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AIRCRAFT
YEAR BOOK

1926

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INTRODUCTION

The editors of the Aircraft Year Book acknowledge their indebtedness to the officers and personnel of the U. S. Air Service, Navy Bureau of Aeronautics, Marine Corps Aviation and the Air Mail Service of the Post Office Department. Material and helpful suggestions also have been received from the Department of Commerce, Department of Agriculture and the Department of the Interior. Especial thanks are due to the National Advisory Committee for Aeronautics, Dr. George W. Lewis, Executive Officer. Grateful acknowledgement is expressed to Mr. R. C. Wood for foreign data.

Aeronautical Chamber of Commerce of America, Inc.

New York City, May 15, 1926.
CHAPTER I

AVIATION RECOGNIZED AS A BUSINESS—IT TAKES ITS FIRST STEPS TO PROVE ITS USEFULNESS IN COMMERCE AND ITS INDISPENSABILITY IN NATIONAL DEFENSE

If it is possible, in a few words to epitomize the situation in which aviation found itself at the beginning of 1925, the following may be said: It was underrated by a few influential officers of the Army and the Navy; it was ignored, in so far as practical action was concerned, by leaders in public life; it was regarded askance by business.

At the time these words are written (early in 1926), it may be stated that much of the former reserve in the high commands of the Army and Navy has disappeared; positive and definite attention has been given by the Administration and Congress; and, finally, with the entrance of responsible men and substantial capital into air transport, the place of aviation in commerce and industry is now very generally recognized.

1925 A FRUITFUL YEAR

There was, undoubtedly, a renaissance of flying. Two hundred and ninety operators returned reports to the Aeronautical Chamber of Commerce. Nearly five and a half million miles were flown and over 200,000 passengers were carried in 1925.

Contracts for twelve air mail routes have been let to private operators, whose resources total well into the millions.

Large sums of money are being saved through the use of aircraft in agriculture and forestry, and an extensive market for flying is thus being opened up.

Both airplanes and airships have occupied a generous portion of first page space in the press for their services in transporting exploration parties through the arctics and the tropics.

Aerial photography is being favored in re-mapping practically the entire United States.

The urgency of aeronautical education, in the schools and out, has enlisted the interest of several of the nation's wealthiest men, one, Daniel Guggenheim, endowing a laboratory at New York University, with a grant of $500,000, and shortly afterward setting aside $2,500,000 additional as a Fund for the Promotion of Aeronautics.
Curtiss Seaplane Racer in which Lt. J. H. Doolittle, U.S.A.S., won International Race for Schneider Cup, 1925, at speed of 232 m.p.h.
Out of the loss of the Shenandoah have been drawn practical lessons, and our airship program promises, at this writing, to be more productive than before.

Basic legislation for the regulation and stimulation of civil aeronautics appears to be assured.

**SPEED RECORDS TO UNITED STATES**

In international events, Curtiss planes and engines, and a Navy flying boat, with Packard engines, have added seven world records—speed for 100 and 200 km. in land planes, straightaway and 100 and 200 km. in seaplanes, and duration for flying boats. But, as against our few records (reflecting, possibly, Governmental indecision in 1924, when preparations had to be made for 1925 events) France obtained sixteen, Holland one and Italy the surprising number of eighteen. The latter may be explainable by the fact that Mussolini is putting into effect the promises he has made with regard to stimulating the Italian aircraft industry.

This edition of the Year Book presents a story of absorbing interest covering aeronautics abroad. It is seen, at this writing, that the United States has fourteen air transport routes. Of these, twelve are under the Kelly law and two under authority of foreign mail appropriations. We have probably more commercial operators than any other nation, due, undoubtedly, to the vast extent and the natural characteristics of our country. In twenty-eight foreign nations, we find a total of 102 air transport lines, most of them not regularly operated, and none, so far as can be determined, lacking some sort of subsidy. Of these 102, forty-eight are German, either in whole or in part, and sixteen are French. The steady expansion of German aviation at home and abroad, in theoretical development and in practical operation, presents an impressive picture. Germany is, today, undoubtedly the dominant world figure in aviation, although the French may be spending more money. The extent of French aeronautical resources, military and civil, are generally well known; but as to Germany's, scattered throughout a score of nations, we can only conjecture.

**AIRCRAFT INVESTIGATIONS CONTINUED**

Early in 1925, so far as the United States was concerned, it was still alleged, upon untrustworthy information and carelessly repeated by the irresponsible or uninformed, that an “aircraft conspiracy” existed. It was generally accepted that our air services were dangerously deficient in flying equipment. It was obvious, to those who had opportunity to study the facts, that our aircraft industry, so vital
Vought Seaplane (Wright engine) catapulted from battleship.—Photo, International News Reel.
Ford-Stout All-metal Acroplane, Motored with Three Wright Whirlwind Engines. Property of National Air Transport, Inc.
to our national defense, was on the verge of disappearance, due partly to the lack of a national policy and partly to the destructive tendencies of government competition and methods of purchasing. It was apparent that in commercial aviation we were far behind the rest of the world.

THE SELECT COMMITTEE OF INQUIRY INTO OPERATIONS OF THE UNITED STATES AIR SERVICES, OF THE 68TH CONGRESS

In the seven years between the time Congress declared war on Germany and March 24, 1924, there were at least twenty aircraft investigations, none of which brought forth truly constructive results. On March 24, 1924, the House of Representatives passed H.R. 192, calling for yet another inquiry, and under authority of this resolution the Speaker appointed the Select Committee of Inquiry into the Operations of the United States Air Services. This Committee, which in the conduct of its hearings demonstrated itself to be determined to get at the truth, earned for itself, through its conclusions, the unique record of being the only congressional investigating body of the sort to report constructively for aviation. Its membership included Florian Lampert, of Wisconsin, a La Follette Republican, chairman; Randolph Perkins, Republican, of New Jersey, Chief Interrogator and Chairman of the Sub-Committee on Procedure; Albert H. Vestal, of Indiana, the Republican Whip, and Charles L. Faust, of Missouri, and Frank R. Reid, of Illinois, both Republicans. Mr. Faust subsequently became a member of the important Ways and Means Committee. Mr. Reid, through the study of the subject made during the hearings, was led in the fall and winter of 1925, to be chief civilian counsel for Colonel William Mitchell, when the latter was court martialed. Of the four Democrats, two were retiring from Congress, but the other two, Clarence F. Lea, of California, and Aming S. Prall, of New York, united with the Republican majority in filing a unanimous report. Mr. Lea brought to the committee much of value, as he had already served through a previous aircraft inquiry. Mr. Prall, one of the few men going to Congress from business life, quickly grasped the business aspects of aviation and joined frequently with Mr. Perkins in pursuing constructive lines of inquiry.

The Lampert-Perkins Committee began hearings Oct. 4, 1924 and ended them March 2, 1925, but, with the permission of the House, did not file its report until Dec. 14, 1925. The attitude of the committee encouraged the giving of critical testimony, which had hitherto been unvoiced, or had the effect of being unvoiced, due to the astonishing publicity given by the press to the hearings. The
outstanding witness was Colonel (then Brigadier General) William Mitchell. Colonel Mitchell's term as Assistant Chief of Air Service was expiring.

The Hoover Committee

Of all the pro-aviation arguments made by the Army and Navy, none has been more logical than this:

The aircraft industry is vital. We must develop it. This development can come either through huge appropriations, or through the cultivation of the civilian market. The latter is wise and proper, because, aside from lightening the burden on the taxpayer, it creates a "going reserve" in flying equipment, trained personnel, airways and fields, and, more than all, the "air-mindedness" of the public.

Each year since 1919 basic legislation for civil and commercial aviation has been urged, and each year it has failed. The principal reason has been, not opposition, but apathy. When the 68th Congress adjourned without having enacted civil air law Secretary of Commerce Hoover felt that the time had come for more positive action. In June, 1925, therefore, in collaboration with the American Engineering Council, Mr. Hoover appointed a Joint Committee on Civil Aviation, under the chairmanship of J. Walter Drake, Assistant Secretary of Commerce, instructing this committee to review the aviation situation in its economic aspects, and report its findings and recommendations. Membership of this committee, under Mr. Drake, was as follows: Prof. J. W. Roe, Past President Society of Industrial Engineers, Vice Chairman and Director; J. Parker Van Zandt, Lt. U. S. A. S., Secretary; Luther K. Bell, at that time Traffic Manager U. S. Air Mail Service; Dr. W. F. Durand, President American Society of Mechanical Engineers; E. S. Gregg, Chief, Transportation Division, U. S. Department of Commerce; Prof. Alexander Klemin, New York University; C. T. Ludington, aircraft operator, and Prof. Edward P. Warner, Massachusetts Institute of Technology.

This committee, unlike any that preceded or followed it, confined itself to the commercial phases—a part of the problem conceded to be the most important, yet which, both before and afterward, was made secondary to the military. The Hoover Committee, on Nov. 26, 1925, submitted its report.

The President's Aircraft Board

Upon completion of his tour of duty as Assistant Chief, Mitchell reverted to his normal rank of colonel and was assigned as air officer of the Eighth Area, with headquarters at San Antonio. Developments during the late summer, led Mitchell, on Sept. 5th,
President's Aircraft Board. (Left to Right) Frank F. Fletcher, Rear Admiral, U.S.N. (retired); J. G. Harbord, Maj. Gen. U.S.A. (retired); Dwight W. Morrow of J. P. Morgan & Co. (Chairman); Hon. James S. Parker, member of Congress; the President; Hon. Hiram Bingham, U. S. Senator; Dr. W. F. Durand; Judge Arthur C. Denison; Howard E. Colin; Hon. Carl Vinson, member of Congress.
to issue a statement in which he attacked both War and Navy Departments, alleging that they were "incompetent, criminally negligent, and almost treasonable" in the administration of their air services. (See Chronology.) Mitchell's charges received great publicity and were regarded by some as being imbued with more than personal significance. Reference is thus made to the Mitchell case, not to attach undue importance to it, but in order to show how the third inquiry of 1925 came into being.

One week to a day—Sept. 12th—after Mitchell's statement was issued. President Coolidge appointed an aviation investigating committee, in response to a joint letter to him from Secretary of the Navy Wilbur and Acting Secretary of War Davis, in which it was stated that: "For the purpose of making a study of the best means of developing and applying aircraft in national defense and to supplement the studies already made by the War and Navy Departments on that subject, we respectfully suggest that you, as Commander in Chief of both Army and Navy, appoint a board to further study and advise you on the subject."

As representative of substantial conservatism, it would be impossible to find a better example than this board which organized itself under the chairmanship of Dwight W. Morrow, member of the banking firm of J. P. Morgan & Co., and classmate of Mr. Coolidge's. With Mr. Morrow were a retired major general—James G. Harbord—and a retired rear admiral—Frank F. Fletcher; a physical scientist of note, Dr. William F. Durand; Judge Arthur C. Denison; Representatives Carl Vinson, of the House Naval Affairs Committee, and James S. Parker of the House Committee on Interstate and Foreign Commerce; Senator Hiram Bingham, formerly a Colonel in the Air Service, and member of the Senate Committee on Military Affairs; and Howard E. Coffin, long a national figure in aviation.

REPORTS, FINDINGS AND RECOMMENDATIONS

Among the findings and recommendations of the Congressional (Lampert-Perkins) Committee, are the following:

Charge of Aircraft Trust Unfounded.—Of the charges concerning an "aircraft trust" and a "conspiracy to defraud the government," the Committee, upon the facts as laid before it, found: "That there was no evidence of corruption on the part of the officers of the Army and Navy or the members of the aeronautical industry submitted to the Committee. That contracts given to aircraft builders have not resulted in excessive profits, but, on the contrary, the aircraft industry, dependent on Government contracts, has been liquidating and going out of business to such an extent that the statement
Wright Aeronautical Corporation's *Apache*, as land and seaplane.
in the Lassiter Board report that "the aircraft industry is rapidly diminishing under present conditions and will soon practically disappear," is justified. That the charges and allegations that there existed an aircraft trust or conspiracy was not proven. Both the Manufacturers Aircraft Association and the cross-license agreement upon which it is based had been investigated nine times in eight years. Two of these investigations having been made by the Department of Justice. Both have sustained the legality of the Manufacturers Aircraft Association and the cross-license agreement. That the findings of these legal investigations should now be accepted as conclusive."

Equipment and Its Cost.—As to what has been procured through total Army and Navy air expenditures for the five years, 1920 to 1924, inclusive, the Committee found that of the total of $424,234,007.00, less than 10 per cent (or about $40,000,000) had actually gone for the purchase and overhaul of airplanes and motors. It was found that "both Army and Navy have deteriorated in equipment and morale; that deterioration in equipment is due in large part to the increasing age of the war surplus equipment issued to the services." "Too much has been spent attempting to put the Army and Navy in the business of manufacturing airplanes, experimentation, research, etc.," the committee observed, "and too little has been spent in actual purchase of airplanes and engines."

Aircraft in National Defense.—The Committee was tremendously impressed with the importance of aircraft in national defense. It reported: "Aircraft will be the first resort of our country in case of a war emergency. It is one of the most essential arms of our military defense. Every new development of the modern airplane increases its relative importance. It has introduced an element of mobility in military operations that compels a revision of all military plans of preaircraft days. It has lessened the importance of the battleship, but has not eliminated the necessity of it. The airplane becomes the necessary auxiliary and defender of the battleship. . . . The question of the relative standing of the United States in air power among the nations of the world is largely a matter of opinion. It is clear, however, that the standing of the United States is not higher than third nor lower than fifth in the air power of the world."

Concerning the Aircraft Industry.—The Lampert-Perkins Committee disclosed that the aircraft industry, which, at the close of the World War had an annual production capacity of 21,000 planes, is so far demobilized that it could not now produce more than 1,200 planes per annum, "without sharp expansion in capital and equipment and after months of effort. Unfortunately for the industry," continues the Lampert-Perkins Report, "many serious errors of departmental policy have been committed—errors which have brought the industry to the verge of ruin described in the Lassiter Board report and which have deprived the Nation of a valuable source of strength."

The Lassiter Board Report above referred to was of a Committee of the General staff dated April 24, 1923, contained the following language: "The aircraft industry in the United States at present is entirely inadequate to meet the peace and war time requirements. It is rapidly diminishing under present conditions and will soon practically disappear."
For this alarming condition, the Lampert-Perkins report found the following to blame:

"(a) Lack of continuity in Government orders.
(b) Losses on Government contracts, both experimental and production.
(c) Direct competition by Government plants.
(d) Failure to recognize and protect design rights.
(e) A destructive system of competitive bidding.
(f) Discouragement of enterprise and individual efforts as the result of more than twenty investigations of various sorts in a period of eight years.
(g) Lack of confidence and mutual understanding among the contractors themselves.
(h) Failure of the industry to develop commercial and export trade."

