the bomber is faster than the station wagon—a fact which both aircraft and station wagon drivers readily admit. The high-speed taxi runs are utilized to give the bomber's ground crewmen, aboard the station wagon, a good look at the ground operation of the landing gear, brakes and outrigger gear. Men in the station wagon maintain radio contact with the bomber while watching its steering, anti-skid features, or braking.

Deepest, Dampest Seat Ejection on Record

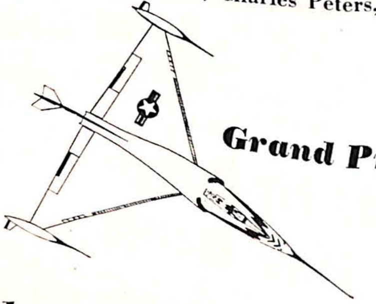
A Navy pilot owes his life to the ingenuity of aircraft scientists and engineers who developed emergency ejection seats rugged enough to work under water as well as high in the air.

In a recent unusual accident, a Navy lieutenant was strapped into the seat of his jet interceptor when the brakes failed and his aircraft rolled tail-first over the side of an aircraft carrier on Pacific maneuvers.

The force of the dunking momentarily stunned the pilot, and he was 75 feet below the surface before he tripped the ejection device. He was hurled from the plane still in the seat, and as the straps were released he was able to swim to the surface. He was rescued by a helicopter.

Future Aircraft Engineers?

Three Warren, Ohio, youths, who won a trip to Washington for the best designs of the "Jet of Tomorrow" in a contest sponsored by a Warren, Ohio, welding and manufacturing firm, Air Force sub-contractors, are shown above with General Orval R. Cook, President of the Aircraft Industries Association. General Cook presented each with a model of one of the latest American jet transport planes. Left to right in the photo are Ronald Miller, Charles Peters, General Cook, and Daniel Meus.



Grand Prize

1st Runner-Up

2nd Runner-Up

The top officials of the United States Air Force and the Aircraft Industries Association, USAF Chief of Staff Thomas D. White, and AIA President Orval R. Cook, have a new slant on how today's teen-agers envision the jet plane of the future.

Designs for the "Jet of Tomorrow" were presented to the two aviation leaders by three Ohio high school boys who won a trip to the nation's capital in a contest sponsored by a Warren, Ohio, manufacturer of jet plane components. The contest required each entrant to develop, from original design ideas, a detailed engineering drawing covering fuselage, wing plan, power plant and controls.

The contest was conducted this spring among nearly 15,000 students in the Trumbull County schools. Judges included, in addition to a school teacher, the commanding officers of Navy and Air Force units in Northeastern Ohio. First place went to Charles Peters, 15, a ninth grader. Runners-up were Daniel Meus, 15, also a freshman, and Ronald K. Miller, 18, a senior.

Aircraft Maintenance Men Make Clean Sweep Of Wing Area Equaling Twenty Rooms

The harried housewife who is tired of sweeping her home should have sympathy for the personnel of one U. S. aircraft plant who periodically sweep an area equal to about four average five-room houses—the 185-foot wings of a modern jet bomber.

This king-sized housekeeping task is performed in the final assembly area some 17 feet above the factory floor at the highest point. The wing area alone is 4,000 square feet, but actually, the entire airplane receives a good sweep-down at regular intervals until the time arrives to roll the 400,000-pound bomber from the production line.

The aircraft can be swept off completely in about three hours, with careful attention given to each section. The wing job, including the flaps, takes half an hour to complete.

But aircraft employees who make the clean sweep have one great advantage over the housewife. On the wing there isn't any furniture to move about.

Aviation Booklet Gives Impetus To Study Of Aircraft Industry

A revealing glimpse of that remarkable "city-in-itself"—the aircraft plant—is given in *Aircraft Number 116*, one of several booklets published by the National Aviation Education Council, a non-profit organization dedicated to strengthening the educational foundations of American youth living in the air age. This is the story of the birth of a modern, jet plane—and the factory that gives it life.

Vastly different from its earliest ancestors, which were made mostly of wood and fabric, and held together by bolts, wire, and glue, *Aircraft Number 116* is a very complex machine, requiring more than 8 years of exacting work, careful planning and the skill of thousands of people, before it becomes a reality on the flight line.

The story traces all the complicated processes involved in the development of 116, from the time it is just a gleam in the design engineer's eye until it is a finished product, rolling majestically down the final assembly line. There are years of planning, testing, changing, and more testing. For each of its 50,000 parts, there are technical questions that have to be answered and problems solved. Finally, after the prototype has proved in actual flight the airworthiness of the design as it was made, as it was checked in the wind tunnel, as it was shown in the more than 18,000 blueprints and constructed in the mock-up, the production team goes into action.

The factory manager, like the battlefield general, plans his production campaign. He trains his soldiers who are the shop workers, and he sees to it that his lines of supply are well filled. Under the experienced hands of the riveters, the assemblers, the welders, the stampers, the inspectors, the dimplers and the painters, aircraft number 116 is born.

Designed for the 10 to 15 age group, this profusely illustrated booklet may be obtained by writing: National Aviation Education Council, 1025 Connecticut Ave., N. W., Washington 6, D. C. Price 50 cents.

Airborne Postal Cards Save Millions, Time

Some time next month the 100 millionth air mail postal card will roll off the presses at the Government Printing Offices, representing a savings to the mailing public of more than $2,000,000.

The postal card became airborne more than eight years ago, when it was made a part of the postal service in January 1949. Conceived by Californian Milt Forrest, the air mail card is practically as fast as a telegraphic night letter. And cost of passage is only 4 cents!

The air mail postal card is finding increasing usage in business and industry as a fast, economical means of communication. But Milt Forrest is far from content. He feels the Post Office still has a big selling job to do on the card. According to his own surveys, only 7 out of 10 Americans are aware that they can send an air mail message for 2 cents less than the popular air mail price.

The Post Office department has realized tremendous savings from the handy, speedy message form, since the 4 cent air mail card can be flown for a fraction of the cost of an ordinary air mail letter.

The Rain On The Plane Stays Mainly Down The Drain

Anyone who has ever driven an automobile through a blinding rainstorm with faulty or inoperative windshield wipers can appreciate the problems of a pilot trying to land a high-speed jet bomber in a downpour, particularly when he must rely on his eyesight to line the bomber up with the runway and accurately estimate his height from the ground.

An aircraft company has solved the problem handily, by blasting hot engine air over the windshield, deflecting the water and keeping the windshield itself as dry as the Sahara.

Jet blast rain deflectors have previously been installed on fighters and interceptors, but far more complex channeling and equipment are required to keep larger bomber windshields rain-free. Such attention to detail is another facet of the aircraft industry's continuing program to increase the safety and combat efficiency of the crews and equipment of our military services.

Explosive Technique

Because of their constantly increasing speeds, modern aircraft require high-strength, heat-resistant, absolutely smooth metals to thwart the thermal thicket and insure stability in flight.

Scientists in the aircraft industry are now exploring the use of "explosive tools" to accomplish the job of shaping hard, difficult-to-form metals into complex contours devoid of rivets. Such an "explosive forming" method involves blasting the metal to be formed with forces from shock waves traveling at the incredible speed of 18,000 miles per hour.

Gunpowder, one of the cheapest, most powerful and easily controlled sources of power, is being investigated for the task, along with .22 caliber rifle cartridges and eight-gauge shotgun shells. The aircraft company working on the explosive-forming development project carries on its experiments in a bomb shelter of World War II vintage.