**LAMPERT-PERKINS COMMITTEE RECOMMENDATIONS**

The Lampert-Perkins committee returned twenty-three definite recommendations. The principal ones affecting the industry are as follows:

"That one single government civil agency be given sole charge of procurement of aircraft, engines and equipment, to the end that duplication in expense be avoided, uniformity of equipment promoted, and a continuous and definite policy established looking to the strengthening of the sources of supply, the maintenance of industry, the promotion of the aircraft production capacity of the Nation, and the establishment of a sound policy of Government procurement.

"Congress should at once pass a law permitting the procurement of aircraft, engines and aeronautical instruments and accessories without competitive bidding under restrictions that will promote the best interests of the Government.

"That Congress authorize the procurement agency to recognize rights in design of aircraft, engines and accessories.

"That not less than $10,000,000 should be spent annually for the War Department and like sum for the Navy Department for the procurement of new flying equipment, constructed by the civilian industry. The orders should be based on a continuing program.

"That there be established a separate and all-inclusive budget for each of the air services, the allocation of the appropriations to be by law.

"That a five year program of construction, education, training, appropriation and commercial encouragement should be formulated and carried out.

"That the Federal Government cease competing with the civilian aircraft industry in the construction of aircraft, engines, and accessories.

"That the War and Navy Departments should survey, condemn and destroy all obsolete and unsafe airplanes.

"That the War Department release for general commercial use at least two-thirds of the war-built Liberty engines now held in storage at moderate prices."

(For air law recommendations, see Chapter X)
(Top) Boeing Airplane Co.'s Navy Patrol Seaplane P.B.-1. (Bottom) Navy P. N. metal hull, Packard engines.
AVIATION RECOGNIZED AS A BUSINESS

THE HOOVER COMMITTEE REPORT

The heart of the Hoover Committee report, that regarding basic air law, is discussed in Chapter X. This committee's work was largely fact-finding, but Secretary Hoover's comments in his foreword are especially significant:

"The element of time saving in transportation has a large economic importance. Today the airplane is the fastest means of transportation. It is evident that during the last few years the development of aviation in this country has been steadily approaching the point of self-supporting application through private initiative in commercial transportation. It is not necessary that the Government should subsidize commercial aviation in this country, but it is highly necessary that it should provide certain services which are essential as a basis for its development. The Government has rendered such services for over a century in connection with ocean navigation, and there should be created without further delay a Bureau of Civil Aeronautics in the Department of Commerce through which the Government shall make possible the development of commercial aviation by providing navigational aids and regulation... The public and Congress would do well to give prompt consideration to the conclusions of the Committee. They clearly indicate that no further time should be lost in proceeding to make available in a commercial way to the whole country the benefits of fast transportation by air. The United States leads the world in railway and motor transportation. It will undoubtedly make rapid progress in the commercial use of airplanes."

FINDINGS OF PRESIDENT'S AIRCRAFT BOARD

In his letter to the members of the Morrow Committee, notifying them of their appointment, President Coolidge said: "I feel that your efforts will result in bringing out the good qualities of the Air Service and in suggesting what action can be taken for their improvement." It is reported that the Committee members were given to understand that what the President particularly desired was an immediate solution, progressive and at the same time politically and administratively practicable, of the controversy over the form of organization which the air defenses of the country should take.

With this fact in mind, the observations of the Morrow Committee assume a new and more liberal importance, inasmuch as the recommendations may justly be regarded as the very least which we may expect in the way of aviation improvement. This is stated, in so many words, early in the report where the committee, by inference, admits that the extreme conflict of opinion in testimony given before it and the Lampert-Perkins Committee, tended to confuse the members themselves, only one of whom—Mr. Coffin—had had any considerable contact with all phases of the subject. "In all this confusion of opinion one fact stands out clearly," states the report.
Curtiss Aeroplane & Motor Co.'s Hawk as land and seaplane.
"During the past generation a great new factor has come into men's lives. Men have learned to fly."

**What We Did in World War.** — The only reference which the Morrow Board made to the war-time aviation situation was: "a colossal effort was made, and a colossal industrial machine created from practically nothing. More than 16,000 airplanes, with motors, were delivered by American manufacturers. In addition, approximately 25,000 motors were produced at the rate of 4,000 per month. Competent authorities believe that by March, 1919, the country could have been producing 10,000 Liberty motors a month."

**Importance of Aircraft Industry.**—In its treatment of the aircraft industry and commercial aviation, the Morrow Report complements that of the Lampert-Perkins Committee. In their essential recommendation both are in substantial agreement. Of the two, possibly those of the Morrow Committee are more significant. While the Lampert-Perkins Report may be said to represent the feeling of the Air Services and of probably a majority of Congress, regardless of party, and certainly of the general public, the Morrow Report certainly is the voice of the War and Navy high commands speaking through the President, and to these conclusions the President and, presumably the Administration leaders in Congress, have given assent.

The Morrow Report states:

"The importance of the aircraft industry in relation to national defense is obvious. The size of the air force needed in the event of a great war will always be far beyond anything that it is economically feasible to keep up in any country in times of peace. The rapidity of the development of the art of airplane design, rendering flying equipment inferior for service use against a major power within a few years after design, prohibits the gradual manufacture and accumulation of material and its storage for use in any future emergency.

"It seems to us probable ... that for some time to come the strength of the aircraft industry in the United States will depend primarily on the number of new airplanes ordered by the services. ... It does ... seem feasible to lay down a general policy. It appears that it should be possible, at this stage of the development of the art, to select a given type of machine as a standard for two or three years, with the understanding that, barring some extraordinary development, no change would be made within that time. The industry would then be assured of a continuous series of orders for a standard design, while an excessive multiplication of types of equipment in service would be avoided. Those advantages seem to outweigh the small gain in performance of the individual airplane that might at times result from a willingness to put a new type into service every few months. There should be a standard rate of replacement, selected to give a complete turnover of service equipment at definite intervals, so that the number of new pursuit machines ordered, for example, might show no extreme fluctuations from year to year."
Consolidated Aircraft Corp. N.Y.-r, as seaplane and landplane. 
(Wright engine.)
Following a request from the President's Aircraft Board to the Aeronautical Chamber of Commerce of America, a written statement signed by twenty-five (25) manufacturers, representative of the entire industry, was prepared and presented to the Board at a Special Meeting held in Washington on Oct. 15, 1925 (see Appendix).

Charles L. Lawrance, President of the Chamber, in presenting the above supplemented it with a brief statement indicating, as outlined in the 1925 Year Book, the extent and serious nature of the study the industry had made of the entire question.

The views of the trade and the services on all industrial questions were practically identical and were indorsed by the President's Board as indicated by the following.

Recommenda[ions of the Morrow Board]

The Morrow Board, in its recommendations, covered the major service needs, and without doubt went just as deeply and sympathetically as the Lampert-Perkins Committee into the needs of the industry. Specifically, with regard to the aircraft industry, the report urged upon Congress the following:

"The adoption of a policy of continuity in orders and of a standard rate of replacement.

"Production orders be given only to companies which maintain design staffs of reasonable size and keep them active.

"Proprietary rights in design be fully recognized.

"Governmental competition with the civil industry in production activity be eliminated except in those projects impracticable of realization by the civil industry.

"During a period of production of a type accepted as standard there be placed a succession of small orders for experimental designs to be given limited service tests, the best of these designs produced during a two or three-year period being adopted as the next standard. Such orders, distributed among firms having design and production staffs of proved competence, should be awarded at a liberal price, high enough to cover all the overhead expenses involved in the upkeep of the design and experimental departments.

"Existing statutes covering the procurement of supplies and requiring competitive bidding be modified where necessary to allow putting the recommendations previously made into effect."

But Nothing Has as Yet Been Done

As this volume goes to press, Congress appears to be about to appropriate liberally for the two air services.

There have been several proposals for putting into effect those parts of the Lampert-Perkins Committee and Morrow Board reports affecting the aircraft industry, but these have not made great progress, and to date no legislation, as specifically urged for the industry, has been realized.
Curtiss Aeroplane & Motor Co.'s Carrier Pigeon. This is No. 1 of National Air Transport's fleet of ten on C.A.M. No. 3.
CHAPTER II

AIR TRANSPORT—MAIL, EXPRESS, PASSENGERS

At the outset, let it be said that the United States today leads the world in prospective, unsubsidized air transport. Our U.S. Postal transcontinental airway, New York to San Francisco, is 2,600 miles long. For 726 miles, between New York and Chicago, it is "double-tracked," for over-night service, and this service may justly be regarded as additional to the transcontinental.

The twelve air mail routes for which contracts have been let by the Post Office Department to private operators, show a combined mileage of nearly 5,500. This means that, at the present writing, there are between 8,000 and 9,000 miles of commercial airways, in scheduled operation in the United States. Of this impressive total, 2,045 miles of Government airway and 400 or 500 miles of private airway are equipped for night flying.

Nowhere else in the world can there be found a situation parallel to ours. We start with equipment, on the whole, inferior to none and superior to many. We are free from the blight of subsidy and are financing ourselves to a total of three millions or more of dollars. And we have the enthusiasm and confidence, characteristic of America, where the public always has demanded, and has ever been willing to pay for, the fastest means of transportation and communication.

FOR PRIVATE OPERATION

Our great national effort began with the signing by President Coolidge of the Kelly contract air mail law, whereby the Postmaster General was empowered, upon being so petitioned, to designate air mail routes, and to contract for their operation by private carriers. It received spectacular impetus the night of July 1, 1925, when the over-night route between New York and Chicago was opened. As he stood by the first plane being loaded at the New York terminal, Hadley Field, New Brunswick, N. J., Postmaster General New said: "I would like to see private companies carrying the mail under contract with the Government, as the railroads do now."

Some months later, when both transcontinental and New York-Chicago over-night services were running smoothly and with reasonable efficiency, Hon. W. Irving Glover, Second Assistant Postmaster General, in response to a query at a congressional hearing, as to
whether he was authorized to say that it is the policy of the Post Office Department to surrender its operation of the air mail service as soon as contractors can be had to take it over, said: "When we can secure contractors who are sufficiently able to do it, or who have the ability to perform the service, and who have the proper amount of capital and financial backing. . . . The Postmaster General has stated to me several times that he wanted to get out of the air service as soon as possible, or as soon as contractors who have the financial ability to perform the service that would be required can be secured."

The keynote of our American aviation policy, as thus far enunciated, and partly put into effect, is air transport. First the attempt is to be made to carry the air mail, next air express and then, if the public is ready and the service sufficiently advanced, to undertake the carriage of passengers. The experience of the air mail, since the establishment of through day and night service, New York to San Francisco, on July 1, 1924, offers much encouragement. Up to Dec. 31, 1925, miles flown total 3,805,429, of which 1,168,762 were flown at night. Approximately 16,414,296 letters were carried, upon which $1,037,524.01 in excess postage was collected. But what seems to many to be most impressive is the record of security. Out of 16,414,296 letters flown day and night, winter and summer, in clear weather, in blizzard and cyclone, less than 4,000 were destroyed.

FACTORS NECESSARY TO AIR TRANSPORT

What we most desire is to make aviation pay its way. This it can not do unless the public finds it profitable to make use of aviation. Whether or not our efforts in air transport will succeed will depend, in varying degree, upon how completely the various operators that are now starting their lines approach perfect realization of all of the four following factors:

1. Adequate finances.
2. Competent organization.
3. Satisfactory equipment.
4. Sufficient traffic.

In an address on "The Present and Future of American and Foreign Air Service," delivered before the Engineers Club of Philadelphia, March 16, 1926, C. M. Keys, chairman of the executive committee of National Air Transport, the largest of the private air mail contractors, said:

"Here is the question which must be answered; and there is only one source from which the answer must come. The question is, whether the people of the United States want to pay something over $2,000 per ton for
the transportation of some commodity or other, for instance, between New York and Chicago, in sufficient volume to justify anybody putting into schedule operation on that line one, two or more airplanes for the purpose of carrying on that transportation.

"That tonnage is not today in sight. The rate is far in excess of the first-class express rate—it is far in excess of any other rate known to commerce. The elements that would make any form of transportation worth that much money are not ordinary commercial elements: they have to grow out of new requirements and new necessities. The thing which the shipper will pay for, of course, is speed. If a package or a letter can leave New York at 8 o'clock tonight and be in Dallas, Texas, by 8 o'clock tomorrow night, the transportation of that package or letter is a commercial thing that can be sold at some price. That price has to equal the cost of giving the service plus a fair profit, or else the service will fail.

"Two years from next October we may be able to give you the answer. At the present time we can not."

The year 1926 can be expected to reveal something of what it costs to operate an air line. Whether or not it will provide an answer to the question of patronage remains to be seen.

NATIONAL AIR TRANSPORT

An account of the organization of National Air Transport, Inc., was given in the Aircraft Year Book, 1925. Officers remain as then stated, Howard E. Coffin, vice president of the Hudson Motor Car Company, being president; C. M. Keys, president of the Curtiss Aeroplane & Motor Company, chairman of the executive committee; Charles L. Lawrance, president, Wright Aeronautical Corp., first vice president; Wayne Chatfield-Taylor, of Chicago, second vice president; Eugene W. Lewis, Detroit banker, third vice president; Carl B. Fritsche, general manager of the Aircraft Development Corp., secretary, and John J. Mitchell, Jr., assistant cashier, Illinois Merchants Trust Company, treasurer. Col. Paul Henderson, former Second Assistant Postmaster General, is general manager.

As discussed elsewhere in this chapter, those interested in N. A. T. were quick to recognize that the four essentials of air transport must be met. With $10,000,000 authorized capital stock, of which $2,000,000 was paid in on the day of organization, N. A. T. was adequately financed. The next steps were taken, quickly and in order, so that N. A. T. was able, on May 12, 1926, to make its first flights over Contract Air Mail Route No. 3, Chicago to Dallas, via Moline, Rock Island, Davenport, St. Joseph, Kansas City, Wichita, Oklahoma City and Fort Worth, 1,000 miles.

In setting up N. A. T. organization, Col. Henderson followed approximately the lines of railway organization. In charge of operations he placed E. P. Lott; engineering, L. D. Seymour; accounting,
The City of St. Joseph has one of the finest Airports in the United States. It represents an investment of $200,000. Hangar illustrated is one erected for use of National Air Transport, Inc. It is believed to be the finest and best equipped hangar on the route.—Photo, C. H. Wolfley.
F. D. Myers; legal matters. William P. MacCracken. Jr.; and traffic, Luther K. Bell. Donald Bartlett is assistant to the general manager.

It is important to remember that National Air Transport was the first of the transport companies to be organized, and that its formation antedated the constructive and stimulating reports on aviation, as made by the President’s Aircraft Board, the Lampert-Perkins Congressional Committee, and the Hoover Committee. National Air Transport entered the field when there was no definite assurance that needful things would be forthcoming, in the way of legislation or public support.

National Air Transport, at the outset, took the position, however, that ultimately it would be the duty of the Federal government to control the interstate airways, and to provide emergency fields, navigational, communication and meteorological aids to all operators, while at the same time it would be the privilege of the municipalities to prepare for the future by setting up municipal air terminals.

Co-operation of Municipalities

Feeling that the cities to be served would welcome an opportunity to cooperate, Mr. Bell was sent out over the route, in August, 1925, before contracts were awarded. Each city was told that, were N. A. T. to be awarded the contract, it would have to invest at least half a million dollars of its own capital before turning a propeller. Cities were invited to participate in developing a service greatly to their benefit by establishing fields and erecting hangars, which could be used, free of charge by N. A. T. for one year, or until it was demonstrated that traffic would justify rental. They were asked to consider the fact that they, in effect, were in partnership with the operator, and whether traffic came easy or hard, depended upon the public attitude of sympathy or apathy.

As a result, Moline, St. Joseph, Kansas City, Wichita, Oklahoma City, Fort Worth and Dallas each established a municipal airport and erected thereon accommodations for National Air Transport. Chicago, as this volume goes to press, was putting the final touches to its public flying terminal. The value of these aids amounted, on estimates by the cities themselves, to more than $100,000. In addition, the cities pledged themselves to aid in the stimulation of traffic.

One of the first acts of National Air Transport was to order ten Carrier Pigeons of the Curtiss Aeroplane & Motor Company. At the same time thirty-five Liberty engines were purchased from the government. Since then two passenger ships, a Liberty motored De Haviland and a Travel Air with Curtiss O. X. 5 have been purchased. The Carrier Pigeons have about the same cruising speed
(Left) Hon. Harry S. New, Postmaster General, dispatching first plane from New York on New York-Chicago overnight service, July 1, 1925. (Right) Henry Ford loads one of his cargo monoplanes.

—Photos P. and A.
AIR TRANSPORT

as a De Haviland, yet their pay load of 1,000 pounds is about three
times greater. All the Carrier Pigeons are fitted for night flying.

Mr. Lott, in charge of operations, makes his headquarters at
Kansas City, the run being split there. Of the eight pilots, four are
based at Kansas City, two at Chicago and two at Dallas. At the
eight fields, there is a combined force of some thirty-five or forty
men, including engine mechanics, riggers and laborers. Dispatching
is by telephone and telegraph.

General headquarters are in Chicago.

The answer to the last question—traffic—is, at the moment, of
course, unobtainable. Like the other operators, however, National
Air Transport is putting forth a vigorous effort. The line, for
traffic purposes, has been split into three divisions: Illinois and
Iowa, with R. W. Ireland, in charge at general headquarters, Chi-
cago; Missouri and Kansas, with C. E. Fleming, in charge, with
offices in the Chambers of Commerce, St. Joseph, Kansas City and
Wichita; Oklahoma and Texas, with Charles B. Braun in charge,
with offices in the Chambers of Commerce, Oklahoma City, Fort
Worth and Dallas.

N. A. T. AND AIR EXPRESS

The primary reason for the organization of National Air Trans-
port was the operation of an air express line from Chicago to New
York. At several of the original conferences, in Detroit and else-
where, prior to actual incorporation, there were present, Robert E.
M. Cowie, president of the American Railway Express Company,
and Daniel M. Sheaffer, Manager of Mail and Express Traffic, the
Pennsylvania Lines.

At the time of publication, more than a year had passed since
the organization of N. A. T. It seemed then, that the protracted
negotiations with the railways, whereby the National Air Transport
and the American Railway Express would enter a working agree-
ment, were about at an end. The delay was not surprising. It was
not due to antagonism, nor indifference, but to the fact that such a
contract, whereby American Railway Express would become pick
up and delivery service for a common carrier by air, involved adop-
tion of a radically new transportation policy.

In all these negotiations, Mr. Sheaffer has participated. Em-
powered to act for General W. W. Atterbury, president of the
Pennsylvania, Mr. Sheaffer has had opportunity to make an extraor-
dinary contribution to improved transportation. Being a student of
transportation, as well as a practical railway official, Mr. Sheaffer
was one of the first to realize the vital relationship between the rail-
Time Flies! Save Time! Fly Your Mail! This envelope speaks for itself.
roads and all other forms of transportation and the consequent commitment of the great railway of which he is a part, to a liberal policy toward air transport. Such a policy is now characteristic of all progressive railroads.

GREAT RAILROADS CO-OPEARTE

As unquestionably typical of the attitude of American railways toward air transport, may be quoted the following excerpt from an interview with General Atterbury, which appeared in the May 8th, 1926, issue of the Saturday Evening Post, in an article by Wesley W. Stout:

"I am exceedingly anxious to see it [air transport] encouraged to develop along proper lines and in proper co-ordination with the railroads.

"The Pennsylvania Railroad, which uses the air mail for some of its official correspondence, has been most happy to co-operate with the Government in the development of the New York-Chicago-San Francisco air route. Our part is getting the mail at the New York end to and from the air terminal at New Brunswick, New Jersey. Though this is only a small part of the total work, it is an essential one, and we are doing it whole-heartedly. We welcome the establishment of other routes in our territory and additional opportunities to co-operate. Wherever an air service may have junction with the Pennsylvania, we desire to make this junction effective in the practical interchange of traffic.

"I will go a step further and say that the Pennsylvania Railroad management is not only willing but desirous to see the air service broadened to embrace high-grade express traffic. The ten new air routes will be privileged to carry express or any other traffic they can obtain as long as they perform the mail service properly. The original New York-Chicago-San Francisco route also probably will be turned over to private agencies under contract, and thus be available for high-grade express traffic.

"It is my thought and that of my associates that the railroads should not stand in the way of this, but should encourage it, and our management has so placed itself on record.

"Anything which stimulates invention, industry and commerce necessarily increases the general volume of trade and traffic throughout the country; and in this larger prosperity the railroads, like all other economic agencies, have their share. They should play the part of leaders, never of obstructionists, in the march of progress. For all we know to the contrary, air transport may embrace the most important field of progress which this generation is to see. Nor must we forget our national defense, in which it already has been demonstrated that aircraft is one of the dominating factors.

"Patriotism joins with business sense in demanding encouragement in every legitimate way."

THE FORD CONTRIBUTION

How the more experienced leaders in aeronautics regard the part being taken by the Ford Motor Company, or rather personally by
AIR TRANSPORT

Henry Ford and his son Edsel, is illustrated by remarks made by Mr. Keys, of the Curtiss Company, at the Philadelphia meeting already referred to. He said:

"Mr. Ford was the first in the air, operating a line of all-metal ships from Detroit to Chicago and later from Detroit to Cleveland, for the transportation of his own tonnage, and later for the transportation of mail. His operating experience is very freely offered to all other operators. His whole operation has been public spirited and generous and was in fact the starting point of organized commercial aviation in this country."

The Ford interest may be said to have begun when William B. Stout enlisted the personal as well as financial aid of Edsel Ford and William B. Mayo, chief engineer of the Ford company. Out of this comparatively slight contact grew the purchase of the Stout Metal Airplane Company and the erection, on Ford property at Dearborn, of a splendid factory, a commodious hangar, and the equipment of a great field, with runways for planes and mast for airships. Ford Airport was dedicated Jan. 15, 1925.

The Stout Metal Airplane Company is now operated as a division of the Ford Motor Co., with Mr. Stout continuing in executive charge. Mr. Stout, with the two Fords and Mr. Mayo, is also a director. Some of the stockholders in the original Stout company, who were bought out by Ford, replaced their investment in a new enterprise, the Stout Air Services, Inc.

The following data has been obtained through the courtesy of Mr. Stout:

"On April 13th, 1926 the Ford airlines celebrated their first anniversary. The entire year of flying has been accomplished without a single injury to anyone and with a remarkable freedom from mechanical trouble. Over 1,000 trips have been made and a distance covered equal to ten times around the world at speeds close to one hundred miles an hour. This has been done without any blowing of trumpets, but just as an everyday routine transportation proposition. Practically no changes have been made in the planes, which are the same today as at the beginning. That the maintenance is simple is proved by the fact that since the fire at our factory, two airlines have been run with only four airplanes, this including three trips on the Chicago route per day and two to Cleveland, with from 1000 to 1500 pounds of pay load.

"The year has brought many changes to the whole airplane industry, the influence of the Ford entry into aviation having been felt throughout the world. A new impetus has been added to the development of new engines. Planes with three or more engines that can continue on their way on schedule even should one engine stop are under development. [This statement refers to the new Ford monoplane with three Wright Whirlwind engines.—Ed.] Metal construction is coming forward rapidly and both flying boats and land planes are being perfected in various factories for the use of the private flier."
(Top) Boeing mail plane. On night run, Chicago-New York. (Bottom) Overnight air mail arriving at Cleveland. Note huge crowd of spectators.
AIR TRANSPORT

"The following figures give the detailed story:

<table>
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<tr>
<th></th>
<th>Detroit-Chicago Route</th>
<th>Detroit-Cleveland Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trips undertaken</td>
<td>650</td>
<td>443</td>
</tr>
<tr>
<td>Trips completed</td>
<td>635</td>
<td>439</td>
</tr>
<tr>
<td>Miles flown</td>
<td>161,925</td>
<td>54,353</td>
</tr>
<tr>
<td>Hours in the air</td>
<td>1,745:58</td>
<td>645:04</td>
</tr>
<tr>
<td>Pounds carried</td>
<td>625,568</td>
<td>468,381 1/2</td>
</tr>
<tr>
<td>Trips cancelled</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>Forced landings</td>
<td>39</td>
<td>11</td>
</tr>
<tr>
<td>Forced landings due to motor trouble</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Forced landings due to bad weather</td>
<td>28</td>
<td>4</td>
</tr>
</tbody>
</table>

The Ford Motor Company holds the contracts for Routes No. 6 and 7. The former is from Detroit to Cleveland, 91 miles. The latter is from Detroit to Chicago, 237 miles. Service to Cleveland and Chicago, with mail, began Feb. 15, 1926. The Ford Airlines had, of course, been in operation over these routes for many months previous.

COLONIAL AIR TRANSPORT, INC.

The contract for the operation of Route No. 1, Boston to New York, via Hartford, 192 miles, is held by Colonial Air Transport, Inc., an amalgamation of Eastern Air Transport and Colonial Air Lines. This service will place the New York-Chicago overnight line at the disposal of 10,000,000 people in New England, the schedule conforming to U. S. Postal arrivals and departures at Hadley Field, New Brunswick, N. J.

(Top) Robertson Aircraft Corp.'s fleet of de Havilands on St. Louis-Chicago Air Mail Route. (Bottom) Ryan monoplane (Wright Whirlwind engine). Type to be used by Pacific Air Transport from Seattle to Los Angeles.

Governor Trumbull is president of Colonial. Messrs. Bullard, Horner, Fairchild and Whittemore are vice presidents. Mr. Freeman is treasurer and Mr. Odell, secretary. Active management of Colonial is in the hands of J. T. Trippe, vice president and managing director. Robert G. Thach is general counsel and F. C. Arnault, traffic manager.

Service is scheduled to start about July 1.

Robertson Aircraft Corporation

The Robertson Aircraft Corporation is probably as well known as any aviation organization in the United States. It holds the contract for Route No. 2, St. Louis to Chicago, via Springfield and Peoria, 278 miles. This line is essentially a St. Louis-New York service. Flying on schedule, co-ordinating with the New York-Chicago U. S. Postal overnight, began on April 15.

The Robertson Aircraft Corporation conducts, at Lambert-St. Louis Flying Field, a general operating, merchandizing and rehabilitation business. It has on hand a large fleet of Liberty-motored De Havilands, Curtiss Orioles, J. X.s and Standards. In 1925, Robertson ships flew 138,640 miles. In its school, the company graduated seventy-six students. Well over $100,000 worth of aeronautical material was sold during the year to other operators.

The company is headed by Maj. William B. Robertson. On the air mail contract, Maj. Robertson utilizes three pilots and five mechanics. He began his service with Liberty-motored De Havilands, but is in position also to employ Curtiss Orioles, according to the fluctuation of traffic.

Western Air Express

Contract Air Mail Route No. 4—Los Angeles to Salt Lake—presents favorable flying conditions and interesting traffic possibilities. This service has been operated since April 17, 1926, by Western Air Express, Inc., which is practically 100 per cent Southern California and Salt Lake City in capital, management and equipment.

This route was one of the first petitioned for and was the outgrowth of the rivalry between Los Angeles and San Francisco for
Some of the New Mail Carriers. (Top) Three all-metal Ford-Stout monoplanes in service of Florida Airways.—Photo, Keystone. (Bottom) Douglas mail plane of Western Air Express on Los Angeles-Salt Lake route.
quick communications with the East. The fact that in population and postal receipts Greater Los Angeles outstripped all the San Francisco Bay cities combined led to the belief, which Western Air Express seems to be on the way of substantiating, that there is more air mail to be had out of Los Angeles than out of San Francisco.

By effecting junction with the U. S. Postal transcontinental planes at Salt Lake City, Western Air Express saves from a day to two days on eastern mail for all of southern California, and is of considerable saving between Salt Lake and Los Angeles. The line runs via Las Vegas, Nev., and is 660 miles long. Equipment consists of six Douglas mail planes, and eighteen Liberty engines. These ships are similar to the new ones recently purchased by the Post Office Department.

The organization consists of the following: Harris M. Hanshue, president and general manager; Maj. C. C. Mosely, vice president in charge of operations; Byron L. Graves, treasurer; Robert A. Morton, secretary-counsel; James G. Wooley, traffic manager. Mr. Hanshue for many years was an automobile distributor in Los Angeles. Among the men who are associated with him in providing capital are the following: George M. Holley, president. Holley Carburetor Co., Detroit; Col. E. J. Hall, vice president, Hall-Scott Motor Co., Berkeley; Thomas F. Kearns, publisher, Salt Lake City Tribune; Grover Ruckstell, president, Ruckstell Axle Co., New York, and the following from Los Angeles—Fred S. Albertson, director, Dodge Bros. Motor Car Co.; W. R. Hervey, vice president, South-Western Trust & Savings Bank; Harry M. Haldeman, president, Pacific Pipe and Steel Co.; J. Dabney Day, president, Citizens National Bank; R. I. Rogers, vice president, Merchants National Bank; John E. Barber, vice president, First National Bank; Harry Chandler, publisher, Los Angeles Times; J. A. Talbot, president, United Oil Co.; and Motley Flint, vice president, Pacific South-west Trust & Savings Bank.

WALTER T. VARNEY

Like Maj. Robertson, Walter T. Varney, of San Francisco, was a fixed-base operator for a number of years before he entered the larger field of air transport. At his port at San Mateo, he maintains six ships. In 1925 he trained sixty-five students. In connection with his regular operations he runs a taxi service, in which the Checker Cab Co., of San Francisco, participates by providing ground transportation to and from terminals.
Contract Air Mail Route No. 5, which Mr. Varney operates, extends 435 miles north and west from Elko, Nev., to Pasco, Wash., via Boise, Ida. It is the Washington-Oregon-Idaho line, and provides for the Pacific Northwest practically the same service which Mr. Hanshue supplies to the Pacific Southwest. Mr. Varney's first flights were made April 6. He has in operation eight Swallows, equipped with Wright Whirlwind engines.

Associated with Mr. Varney in his air mail and transport business are Charles T. Wrightson, business manager; Frank P. Bell, traffic manager; Leon D. Cuddeback, chief pilot.

**Pacific Air Transport**

Pacific Air Transport, Inc., holds the contract for Route No. 8, the longest—1,121 miles—and without doubt the most difficult to operate. It extends from Seattle to Los Angeles, with stops at Portland, Medford, Sacramento, San Francisco, Fresno and Bakersfield.

Vern C. Gorst, a motor bus operator, is president and general manager. C. N. Comstock is vice president; Frank A. Flynn, treasurer, and C. H. Greene, secretary. The equipment proposed to be used is the Ryan monoplane (six in number) powered with
nated solely by B.B.T. air mail type flood light.—Photo. B.B.T. Corp. of America

the Wright *Whirlwind* engine. These ships, at the time of writing, were under construction by the Ryan Airlines at San Diego. No date has been set for starting.

CHARLES DICKINSON

Charles Dickinson, of Chicago, has undertaken to operate the line, Minneapolis-St. Paul-La Crosse-Milwaukee-Chicago, 377 miles. This is Route No. 9. Mr. Dickinson is reported to be preparing to begin operations early in June, 1926, using *Lairds*, with the Wright *Whirlwind* engine.

FLORIDA AIRWAYS CORPORATION

Maj. Reed Chambers, of World War fame, and Lieut. Jack Harding, one of the Army men who flew around the world, are associated, as president and vice president in charge of maintenance, respectively, of Florida Airways. With them are Maj. W. A. Robertson, vice president in charge of operations, and Capt. A. Raymond Brooks, assistant to the president. Florida Airways, since April 1, has been operating Route No. 10, Miami-Fort Myers-Tampa-Jacksonville. They were shortly to extend the service to Atlanta. The mileage will then be about 664. Their equipment consists of four
Ford Liberty-motored all-metal monoplanes, two Travel Airs and one Curtiss Lark, with Wright Whirlwind engine. They carry passengers as well as mail and express.

Like Western, Colonial and National, Florida Airways includes among its stockholders some names of nation-wide prominence: E. F. Everitt, president, Rickenbacker Motor Co., Detroit; E. E. Allyn, Cleveland; William B. Stout; Rollin H. White, president, Cleveland Tractor Co.; R. A. Stranahan, president, Champion Spark Plug Co.; Capt. E. V. Rickenbacker; Percy A. Rockefeller; Thomas A. Proctor, 2nd., and Anton E. Walbridge and Miss Anne Morgan, of New York.

PITTSBURGH AND DENVER ROUTES

As this book goes to press, contracts have just been awarded to Clifford Ball to operate the 120 mile route, Pittsburgh to Cleveland (this is Route No. 11), and to Colorado Airways, Inc., to operate No. 12, Pueblo-Colorado Springs-Denver-Cheyenne, 100 miles. The dates these services are to begin have not yet been announced.

AIR MAIL IN WHITE MOUNTAINS

Robert S. Fogg, who reports the record of six years of passenger carrying without an accident, had the honor of receiving, in 1925, the first R. F. D. air mail contract. This was in response to urgent petitions by summer residents on Lake Winnipesaukee. From July 1 to August 1 he made daily flights of forty-three miles from the Weirs of Wolfeboro, making stops at ten islands. He carried 11,400 pounds of mail, including the morning newspapers. He did not miss a trip.

THE NEW ORLEANS LINE

Arthur E. Cambas, owner of the New Orleans Air Line, holds the contract, under the foreign mail appropriation, to fly the eighty miles from New Orleans to Pilottown. During 1925 he made 300 flights, to and from steamers, carrying 28,046 pounds of mail. For this service Cambas received $14,410. This route is now under advertisement.

THE SEATTLE LINE

Edward Hubbard, who bears an excellent record for dependability in operations of all sorts since the War, continued, in 1925,
to operate the foreign mail contract route of eighty-four miles, between Seattle and Victoria, B. C. In that period he made sixty-two round trips, carrying 25,770 pounds of mail. His compensation totalled $15,625. This route is now under advertisement, for the new fiscal year.
The *Fleetwing*. Designed and manufactured by Pitcairn Aviation.
CHAPTER III

THE COMMERCIAL AIRCRAFT OPERATOR PROSPERS—GREAT INCREASE IN PAID FLYING WITH PASSENGERS AND FREIGHT

Commercial flying, in 1925, received a tremendous impetus. Further rehabilitation of war-time surplus and the development of new and improved types of two and three place planes more than offset the steady diminution of flying equipment due to the elimination of old machines or other causes.

The Editors of the Aircraft Year Book obtained reports from 290 operators, of whom twenty-eight flew only for personal pleasure. These operators possessed 676 aircraft, of which twenty were seaplanes, flying boats or amphibians. They were scattered throughout forty-one states, and, in addition, two reports were received from Canada and one from Mexico.

The American operators flew from 234 fields or water terminals. Of these, 172 were identified as being leased, thirty were owned, seventeen were municipal, five government and four rather ambiguously identified as "public," meaning, probably, used free of charge.

During the calendar year 1925, according to their signed statements, these 290 operators made 258,762 flights, and during these flights covered 5,396,672 miles. Their revenue was derived from passenger carrying, about 205,094 being transported; special merchandise express and mail service, these inanimate cargoes totalling well over 112 tons (of which 65,216 pounds was mail), and from instruction and aerial photography. Ninety-four operators maintained flying schools of one sort or another, and ninety-two identified themselves as aerial photographers.

SECURITY AND SUCCESS FOR ALL

As in the treatment of accidents, it is impossible, in considering commercial flying, to dissociate the problem of the operator from Federal regulation. As, this year, no attempt has been made to separate accidents due to gypsies from those occurring under other circumstances, so, in discussing operations, no differentiation is made between what may be termed the semi-fixed and the fixed base flyer. The problem is security for all and success for all who operate, whether for pleasure or profit.

In the questionnaires circulated by the Aeronautical Chamber of Commerce, comments were requested and suggestions invited as
Buhl-Verville Aircraft Co.'s Commercial, illustrating ready for flight or storage.
to means for bettering the business. A great many responded.
Inevitably, every response involved, in one way or another, the
question of basic air law. Very few, not more than half a dozen
at the most, wrote with agitated mind of how they would suffer
from regulation, then, in possibly, the same sentence, implored the
help of any who might read, in obtaining fields, marking routes and
persuading the public to fly. The truth is, the great need of all
these operators can only be met through basic legislation.

"Most of my flying is barnstorming," writes one flyer. "My
suggestions are: Good, trained and tested pilots; safe aircraft, in­
spected every six months; good fields in all towns populated from
7,000 and up; standard markings of fields; names of towns that
have landing fields visible to air pilots."

"I favor some sort of regulation that will give the commercial
pilot and company every help possible and that will restrict flying
only so that inexperienced flyers will be prohibited from carrying
passengers." is the opinion of a business man, who is a flyer.

A pilot who has built up his own establishment through the
demonstration of efficiency and security writes: "I think the most
important thing to be done for the benefit of commercial aviation
is its proper regulation by the Federal government along the line
of the Bingham bill. However, it is all-important as to how the
details are worked out and this should be done only by those who
have had commercial operating experience."

Another pilot suggests: "The establishment of fully equipped
airports in municipalities. The establishment of emergency landing
fields along airways. The establishment and marking of airways
throughout the United States. A mapping service for the benefit
of commercial operators. Regulations with reference to air traffic.
Government inspection of all aircraft as to their airworthiness. This
is essential to gain the confidence of the public. Registration of all
pilots following a standard examination before issuance of certifi­
cate. Fully equipped meteorological bureaus. Statistical depart­
ment to compile records of accidents and crashes to determine causes
and provide remedies. Research departments to study and perfect
safety devices."

GREATER PUBLIC DEMAND FOR FLYING

The tremendous mileage reported is accounted for by the in­
creasing demand of the public that air service be made available.
This, too, affords an index into the reasons for well over 112 tons
of inanimate cargo having been carried. While most of the pas­
sengers were flown on short pleasure hops over a field, all of the
Aerial Service Corp. (Top) OX5 Training Plane (note split landing gear and combined wheels and skis. (Bottom) Mercury, Jr., commercial.
air freight had to be carried a considerable distance, and under circumstances which supplied legitimate business justification for paying extra for extra speed. Articles and commodities carried, aside from thirty tons of mail, included traveling salesmen's samples, machinery parts, pay rolls, oil rigs, newspapers, films, medical supplies, etc. In most instances it was demonstrated that a higher tariff could be charged for goods than for passengers.

Among those who reported operations were four physicians. One, Dr. F. A. Brewster, of Holdredge, Nebr., keeps a Curtiss J. N. and pilot "to assist in getting over a large territory in a surgical and consultation business, used when roads are bad and to save time on long trips." Another, Dr. Clifford Strange, of Portland, Me., owns his flying field from which operated four other planes in addition to the one he flies. These five planes during 1925 made 3,000 flights, covered 45,000 miles and carried a thousand passengers. Like his son, Dr. J. Carle Rinehart, of Vancouver, Wash., is a pilot. Dr. J. H. Nowicke, of Roseville, Mich., in 1925, flew over 6,000 miles.

**Noteworthy Examples of Operation**

The operations of Arthur E. Camcas, owner of the New Orleans Air Line, are discussed in the chapter on "Air Transport—Mail and Express."

One of the most encouraging examples of how success can be worked out through fixed-base operations is the story of E. K. Campbell, President and General Manager of the Campbell Airplane Co., Moline, Ill. In 1925 the fourteen ships housed on Campbell's field made 4,661 flights, traveling 70,000 miles and carrying over 8,000 passengers. Campbell's field was selected as the site for the $6,000 hangar which the Moline Chamber of Commerce constructed for the use of National Air Transport.

Down in Texas, where train service is frequently inadequate, it is as far from Beaumont to El Paso as from New York to St. Louis, and where the space in between is one magnificent landing field, scores of planes are maintained, like motor cars, for combined pleasure and business. One such owner is C. Eugene Conrad, of San Antonio, a real-estate operator. In his work of selling land in 1925, including forty long trips, totalling 22,515 miles, Conrad carried camera equipment for photographing large tracts offered for sale.

**The Curtiss Flying Service**

There is no pilot-executive better known throughout the United States than C. S. Jones, who, practically continually since the Armi-
Curtiss Aeroplane & Motor Co.'s *Lark*. Shown as land and seaplane with Wright *Whirlwind*. 
COMMERCIAL AIRCRAFT PROSPERS

Christopher Curtiss, has managed all the commercial flying of the Curtiss Aeroplane and Motor Co. This subsidiary now known as the Curtiss Flying Service, Inc., in the five years 1920-1925, has flown three-quarters of a million miles, carrying approximately 25,000 passengers, and training 250 students, without a fatal accident. Curtiss Flying Service is operated for business and is conducted on a business basis. Free flights are as rare as free rides to the general public on a railroad. In 1925, every one of the 4,496 flights made by Jones or his four pilots was on demand. Curtiss Flying Service, like its parent corporation, realizes that the same same strict methods of efficiency and accounting must be applied to operating as to manufacturing. Commercial aviation must be dependable and secure and it must more than pay its way.

The fleet which Curtiss Flying Service maintains at its terminal in Garden City numbers sixteen. Mileage during 1925 totalled 170,000 to 175,000; passengers carried numbered 3,768.

Curtiss Flying Service holds itself ready, day or night, to fly people or express to any point in the United States, Canada or Cuba in a radius of 1,500 miles from New York. In several instances, special flights have been made to much more distant points. Mileage rates for land planes cross country, single passenger, are 50 cents a mile, round trip, with 10 cents a mile for each additional passenger. If desired, passengers are picked up at designated piers by the Curtiss amphibian and flown to points along the coast or to the nearest landing field and transferred from the amphibian to a land machine, or can be met by motor. Rates for the hour range from $40 to $60, according to the type of machine.

The report of Curtiss Flying Service, 1925, shows a total of 2,265 flying hours (approximately 175,000 miles), 2,080 hours of which was paid commercial flying, totalling approximately $90,000, a gain of more than 33 3/4% over 1924.

Sixty students were taught to fly and a large percentage passed the FAA test given by the National Aeronautic Association. Most of the nearly 4,000 passengers were carried on the popular $5 hops of ten miles. In the aerial photographic field the company does no actual photography but furnishes the flying service for all the large aerial photographic companies.

**Curtiss Cross-Country Flying**

The cross-country flying, 466 trips, is probably the most interesting of the activities of the company. At the time of the eclipse, eight airplanes left Curtiss Field with photographers, reporters, and scientists to observe the phenomenon from the air. This was
particularly noteworthy as the thermometer registered zero, motors started with difficulty, and yet every machine that was scheduled was in the air on time.

Five machines covered the inauguration of President Coolidge, carrying films and pictures to Dayton, Chicago, Cleveland and Philadelphia, New York and Boston. This event marked an important step in commercial aviation in that the Army and Navy cooperated with the flying companies in refusing to supply Government planes for carrying these pictures and films in direct competition with the industry. A "racing fan" chartered a machine for the Kentucky Derby. Films and pictures were flown in from Cave City at the death of Floyd Collins. Three machines filmed the race between the Twentieth Century Limited and Gar Wood's boats. Mayor John Smith, of Detroit, was the guest of the New York City Fire Department at a banquet in New York but had a speaking engagement in Detroit the following afternoon. The airplane was the only means of transportation that would allow him to keep both engagements. He attended the banquet in New York, left Curtiss Field at 6 a.m., slept most of the way to Detroit, had time to lunch with Major Lamb, Commanding Officer of Selfridge Field, and arrived in Ford Airport in plenty of time for his speech.

A small child of a prominent New York family was injured at their Canadian camp. Unwilling to rely upon local help a New York physician was flown direct to the camp, making the journey in one-fifth of the time possible by any other means and in about the same time a local physician would have taken by boat.

Hours before the man on the street had heard of the Shenandoah accident, airplanes were leaving Curtiss field, hired by the great New York dailies, carrying reporters and bringing back pictures of the wreck. Six airplanes belonging to the Curtiss Flying Service, Inc., covered this disaster, flying more than 2,500 miles in two days and each one accomplished its mission successfully.

One enterprising firm making lunch wagons chartered a plane to take its sales manager to a convention in New Hampshire, thus getting the "hop" on the trade, selling ten wagons before its competitors arrived on the ground. The baseball series, football games, boat races, the submarine disaster, in fact, practically every news event of importance, was covered by machines belonging to this company.

**Efficiency of Loening Amphibian**

The Curtiss Metropolitan Airplane Co., of Port Washington, Long Island, which has successfully maintained a special flying
service in New York and Florida for seven years or more, last year flew at least 40,000 miles. During August, 1925, their Locining Amphibian was operated daily between Port Washington and Saratoga, N. Y., by way of the Hudson River. In 881.2 hours, the amphibian flew 9,120 miles, without a single miss. The load of merchandise, etc., was taken on at W. 82d St., New York City, at 6 a. m. In addition to racing forms, etc., passengers were carried on numerous occasions, the fare being $50 each way.

The Duplex Printing Press Co., of Battle Creek, Mich., maintains its own Swallow to deliver emergency repair parts to users of their products. In 1925, 300 flights were made, the mileage totalling 12,000. Operations are carried on the year round, regardless of weather, in a radius of 500 miles from Battle Creek.

The Eagle-Picher Lead Co., of Picher, Okla., maintains field, hangar and plane to enable frequent and easy inspection of outlying mines and leases. “We find it is a great time saver,” they write, “and no more expensive to operate than a good car.”

Alternating between the beaches of Florida and the mountains of New Hampshire, is Robert S. Fogg, reports that in six years of passenger carrying he has never had an accident. His 1925 operations are reported in the chapter, “Air Transport—Mail and Express.”

Dominant in aerial photography is the S. M. Fairchild Flying Corp., whose activities are described in a separate chapter.

An interesting record was established by the General Airways System, operators for the Sikorsky Company. Sikorsky’s huge sixteen-passenger, twin-motored plane Yorktown, according to the log of Col. Harold E. Hartney, vice president, was kept busy throughout the year on business and advertising flights. It is reported that, in 400 flights made by the Yorktown, 4,000 passengers and 5,000 pounds of freight were carried. Mileage totalled 50,000.

C. B. Harris, president of the Milton Box Co., Milton, Ore., kept his own plane for pleasure and for transportation in his logging operations in the northwest.

A consistently successful operator on a small but apparently profitable scale is Edward Hubbard, whose story is related in the chapter on “Air Transport.”

Pioneers in a new and intensely promising field—that of combating insect pests and plant diseases—are the Huff Daland Dusters, Inc., whose fascinating record is related in the chapter on “Airplanes in Agriculture.”
The Use of Airplanes in Insurance

The Indemnity Co. of America, so far as the Aeronautical Chamber of Commerce is informed, is the only underwriting organization maintaining air transport. Its aircraft department is headed by Col. William Thaw, former commander of the LaFayette Escadrille. At Lambert-St. Louis Flying Field, the Indemnity Company maintains a three-place Laird Commercial, which, in 1925, was flown on 100 trips totalling 8,000 miles. "The purpose of our plane," the company writes, "is to inspect aircraft risks; to facilitate the handling of automobile and aircraft claims, and to aid in the promotion of aviation."

An excellent illustration of an individual flyer who has developed into a fixed-base operator of considerable size and importance and of excellent standing in the community is D. A. McIntyre, of Tulsa, Okla. For seven years he has been at his present location. In 1925 his nine airplanes flew a total of 60,000 miles and carried several thousand passengers. His field has formed the nucleus of an important flying center, being the home station of twenty-five other planes.

When One Out of Three Flies

Monmouth, Ill., has a population around 9,000, yet, in 1925, the ships of the Mid-west Airways Corp. backed by substantial local capital, made 2,000 flights, flew 32,200 miles and carried 3,000 passengers. When one out of every three persons in the country takes to the air, as they do in Monmouth, the "flying age" will have arrived.

Catalina Island, off the coast of Southern California, is noted for two things—the hospitality of Wm. Wrigley, Jr., who owns the island, and the performance of Pacific Marine Airways, Inc., in which, by the way, Mr. Wrigley has no financial interest.

For four years Pacific Marine Airways, operating H. S. flying boats, has been flying between Los Angeles Harbor, Wilmington, and Avalon, Catalina. In this time they report no accidents. The distance is twenty-eight miles; the time required for the flight is thirty minutes, or less. In summer there are two departures from the mainland, 10:30 a. m. and 4:45 p. m., returning from Avalon at 3:30 and 5:30 p. m. In winter, trips are made by appointment. In 1925, 1,957 flights were made with two flying boats, covering 35,000 miles and carrying 1,983 passengers. Ellard A. Baron is president and F. W. Farris, vice president and chief pilot of Pacific Marine Airways, Inc.
Two examples of Sikorsky engineering and construction. (Top) S-32 seaplane. (Bottom) S-31 with Wright Whirlwind.
LUDINGTON AND PITEAIRM IN PHILADELPHIA

Philadelphia, in so far as commercial aviation is concerned, is synonymous with the Ludington Exhibition Company and Piteairn Aviation, Inc.

The head of the former is C. Townsend Ludington, who also is president of the B. B. T. Corp. of America, representatives of the flood light now standard in night flying, and is chairman of the Technical Committee, National Air Transport, Inc. At the Ludington Field in Pine Valley, N. J., near Philadelphia, is a fleet of Farman, Wacos and Curtisses, engaged in instruction, photography and taxi service. In 1925 they flew 8,000 miles.

Like Mr. Ludington, Harold F. Piteairn, president of Piteairn Aviation, Inc., is a pilot, and also a director of National Air Transport, Inc. The Piteairn Field is at Willow Grove, Pa. Here are a factory, hangars and ten airplanes. During the first sixteen months of operation by Piteairn Aviation, Inc., no passenger has suffered the slightest discomfort. In 1925, Mr. Piteairn's ships made 5,314 flights, covered 63,000 miles and carried 4,168 passengers.

AN AIR LINE IN SOUTHERN CALIFORNIA

Both Mr. Piteairn and Mr. Ludington believe commercial aviation should earn its way without artificial stimulation.

Southern California, in Ryan Air Lines, Inc., has provided another practical illustration of commercial operation. T. Claude Ryan has developed a manufacturing and transport business of considerable proportions at San Diego. On March 1, 1925, he made his first scheduled trip between Los Angeles and San Diego, 121 miles. Ships leave Los Angeles at 9 a. m.; arrive San Diego 10:30 a. m. The return trip to Los Angeles is begun at 4 p. m. in the summer and 3 p. m. in the winter. Fare one way is $17.50, including taxi; round trip, $26.50, including taxi. In 1925, ten Ryan ships made 4,082 flights, covering 119,225 plane miles, and carrying 7,890 passengers.

The interesting and significant performance of the Stout Metal Airplane Company Division of the Ford Motor Company is discussed in the chapter "Air Transport,—Mail, Express, Passengers," as is also that of Walter T. Varney, of San Francisco.

AN AIR DELIVERY FOR NEWSPAPERS

The Telegram Publishing Co. of Temple, Texas, maintains two ships. These ships were used in delivering papers each afternoon to twelve towns in a radius of 120 miles. Each load weighed 100
pounds. In 10,000 miles of flying in 1925, according to the report returned several thousand pounds of newspapers were transported.

W. A. Yackey is one of the original after the war operators continuing operations without lapse. He operates Checkerboard Field, Chicago. Here he has six planes, ready for any service, making frequent taxi trips to St. Louis and Detroit. He reports having flown 6,126 passengers in 1925, his ships making 7,260 flights. His reported mileage is over 100,000.

**How A City Uses Aircraft**

The Board of Trade at Youngstown, O., has set a good example. It has leased a field, bought an airplane, hired a pilot and is building a hangar. In 1925 the plane covered 4,500 miles in 82 flights, most of them to near-by towns. Of the plane the Board of Trade says: "We send the plane out to advertise the city. It draws hundreds of people to the city and they trade here."

**From Canada And Mexico**

The Aeronautical Chamber of Commerce received two reports from Canada and one from Mexico. One of these, the Dominion Aerial Exploration Co., has seven flying boats, engaged partly in photography and partly in the transportation of explorers equipment, of which 18,000 pounds was carried in 1925 to various parts of the provinces of Quebec and Ontario.

In Mexico, the Mexican Aviation Co. reports operating five Lincoln Standards 100,000 miles between Mexico City, Vera Cruz, Monterey, Victoria, Tuxpan, San Luis Potosi, Jalape, Brownsville and Laredo. They report carrying 150,000 pounds of "pay rolls."
DIRECTORY OF AIRCRAFT OPERATORS

Note:—The Aeronautical Chamber of Commerce prints the following list of operators upon authority of the operators themselves, hence assumes no responsibility for accuracy of statement. The following condensation covers number of craft, field, flights made, miles flown, number of passengers (exclusive of pilots) and pounds of freight carried and indicates whether operator gives flying instruction and whether or not he is equipped for aerial photography. All operators, in 1925, flew cross country. Where flying was solely for owner's pleasure, this is indicated. For addresses and further information apply to Aeronautical Chamber of Commerce, 300 Madison Ave., New York.

ALABAMA

ROScoe TURNER AirWAYS, INC. Three planes. 975 flights. 25,600 miles. 1,500 passengers. Instruction.

ARKANSAS

O. N. HOGUE. One plane. Municipal field. 75 flights. 1,800 miles. 40 passengers. Instruction. Aerial photography.

CALIFORNIA

AERO CORP. OF CALIFORNIA. Seven planes. Leases field. 7,437 flights. 148,000 miles. 6,781 passengers. Instruction. Aerial photography.
J. S. BARHAN. Two planes. Leases field. 150 flights.
RAY F. CARPENTER. One plane. Municipal field. 17,000 miles. Instruction. Aerial photography.
AL. CELLIER, JR. Two planes. 750 flights. 12,000 miles. 375 passengers. Instruction.
IRGVALD FAGERSKOG. Three ships. Municipal field. 2,000 flights. 10,000 miles. 2,000 passengers. Instruction. Aerial photography.
DWIGHT FAULDING. One plane. Leases field. 100 flights. 5,000 miles. Personal. Aerial photography.

KINNER AIRPLANE AND MOTOR CORP. Four planes. 500 flights. 17,500 miles. 400 passengers. Instruction.
LYLE-HOYT AIRCRAFT CORP. Three planes. Leases field. Instruction.
MILTON C. MAIN. One plane. 30 flights. 15,000 miles. Personal.
EDDIE MARTIN. Five planes. Leases field. 4,500 flights. 78,000 miles. 1,600 passengers. Instruction. Aerial photography.
DAVE MATTHEWS. Two planes. Leases field. 1,200 flights. 18,000 miles. 225 passengers. Aerial photography.
K. W. MONTE. Three planes. Leases field. 100,000 miles. Instruction. Aerial photography.
H. L. MULLIN. Two planes. Leases field. 1,080 flights. 23,070 miles. 1,080 passengers. Instruction.
ONTARIO AIRCRAFT CORP. Five planes. Leases field. 1,000 flights. 30,000 miles. 1,436 passengers. Instruction. Aerial photography.
EARLE OIVINGTON. One plane. Owned field. 300 flights. 4,500 miles. 350 passengers. Aerial photography.
PACIFIC MARINE AIRWAYS, INC. Two flying boats. Leases terminal. 105 flights. 35,000 miles. 1,983 passengers. Transportation line. Aerial photography.
CLARENCE O. PREST. Two planes. 2,000 miles. 100 passengers.
COMMERCIAL AIRCRAFT PROSPERS

GEORGE E. POWER. One plane. 100 flights. 3,500 miles.

M. D. QUIMBY. One plane. 2,000 miles. Personal.

USHER RAUSCH. Two planes. Instruction.

RYAN AIRLINES, INC. Ten planes. Leases field. 4,082 flights. 119,225 plane miles. 7,690 passengers. 1,500 pounds freight. Transportation. Aerial photography.


WALTER T. VARNEY. Six planes. Leases field. Instruction. Taxi 9,000 miles; school 78,000 miles. Aerial photography.

ROMAN C. WARREN. Four planes. Leases field. 2,080 flights. 75,000 miles. 1,200 passengers. Instruction. Aerial photography.

JAMES T. YOUNG. One plane. Leases field. 1,300 flights. 14,000 miles. 1,250 passengers.

COLORADO

ALEXANDER AIRCRAFT CO. Three planes. Leases field. 400 flights. 10,000 miles. 25 passengers. Aerial photography.

GUY M. DUFFRON. One plane. Leases field. 300 flights. 7,500 miles. 275 passengers.

EARLE K. PARKER. Three planes. Leases field. 1,000 flights. 20,000 miles. 500 passengers. Instruction.

CONNECTICUT

H. ROSCOE BRENTON. One plane. Municipal field. 15,000 miles. Instruction.

NEW ENGLAND AIRCRAFT, INC. Three planes. Municipal field. 15,000 miles. Instruction.

FLORIDA

CHARLES W. ADAMS. One plane. Leases field. 2,000 miles.

W. H. ALEXANDER. Seven planes. Leases field. 400 flights. 16,000 miles. 563 passengers. Instruction. Aerial photography.

ROY APPLEGATE. One flying boat. Public field. 25 flights. 10,500 miles. Aerial photography.

OTIS A. HARDIN. Three planes. Owned field. 45,000 miles. Aerial photography.

GLEN R. MORTON. Two planes. Municipal field. 300 flights. 15,000 miles. 100 passengers. Instruction. Aerial photography.

GEORGIA

HUFF DALAND DUSTERS, INC. Six planes. Leases field. Peach dusting.

D. H. DAVIS. One plane. 1,000 flights. 50,000 miles. 1,500 passengers.

BEN T. EPPS. Three planes. Municipal field. 150 flights. 1,200 miles. 175 passengers. Instruction.

ILLINOIS

NIEL V. AA VANG. Three planes. Leases field. 900 flights. 13,500 miles. 836 passengers. Aerial photography.

AERIAL PHOTOGRAPHIC SERVICE, INC. One plane. Leases field. 12,000 miles. Aerial photography.

HERBERT W. ANDERSON. One ship. Leases field. 1,200 flights. 10,000 miles. 1,000 passengers.

ERNEST J. BERNs. One plane. Leases field. Instruction.

JOHN L. BROWN. One plane. Public field. 400 flights. 7,000 miles. 350 passengers.

BERT D. BURLEY. One plane. Personal.

CAMPBELL AIRPLANE CO. Fifteen planes. Leases field. 4,661 flights. 70,000 miles. 8,000 passengers. Taxi. Aerial photography.

ARTHUR C. CHESTER. One plane. Leases field. 891 flights. 10,600
HERMAN J. NEUBAUER. Four planes. Leases field. 4,000 flights. 8,000 miles.

OSTERGAARD AIRCRAFT. One plane. Leases field. 2,500 flights. 7,500 miles. 300 passengers. Aerial photography.

CHARLES E. ROBINSON. Two planes. Leases field. 6,000 flights. 20,000 miles. 1,850 passengers.

ARTHUR W. ROZA. One plane. Leases field. 1,25 flights. 6,000 miles. 75 passengers.

SHELDON AIR LINE. Three planes. Municipal field. 800 flights. 12,000 miles. 900 passengers. Instruction. Aerial photography.

STECKHAM AERIAL SERVICE, INC. Three planes. Leases field. Taxi. Instruction.

FRED T. SONNY. Two planes. Leases field. 354 flights. 13,250 miles. 50 passengers. Aerial photography.

VARNEY AIRCRAFT CO. Three to six planes. Leases field. 7,400 flights. 30,000 miles. 3,000 passengers. 20,000 lbs. freight. Taxi.

JOHN E. WOFTON. One plane. Federal field. 360 flights. 4,000 miles. Aerial photography.

YACKEY AIRCRAFT CO. Four planes. Leases field. 7,250 flights. 100,000 miles. 6,126 passengers.

INDIANA

ANDERSON AIRCRAFT MFG. CO. Ten planes. Owns field. 2,743 flights. 16,530 miles. Experimental.

T. DOUGLAS. Two ships. Leases field. 15,000 miles. (est.) 1,200 passengers.

RAY FORTNER. One plane. Municipal field. 1,000 flights. 8,000 miles. 1,200 passengers. Instruction. Aerial photography.

M. E. HEADLEY. Two planes. 46 flights. 900 miles. 12 passengers.

HOBART AVIATION CO. Five planes. Leases field. 500 flights. 4,200 miles. 400 passengers. 100 lbs. freight. Instruction. Aerial photography.
GOODWIN MAVER. Two planes. Leases field. 3,000 flights. 42,000 miles. 1,800 passengers. Instruction. Aerial photography.

MUNCIE AERIAL CO. Five planes. Leases field. 1,000 flights. 17,500 miles. 925 passengers. Instruction. Aerial photography.

FRANK J. O'NEAL. Five planes. Leases field. 1,062 flights. 39,000 miles. Aerial photography.

FARMER PARKER. Two planes. Leases field. 1,500 flights. 6,000 miles. 19 passengers.

PAT AND DUKE AIRPORT CO. One plane. 225 flights. 3,500 miles.

LEONARD WHEELER, JR. One plane. Leases field. 485 flights. 6,200 miles. 539 passengers.

IOWA

W. R. ANDERSON. Four planes. Leases field.

WILLARD F. BRIDGEMAN. Two planes. Leases field.

WM. H. CONNER. One plane. Leases field. 2,000 flights. 15,000 miles. 450 passengers.

RAYMOND C. FISHER. Four planes. Leases field. 5,000 flights. 37,000 miles. 4,500 passengers. Instruction.

A. J. HARTMAN. Two planes. Leases field. 150 flights. 2,500 miles. 125 passengers.

EDWARD JANSSEN. One plane. Leases field. 600 flights. 20,000 miles. 150 passengers.

C. O. LAURIE. Five planes. Leases field. 1,000 passengers. Aerial photography.

MARSII E. MATHEWS. Three planes. Leases field. 800 flights. (est.) 27,000 miles. 1,350 passengers.

ROMKEY AIRCRAFT CO. Two planes. Leases field. 400 flights. 8,000 miles. 850 passengers.

C. F. TUTTLE. Leases field. 20,000 miles. 2,500 passengers. Aerial photography.

PAUL B. SHAW. Two planes. Leases field. 75 flights. 6,000 miles. 75 passengers. Aerial photography.


KANSAS

B. T. BARBER. Four planes. Owns field. 150 flights. 6,000 miles. 200 passengers.

AUBREY M. BARNES. Two planes. 145 flights. 2,500 miles. Instruction.

GEORGE E. HALSEP. One plane. Leases field.

CHARLES H. HODGES. One plane. 500 flights. 12,000 miles.

LEE F. LAWSON. Two planes. Leases field. 6,400 miles.

M. S. MARSHALL. One plane. Leases field.

A. E. MERRIMAN. One plane. Leases field. 100 flights. 10,000 miles. Personal.

F. C. PARK. One plane. Leases field. 200 flights. 4,000 miles. 300 passengers. Instruction.

TRAVEL AIR INC. Two planes. Leases field. 3,200 flights. 75,000 miles (est.). 6,500 passengers. Instruction.

KENTUCKY

K. V. SHORES. Two planes. Leases field. 320 flights. 2,800 miles. 240 passengers. Instruction.

LOUISIANA

ARTHUR E. CAMBAS. (N. O. Air Line). Two planes. Five seaplanes. Leases field. 300 flights. 23,000 miles. 17 passengers. 28,046 lbs. freight.

HUFF DALAND DUSTERS INC. 23 planes. 4 fields leased. Cotton dusting.
MAINE

DR. CLIFFORD STRANGE. Five planes. Owns field. 3,000 flights. 45,000 miles. 1,000 passengers. Instruction.

MARYLAND

CHESAPEAKE AIRCRAFT CO. Three planes. Leases field. 100 flights. 5,000 miles. Aerial photography.

MICHIGAN

WM. CLUNIE. One plane. Municipal field. 40 flights. 1,500 miles.

DETROIT AVIATION SCHOOL. Two planes. Leases field. Instruction.

DUPLEX AIR SERVICE. One plane. Municipal field. 250 flights. 12,000 miles. 150 passengers.

ARLIE T. EMMES. Two planes. Leases field. 700 flights. 17,000 miles. 700 passengers.

FENTON AIRWAYS INC. Six planes. Leases field. 2,643 passengers.

LESLIE FERRIS. One plane. Leases field. 500 flights. 25,000 miles. 400 passengers. Instruction.

FORD AIR LINES. Four planes. Owns field. 1,074 flights. 216,278 miles. 1,938,305 lbs. freight.

LUTHE FLYING SERVICE. Four planes. Leases field. 1,000 flights. 25,000 miles. 958 passengers. Instruction. Aerial photography.

J. A. NOWICKI, M. D. One plane. Leases field. 6,338 miles. Personal.

FRANK OVERCASHIER. Five planes. Leases field. 50,000 miles. 1,500 passengers. Aerial photography.

D. S. STEWART. One plane. 700 miles. Personal.

JACK WEIDEN. One plane. 2,600 miles. 300 passengers.

MINNESOTA

ARROWHEAD AIRWAYS CO. One flying boat. Leases field.

H. F. DEICICHEN. One plane. Leases field. 400 flights. 9,000 miles. 500 passengers.

CHARLES W. HOLMAN. Four planes. 35,000 miles. 1,500 passengers.

CHANCEY M. LARSEN. One plane. Municipal field. 375 flights. 16,000 miles. 400 passengers.

EDWARD H. LAWSON. One plane. Leases field. 350 flights. 6,000 miles. 200 passengers.

MIDWEST AIRCRAFT CO. Two planes. Municipal field. 1,000 passengers.

MARVIN A. NORTHUP. Two to three planes. Leases field. 27,000 miles.

MISSOURI

NICHOLAS BEAZLEY AIRPLANE CO. Six planes. Leases field. 500 flights. 7,500 miles. 400 passengers. Instruction. Aerial photography.

BRIDGETON AIRCRAFT CORP. Three planes. Municipal field.

LEE R. BRIGGS. Two planes. Leases field. 350 flights. 5,700 miles. 245 passengers. Instruction.

J. M. COBURN CO. Three planes. Leases field. 2,000 flights. 30,000 miles. 4,364 passengers. Aerial photography.

RAY DODSON. One plane. Leases field. Personal.

INDEMNITY CO. OF AMERICA. One ship. Municipal field. 100 flights. 8,000 miles. 25 passengers.

LOU F. MEISTER. One plane. Municipal field. 2,000 flights. 5,000 miles. 2,000 passengers. Instruction.

PORTERFIELD FLYING SCHOOL CORP. Five planes. Leases field. 2,000 flights. 125,000 miles. 1,700 passengers. 3,000 lbs. freight. Instruction. Aerial photography.
<table>
<thead>
<tr>
<th>Company</th>
<th>Planes/Boats</th>
<th>Flights</th>
<th>Miles</th>
<th>Passengers/Telephone Calls</th>
<th>Notes</th>
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<tr>
<td>ROBERTSON AIRCRAFT CORP.</td>
<td>10</td>
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<td>44,800</td>
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<tr>
<td>R. W. SCHROCK</td>
<td>3</td>
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<td>1,500</td>
<td>3,500 passengers</td>
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<tr>
<td>THOMAS WEBBER</td>
<td>2</td>
<td>450</td>
<td>4,000</td>
<td>300 passengers</td>
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<td>MISSISSIPPI</td>
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<td>HUFF DALAND DUSTERS INC.</td>
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<td>MONTANA</td>
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<td>OLIVER F. GIES</td>
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<td>NEBRASKA</td>
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<td>F. A. BREWSTER, M. D.</td>
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<tr>
<td>LAWRENCE ENZMEVGIR</td>
<td>1</td>
<td></td>
<td>18,000</td>
<td>2,564 passengers</td>
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<tr>
<td>OTTO R. RICKEL</td>
<td>1</td>
<td>77</td>
<td>1,200</td>
<td>75 passengers</td>
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</tr>
<tr>
<td>ANDREW A. RISSEY</td>
<td>1</td>
<td></td>
<td>25,000</td>
<td>2,800 passengers</td>
<td></td>
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<tr>
<td>JACK WESTPAHL</td>
<td>1</td>
<td>300</td>
<td>4,500</td>
<td>200 passengers</td>
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<tr>
<td>NEW HAMPSHIRE</td>
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<tr>
<td>ROBERT S. FOGG</td>
<td>2</td>
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<tr>
<td>ATLANTIC AIRCRAFT CORP.</td>
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<td>1,037</td>
<td>10,350</td>
<td>1,197 passengers</td>
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<tr>
<td>NO. F. CASEY</td>
<td>1</td>
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<tr>
<td>PACER AIRCRAFT CO.</td>
<td>3</td>
<td></td>
<td>18,000</td>
<td>400 passengers</td>
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<tr>
<td>WRIGHT FLYING CO.</td>
<td>1</td>
<td>100</td>
<td>5,000</td>
<td>100 passengers</td>
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<tr>
<td>JOHN J. YELLIN</td>
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<td></td>
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<tr>
<td>JOHN J. YELLIN</td>
<td>200 flights</td>
<td>3,000</td>
<td>150 passengers</td>
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<tr>
<td>NEW MEXICO</td>
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<tr>
<td>W. L. GULLETT</td>
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<tr>
<td>NEW YORK</td>
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<tr>
<td>AL BEARDI, Four planes.</td>
<td>634 flights</td>
<td>20,500</td>
<td>734 passengers</td>
<td>6,000 lbs. freight</td>
<td></td>
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<tr>
<td>RICHARD L. BENNETT, Five planes.</td>
<td>600 flights</td>
<td>12,000</td>
<td>100 passengers</td>
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<tr>
<td>L. K. BOXNEY, Two planes.</td>
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<tr>
<td>EMILE H. BURGIN, Two planes.</td>
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<tr>
<td>CURTISS FLYING SERVICE, Sixteen planes.</td>
<td>4,496 flights</td>
<td>170,000</td>
<td>3,768 passengers</td>
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<tr>
<td>CURTISS-METROPOLITAN AIRPLANE CO. Two to four amphibian and sea-planes.</td>
<td>40,000 miles (est.)</td>
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<tr>
<td>EDO AIRCRAFT CORP.</td>
<td></td>
<td>94</td>
<td>15,000</td>
<td>75 passengers</td>
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<tr>
<td>S. M. FAIRCHILD FLYING CORP.</td>
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<tr>
<td>GENERAL AIRWAYS SYSTEM, Seven planes.</td>
<td>400 flights</td>
<td>50,000</td>
<td>4,000 passengers</td>
<td>5,000 lbs. freight</td>
<td></td>
</tr>
<tr>
<td>RAYMOND HENRIES, Two planes.</td>
<td>1,000 flights</td>
<td>20,000</td>
<td>450 passengers</td>
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<tr>
<td>MURRAY O. HINE, One plane.</td>
<td>50 flights</td>
<td>1,500</td>
<td>20 passengers</td>
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<tr>
<td>JACK Loomis, Two planes.</td>
<td>19,000 miles</td>
<td>Aerial photography.</td>
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<tr>
<td>ALFRED MAGUIRE, Four planes.</td>
<td>1,500 flights</td>
<td>5,000</td>
<td>Instruction.</td>
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</tr>
<tr>
<td>HAMILTON MAXWELL, INC. 217 flights.</td>
<td>28,400 miles</td>
<td>Aerial photography.</td>
<td></td>
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</tr>
</tbody>
</table>
PERIN FLYER CO. Five planes. Leases field. 1,186 flights. 17,790 miles. 1,432 passengers.

PIONEER INSTRUMENT CO. One plane. 150 flights. 4,500 miles.

VICTOR RECKARD. Two planes. Leases field. 742 flights. 15,000 miles. 940 passengers. 350 lbs. freight. Instruction. Aerial photography.

EDWIN M. ROYNE. Four planes. Leases field. 1,500 flights. 15,000 miles. 3,000 passengers. Aerial photography.

WESTCHESTER AERIAL DISPATCH, INC. Four planes. Leases field. 314 flights. 31,400 miles. 200 passengers.

NORTH CAROLINA

BREVARD AIRCRAFT CORP. Two planes. Leases field. 1,220 flights. 36,810 miles. 3,000 passengers. 1,220 lbs. freight. Instruction. Aerial photography.

E. H. BYARS, JR. Two planes. Leases field. 400 flights. 2,000 miles. 300 passengers.

JOHN E. CROWELL. Six planes. Public field. 1,200 flights. 13,000 miles. 1,100 passengers. Instruction. Aerial photography.

HUFF DALAND DUSTERS, INC. Two planes. Leases field.

R. E. LEE. One plane. 300 flights. 2,000 miles. 200 passengers.


FRANK ROBINSON. One plane. Leases field. Aerial photography.

ALTON STEWART. One plane. Leases field. 400 flights. 10,000 miles. 250 passengers. Instruction.

N. E. STORMS. One plane. Leases field. 450 flights. 8,000 miles. 78 passengers.

NORTH DAKOTA

J. J. BERTRAM. One plane. Leases field. 250 flights. 5,000 miles. 420 passengers.


N. W. AIRCRAFT CO. Two planes. Leases field. 500 flights. 4,000 miles. 200 passengers. Instruction. Aerial photography.

JAS. M. SAGMILLER. One plane. Leases field. 500 flights. 14,000 miles. 200 passengers. 1,500 lbs. freight.

OHIO

ADVANCE AIRCRAFT CO. Owns field. 3,000 flights. 40,000 miles. 1,000 passengers.

L. H. & V. H. CHASE. One plane. Owns field.

F. K. CHERRY. Two planes. Leases field. 578 flights. 15,000 miles. 680 passengers. Instruction. Aerial photography.


T. B. GREIVE. Two planes. Owns field. 30,000 miles.

HAROLD K. IRISH. One plane. Leases field. 1,103 flights. 20,000 miles. 987 passengers. Instruction.

JOHNSON FLYING SERVICE. Three planes. Leases field. 3,000 flights. 20,000 miles. 5,220 passengers. 2,000 lbs. freight. Instruction.

LITTLE & ASTOR. Four planes. Leases field. 1,102 flights. 16,000 miles. 1,043 passengers. Aerial photography.

FLOYD J. LOGAN. Ten planes. One flying boat.

GLENN L. MARTIN CO. Two planes. Owns field. 130 flights. 12,000 miles. 106 passengers.

OHIO AIRWAYS SERVICE. Three planes. Leases field. 2,000 miles. 40 passengers.

WILLARD PARKER. Five planes. Leases field. 2,400 flights. 25,000 miles. 2,700 passengers. Instruction. Aerial photography.

FRED F. SMITH. Three planes. Owns field. 800 flights. 5,000 miles. 1,000 passengers. Instruction. Aerial photography.

HUGH WATSON. Four planes. Leases field. 2,000 flights. 23,310 miles. 1,100 passengers.

WOODSON ENGINEERING CO. Three planes. Leases field. 1,000 flights. 20,000 miles. 800 passengers. Instruction. Aerial photography.

YOUNGSTOWN BOARD OF TRADE. One plane. Leases field. 82 flights. 4,800 miles.

OKLAHOMA

WILLIAM A. BURKE. One plane. Leases field. 125 flights. 12,000 miles. Personal.

EAGLE-PICHER LEAD CO. One plane. Owns field. 200 flights. 15,000 miles. 250 passengers.

G. V. AERIAL TRANSPORT CO. Three planes. Leases field. 1,623 flights. 36,702 miles. 1,775 passengers. Aerial photography.

JOHN GREEN. One plane. Leases field. 125 flights. 15,000 miles. 250 passengers.

ALEX. HOMOK. One plane. Owns field. Personal.

D. H. HUFF. One plane. 200 flights. 5,000 miles. 150 passengers.

ARTHUR A. KELLY. Two planes. 100 flights. 3,000 miles. 75 passengers.

D. A. McINTYRE. Eight planes. Owns field. 60,000 miles. Instruction. Aerial photography.

THOMAS D. PARK. One plane. Leases field. 25,000 miles.

JAY B. SODOWSKY. One plane. Leases field. 536 flights. 14,000 miles. 1,000 passengers.

R. H. TARBUTTON. Two planes. Leases field. 25,000 miles. 1,000 passengers. Instruction. Aerial photography.


OREGON


RANKIN FLYING SERVICE. Four planes. Leases field. 1,376 flights. 19,506 miles. 1,931 passengers. Instruction. Aerial photography.

PENNSYLVANIA

AERO. SERVICE CORP. One plane. Leases field. 100 flights. 18,000 miles. Aerial photography.

C. B. CARROLL & J. T. MALOY. Four planes. Leases field. 1,483 flights. 25,000 miles. 1,408 passengers. Instruction.


CRAMER FLYING SERVICE. Three planes. Leases field. 5,000 flights. 49,000 miles. 2,000 passengers. Instruction.

S. C. DAVENPORT. One plane. Owns field. 100 flights. 2,000 miles. 150 passengers.

W. H. EMERY, JR. One plane. Owns field. 257 flights. 6,000 miles. 360 passengers. Aerial photography.

RALPH M. FOSTER. One plane. Leases field. 210 flights. 4,000 miles. 180 passengers.

R. CLYDE KING. One plane. Personal.

LUDINGTON EXHIBITION CO. Six to ten planes. Leases field. 300 flights. 8,000 miles. Instruction. Aerial photography.

FLOYD V. NULL. Four planes. Owns field. 1,800 flights. 5,000 miles. Instruction. Aerial photography.

KARL S. ORT. Two planes. Leases field. 600 flights. 50,000 miles. 30 passengers. Aerial photography.
PENNSYLVANIA AERO SERVICE. Six planes. Leases field. 700 flights. 18,000 miles. 900 passengers. 600 lbs. freight.

PITCAIRN AVIATION INC. Ten ships. Owns field. 5,314 flights. 63,000 miles. 4,168 passengers.

UNIVERSAL AIR SERVICE. Two planes. Municipal field. 700 flights. 7,000 miles. 700 passengers. Instruction. Aerial photography.

EARL WATSON. Three planes. Leases field. 900 flights. 30,000 miles. 500 passengers. Aerial photography.

LLOYD V. YOST. Two planes. Leases field. 1,000 flights. 21,000 miles. 1,000 passengers. Instruction.

SOUTH CAROLINA

PAUL R. REDFERN. 70,000 miles.

ELLIOTT SPRINGS. One plane. Owns field. Personal.

SOUTH DAKOTA

WILBUR COAL. One plane. Leases field. Pleasure.

E. C. CURRAN. One plane. Leases field. 12 flights. 240 miles.

RAY E. FULLER. One plane. Leases field. 500 flights. 10,000 miles. 300 passengers.

H. M. HANSEN. One plane. Leases field. 35,000 miles.

L. W. LEIB. One plane. Leases field. 40 flights. 500 miles. 34 passengers.

H. W. TENNANT. Five planes. Leases field. 1,500 flights. 28,000 miles. 1,500 passengers.

C. J. WAGG. Four planes. Owns field. 976 flights. 19,520 miles. 500 passengers.

TENNESSEE


TEXAS

AUSTIN AIR SERVICE. Three planes.

A. M. BRACKETT. Two planes. 200 flights. 2,500 miles. 50 passengers.

C. C. CANNAN. One plane. 225 flights. 6,700 miles. 240 passengers.

C. EUGENE CONRAD. One plane. Leases field. 40 flights. 22,515 miles. Personal.

CRESTON DEL COSTA. One plane. Leases field. 300 flights. 4,500 miles. 225 passengers.

MURIEL D. DICE. Five planes. Leases field. 50 flights. 15,000 miles. 300 passengers. 45,000 lbs. freight (est.). Instruction.

EDDIE HELTON. Four to five planes. Leases field. 750 flights. 24,000 miles. 650 passengers.

TED N. KINCANNON. Eight planes. Municipal field. 1,200 flights. 25,000 miles. 2,000 passengers.

CAPT. R. W. MACKIE. One plane. Leases field. 1,500 flights. 40,000 miles. 600 passengers. Instruction. Aerial photography.

CHAS. F. PEDLEY. Three planes. Leases field. 1,500 flights. 25,000 miles. 1,200 passengers.

THOMAS W. SMITH. One plane. Leases field. 200 flights. 4,000 miles. 145 passengers.

MARION STERLING. One plane. Municipal field. 300 flights. 8,000 miles. 400 passengers. Instruction.

TELEGRAM PUBLISHING CO. Two planes. Owns field. 400 flights. 10,000 miles. 375 passengers. Newspaper delivery.

TONCRAY MOTOR CO. One plane. 100 flights. 3,000 miles. 150 passengers.

UTAH

ROCKY MOUNTAIN FLYING CIRCUS. Two planes. Leases field. 1,800 flights. 28,000 miles. 1,720 passengers. Instruction. Aerial photography.
COMMERCIAL AIRCRAFT PROSPERS

ROY W. WARNER. One plane. Government field. 3,000 miles. 25 passengers. Personal.

WASHINGTON
A. C. ECKMANN. One seaplane. Leases field. 90 flights. 4,200 miles. 150 passengers.

EDWARD HUBBARD. Two flying boats. Leases field. 13 flights. 20,000 miles. 60,000 lbs. mail.

NICK B. MAMER. Four planes. Municipal field. 1,500 flights. 40,000 miles. 2,000 passengers. Instruction. Aerial photography.

JAS. CARLE RINEHART. One plane. Leases field. 175 flights. 7,500 miles. 50 passengers.

WEST VIRGINIA
JACK R. ADAMS. One plane. Leases field. Personal. W. O. DAVIS. One plane. 80 flights. 2,100 miles. 14 passengers.

TRI STATE AERIAL ADVERTISING CO. Two planes. Leases field. 950 flights. 15,000 miles. 458 passengers. Instruction. Aerial photography.

WISCONSIN
HARVEY J. ANKOMENS. One plane. Leases field. 10,000 miles. 300 passengers.

ANTON F. BROTZ, SR. One plane. Leases field. 370 flights. 4,800 miles. 255 passengers. Aerial photography.

JOHN CONANT. Two planes. Leases field. 6,000 miles (est.). 1,000 passengers.

J. F. DEWEY. One plane. Leases field. 90 flights. 4,000 miles. 70 passengers.

SOUTHERN AIRCRAFT CO.
D. K. STEELE. Three planes. Leases field. 2,000 miles. 75 passengers. Aerial photography.

WM. H. WREN. Four planes. 2,000 flights. 50,000 miles. 3,000 passengers.

VOYAGING KARL R. HUGHES. Leases field. 410 flights. 9,300 miles. 82 passengers.

HARRY W. HUKING. One plane. Government field. 5,000 miles. Pleasure.

WYOMING AIRWAYS CORP. Two planes. Owns field. 2,000 miles. 1,000 passengers.

CANADA
CANADIAN AIRCRAFT CO. Three planes. Leases field. 1,300 miles. 15 passengers.

DOMINION AERIAL EXPLORATION CO. Seven flying boats. Leases field. 250 flights. 26,400 miles. 400 passengers. 18,000 lbs. explorers' equipment.

MEXICO
MEXICAN AVIATION CO. Five planes. Leases field. 520 flights. 100,000 miles. 130,000 lbs. currency for payrolls.
Illustrating location and layout of Cleveland airport. This is a port of the first class. *Sketches by Airways Section, U. S. Air Service.*

Air Mail Hangar of first class, built by William E. Arthur & Co., at Cleveland.
CHAPTER IV
AIRPORTS AND AIRWAYS—IMPORTANT WORK OF AIRWAYS SECTION—MUNICIPALITIES ESTABLISH TERMINALS

Given some place to start from, some place to go to, and a route over which to fly, and the airplane will develop air traffic as well as itself.

Out of the widespread discussion of a national air policy, there has developed the general conviction that while it is the duty of the Federal Government to provide such indirect aids to air navigation as charted routes, emergency fields, illumination, communication, weather data, etc., it is the privilege of the municipalities to establish and equip their own air terminals, just as in past years they have provided their own water terminals.

Since 1923, the Army Air Service has maintained in the office of the Chief of Air Service at Washington, an Airways Section, which has been of inestimable service to commercial aviation. First, under Lt. B. S. Wright, then Lt. St. Clair Streett, and now under Lt. Donald G. Duke, the Airways Section has projected, mapped and operated model air routes, located and recorded existing landing fields, and greatly stimulated the establishment of new fields.

The model airway now extends from Langley Field (Hampton, Va.) to Bolling Field (Washington), where it divides, one branch running to Mitchel Field (New York), and the other through Cumberland, Moundsville and Columbus to Wilbur Wright Field (Dayton) where it divides again, one branch extending to Selfridge Field (Detroit) and the other to Louisville. The Detroit route then passes through Toledo, Kokomo and Kankakee to Scott Field (near St. Louis) where a junction is effected with the airway from Louisville. The trunk airway then runs southwest through Kansas City, Muskogee and Dallas—Ft. Worth to San Antonio. The total mileage of the airways is just under 3,000.

Record of the Model Airways

In the fiscal years 1923, 1924, 1925 and July to December inclusive of the fiscal year, 1926, the record of the Model Airways is as follows: Flights started, 608; flights completed, 584; miles flown, 1,083,463; passengers, 1,006; pounds of express carried, 51,623; accidents, 1; fatalities, 0.

To date, the Airways Section has completed thirty-two air navigation charts (Strip maps) at a cost of $2,000 each, and 16 addi-
Pitcairn Airport, near Philadelphia.
AIRPORTS AND AIRWAYS

National charts are now under completion. The section has compiled 450 bulletins on landing fields provided by the government, municipalities and commercial operators along the present and proposed airways system, 58 of those having been issued in 1925.

According to the latest army compilation there are 3608 landing fields in the United States today, divided as follows: Emergency, 2,762; commercial, 225; municipal, 310; air mail, 66; seaplane, 103; Army, 102; Navy, 40.

Suggestions for Guidance of Municipalities

The list of municipal fields as found in the Appendix is indicative of the tremendous interest in air transport, but most of these fields are not improved. It required the specific stimulus of the Kelly Air Mail Law and the consequent petitions for air mail routes to move the cities to definite action.

The story of the National Air Transport's remarkably successful appeal for terminal and hangar facilities on C. A. M. Route No. 3 is a case in point. In this work, the N. A. T. was greatly aided by the Wichita and St. Joseph Chapters of the National Aeronautic Association and the Standard Oil Company (Indiana), upon a plan worked out by Carl H. Wolffey, Aviation Commissioner of the city of St. Joseph and Charles H. Wagner, St. Joseph, manager of Standard Oil; Allan Jackson, Vice President in charge of sales of the Standard of Indiana, authorized the expenditure of some $15,000 in marking air routes and making strip maps, the latter being of particular service.

Chicago, Moline, St. Joseph, Kansas City, Wichita, Oklahoma City, Fort Worth and Dallas, all largely, if not wholly, upon the incentive provided by the National Air Transport, have established municipal air ports. These vary in their investments, from $15,000 or $20,000 to a quarter of a million dollars.

Cleveland, July 1, 1925, coincidental with the start of the New York-Chicago overnight mail service, opened its million dollar air port, thus setting an example for cities of the first class.

Cities desirous of establishing air terminal facilities should consider in the following order, these important factors:

1. Demand.—Be sure that your city is on an established or immediately practical air mail or express route before campaign is started.

2. Cost.—This depends upon local land values. For a city of 100,000 population, a total of $100,000 to $150,000 should provide a port of the first class, completely equipped, with hangars, beacons, etc.
3. Location.—As close as possible to post office and express offices and easily reached by motor car and other means of surface transportation.

4. Size.—One hundred acres is the minimum to be safely considered, and then only when all approaches are clear; 160 acres is more desirable; larger areas may be determined by the size of the city and available funds.

5. Preparation of Field.—Clear away all trees; remove or lower such hazards as telephone or telegraph wires; grade, tile and seed the area; lay out L-shaped runways, so as to permit taking off or landing into prevailing winds, these runways to be rolled cinders or concrete and to be from 1200 to 3000 feet long.

6. Equipment.—Markers, lights, hangars, service pumps, etc., all governed by local conditions and air traffic demands.

Each field almost of necessity requires special consideration. It is suggested that municipalities write to the Aeronautical Chamber of Commerce for reference to the nearest available authority.
CHAPTER V

USES OF AIRCRAFT IN AGRICULTURE, FORESTRY, ETC.

It has been three or four years since the Aircraft Year Book first gave publicity to the theory that aircraft could be put to practical use in the destruction of insect pests and the suppression of plant diseases; in a wider application of forestry; in crop survey and in other affiliated lines of work.

The year 1925 saw tremendous development along this line. Out of what a few years ago was a theory has developed a large commercial activity, which, to date, is largely centered in one organization, the Huff Daland Dusters. This company, which was the first to accept the invitation of the air service and the Department of Agriculture to undertake pioneer experimentation, now has in operation seventeen Huff-Daland Airplanes stationed at ten points in Louisiana, Georgia, Mississippi and North Carolina. During the calendar year 1925 these airplanes dusted 80,000 acres of cotton with calcium arsenate.

Dr. B. R. Coad, who is in charge of the Delta Laboratory of the Bureau of Entomology, Department of Agriculture, has the following to say concerning the successful application of aircraft in the preservation of crops:

"There is no reason for limiting the operation of airplanes to cotton and we have also been particularly interested in observing the possibility of using the planes on other crops. Early this season before cotton dusting started the Huff Daland Dusting Corp. treated nearly 200,000 peach trees successfully in Georgia. In our experimental work we have co-operated with the Malaria Mosquito Laboratory of the U. S. Bureau of Entomology and found considerable possibility of a field for the plane in spreading paris green for the destruction of the malaria mosquito in its breeding ground. An idea of the multitude of possibilities along this line is furnished by the fact that we have had with us representatives of seven different foreign countries who are interested in adopting airplanes to some of their problems of insect control. At least five of these countries are now carrying out active tests.

"We have been particularly interested this season in watching the reaction of the farmers and business men in sections where airplane dusting has been carried on on a commercial scale. Naturally this year the farmers who subscribed were the community leaders in most cases, and their neighbors held back to see what success was secured. In this way we have watched the operation of several units in North and South Carolina and of seven such units in the Mississippi Valley, in Louisiana, Arkansas and Mississippi. At least 95 per cent of those subscribing this year are enthusiastic over the service, and in every instance the farmers are contracting for a tremendously increased acreage in the same communities next year."
"The last year on which we had a definite estimate for loss of cotton production due to the boll weevil was in 1921. The Bureau of Crop Estimates of the U. S. Department of Agriculture that year reported the potential production prevented by weevil as 6,277,000 bales. Cotton is now worth something over $100.00 per bale. This figure serves to show the enormous destructive capacity of the weevil. This loss is distributed over the forty million acres of the American cotton belt but is distributed very irregularly. I have attempted to classify the area roughly and determine the infested area acreage which can be reached efficiently with planes. As nearly as I can calculate this would be somewhere between twenty and twenty-five million acres."

Dr. Coad estimates that were airplanes applied to at least the fifteen million acres which are undoubtedly accessible to flying there would result a saving of 3,000,000 bales of cotton or approximately one-half of the total loss due to boll weevils. This should mean an actual monetary saving to the country in one year of $225,000,000.

As to the future, Dr. Coad has the following to say:

"Right now the average operating airplane will care for approximately 5,000 acres of cotton through the season. It would require the operation of 3,000 airplanes to treat the 15,000,000 acres of cotton available, to say nothing of the reserve equipment which would be behind this operation. This opens the view of commercial aviation not presented by any other kind of operation which has appeared so far. The basis of this program is the profitable operation of airplanes without subsidy."

DESTROYING LOCUSTS IN THE PHILIPPINES

In previous issues of the Aircraft Year Book the work of the Army Air Service in poisoning locusts in the Philippines has been recounted. Not only was the poison immediately effective so that the dead pests were piled up in windrows on the island plantations but a peculiar phenomenon of intuition was reported. The locusts traveled in clouds. The airplanes worked such havoc upon millions of them that invading hordes, upon hearing the sound of airplane engines, appeared deliberately to avoid the areas that were being dusted.

NOW TREATING APPLE ORCHARDS

The Army Air service was the pioneer in dusting operations, supplying equipment and personnel to the Department of Agriculture. In 1925 it also was the pioneer in applying dusting to apple orchards in Oregon. Flights were made for the Department of Agriculture near Monroe. Lt. Oakley G. Kelly, who was one of the pioneers in the work at McCook Field, had charge of the work in the northwest. Entomologists compounded a mixture of arsenate of lead and sulphur to eliminate scab and the codding moth. Further experiments were carried on at the Oregon Experiment Station of the
Loading Huff-Daland Dusting Plane—Photo, U. S. Dept. of Agriculture.
Oregon Agricultural College at Corvallis. Hitherto, apple growers felt that spraying was the best means of controlling their crop. It now appears that dusting can be more effectively substituted. This work, like cotton dusting, requires low, fast straight flying. In the experiments in Oregon, a Curtiss airplane was used. The orchard was two miles long. The plane was flown at 140 miles an hour. Lt. Kelly made fifteen flights back and forth over the orchard, ten feet above the tree tops. He accomplished in one hour more than could possibly have been done in many days of spraying from the ground.

Curtiss Flying Service has extended the use of the airplane to the cranberry bogs. A demonstration given to the Cranberry Association of New Jersey, proved conclusively that pests which had caused great loss to the growers in past years could be eliminated by use of the dusting airplane.

Other Agricultural Applications

The Division of Crops and Live Stock Estimate, Department of Agriculture, extended during 1925 its investigation of the use of aircraft in making more accurate crop surveys. Several flights were made by representatives of the departments, in co-operation with the Army Air Service, in endeavoring to trace the movement of rust spores, etc. As a result of probably a dozen experimental flights made by investigators in various parts of the United States, it is reported that the Department of Agriculture at this writing is seriously considering the acquisition of a fleet of airplanes for use in its field work.

Air Forest Patrol

After a lapse, an appropriation of $50,000 became available for the Forest Service for air patrol, on July 1, 1925. This small amount was ample to patrol forest fires on the West Coast only because of the proffering by the Army Air Service of the necessary flying equipment.

Planes did not make regular patrols as in the past, but instead were held in readiness at their bases for special flights. They covered Western Montana, Northern Idaho, Washington, Oregon, and California. After a sufficient number of reconnaissance flights had been made by each pilot to familiarize him with his territory, the planes were held in readiness for:

1. Reconnaissance of large fires.
2. Confirmation of reports of fires on which it might be difficult to obtain reliable information from other sources.
(Top) Forest Patrol by Air. The new ranger cruising over Cleveland National Park, California. (Bottom) Shenandoah National Park.—Photos, U.S.A.S.
3. Flights after lightning storms and when the atmosphere might be too smoky for effective detection of fires from lookout stations.

Ten airplanes, nine pilots, fifteen mechanics, and two observers were employed. Bases were established at Spokane, Wash.; Vancouver Barracks, Wash.; Eugene, Ore.; Sacramento, Cal., and Los Angeles, Cal.

The period of operation was from July 1 to mid October. Considerable success was attained in placing detailed information concerning the fires in the hands of ground forces by message dropping. Approximately 200 such messages were dispatched. It is impossible to state accurately how many fires were discovered first by the patrol airplanes but out of 421 patrols involving 75,615 miles flying, 217 new fires were discovered, of which number at least sixty-one were discovered and reported by plane before any ground lookout of the Forest Service had detected the danger. The Forest Service particularly through its field agents, who have had opportunities to see the planes in action, is favorably disposed toward the air patrol.

Forest Patrol by Private Contract

As this book goes to press, Secretary of War Davis has suggested that in forest fire patrol work for 1926, arrangement be made by the Department of Agriculture for the use of commercial aircraft. This is in line with the Administration’s policy to refrain, wherever possible, from competing with the industry. The War Department, Secretary Davis states, is willing to make available the services of a competent officer to assist in carrying on the patrol work in the rendering of such assistance in the selection of pilots and airplanes as may be necessary.

Coast Guard Air Service

The Coast Guard for a number of years has had a very definite plan for the establishment of an air corps. Increase of duties imposed upon the Coast Guard by the prohibition problem made possible the getting through Congress of an item in the deficiency appropriation bill early in 1926, calling for $150,000 for establishment of a Coast Guard Air Service. Admiral Billard, Commandant of the Coast Guard, announces plans to establish five bases along the Atlantic Coast from New England to Florida. Strategic points in the Coast Guard campaign against rum smuggling are to be selected and sea-going types of boats will be used.
Atlantic Aircraft Corp.'s Tri-Motor Transport. The engines are Wright Whirlwinds.
CHAPTER VI

AIRCRAFT IN EXPLORATION

FOR the first time in the history of aviation, airplanes were used in 1925 as important means of transport in exploration. There were three expeditions during the year, and so successful were the planes that a number of explorers were led to adopt them for the 1926 projects.

The first exploring party to take an airplane into the wilderness was led by Dr. A. Hamilton Rice up the headwaters of the Amazon river in northwestern Brazil. The actual work of the machine was accomplished during the winter and spring of 1925. The pilot in charge of aerial operations was Lt. Walter Hinton, who piloted the N.C.-4 on the Navy's transatlantic flight in 1919. With Hinton on the Rice expedition was Capt. Albert W. Stevens, aerial photographer on leave from the Army.

They had a Curtiss Seagull flying boat with an OX engine and this machine gave a remarkable performance throughout more than eight months of service in a tropical wilderness far from a repair base, most of the time in the heart of an impenetrable jungle broken only by swift rivers full of rocks, dangerous rapids and waterfalls. The following is Lt. Hinton's personal account of what was accomplished:

INTO THE TROPICS WITH A CURTISS SEAGULL

"We had the Curtiss Seagull out in the open nearly nine months. It was never under shelter but was exposed to all the tropical storms, rains and gales, and blistering heat, its hull in the water continuously save while flying or during occasional overhaul. Yet we flew out of the wilderness with it after I had recorded in my log book more than 12,000 miles of flying.

"The main party included from ten to twelve members and from fifteen to seventy-five natives. They had to make their way slowly and tediously up the rivers Rio Negro, Brano, then the Uraricuera and lastly as far as they could go on the Parima—in all about a thousand miles from the inland seaport of Manaos, Brazil, which lies up the Amazon a thousand miles from the Atlantic. They depended on boats, canoes and launches. They became separated at times. Often the main body would be delayed for months while it struggled to cut through the jungle in order to get past a bad rapids or waterfall.

"With the Seagull we maintained communications between the main base and the others. We flew the mails back and forth, delivered medical sup-
plies and kept all members of the expedition, including the advance parties, in touch with each other. We flew over thousands of square miles of jungle and water otherwise impassable. The shoals, rocks, rapids, waterfalls—some of them fifty feet high—and other natural barriers were photographed from the air and the films developed in our jungle camp that night. Next day we would deliver them to the surface party, either by landing near the camp, or if that was impossible because of low water and rocks, we would drop them in an empty gasoline tin. By this method Dr. Rice always knew what lay ahead and very often our photos and sketches, made by Stevens, would show him the best way and sometimes the only way through the channels or around swift water.

**FLYING BOAT ESPECIALLY OUTFITTED**

"The Seagull was especially outfitted for that dangerous work. The hull was partitioned off into four watertight compartments. The fuel was carried in five-gallon tins. Our tools were the smallest that could be procured and we carried them in the plane at all times along with a tent, aluminum kettle, fishing tackle and matches. One night I had to fly alone after placing one of the party aboard a down river steamer at the beginning of the long trip into the wilderness. The danger here lay in striking a submerged rock, floating stump or the like when landing. But the boys in camp came out in midstream and held lanterns over their heads and I was able to set the machine down without incident. A few weeks later Stevens and I did strike a rock while landing some fifty miles up river from the others. It punched a hole in the hull as big as one's head, but we took off again immediately and found an island which had a beach. There we landed, waited for the river to fall a few feet so we could patch the hull, waited again for the water to rise and then after a ten days' sojourn flew back to camp. That was our only trouble with the machine, which was not its fault."

**LOENING AMPHIBIANS IN THE ARCTIC**

One of the two polar expeditions was all-American, sent out by the National Geographic Society under the leadership of Commander Donald B. MacMillan. The flying contingent was assigned from the Navy Bureau of Aeronautics and was led by Lieut. Commander Richard E. Byrd, Jr. The other members of this unit included Lieut. M. A. Schur and Chief Boatswain E. E. Reber, pilots; Floyd Bennett, Charles Rocheville, A. N. Nold and N. P. Sorenson, mechanics and pilots, and Albert A. Francis, aerologist. The flying equipment consisted of Loening Amphibians.

The two ships of the expedition, the Bowdoin and the Peary, carried thirty-nine members all told, with considerable scientific equipment and three Loening Amphibian planes. They arrived at Etah, Greenland, the northernmost community populated by only fifteen Eskimos, on August 1st. The planes were taken off the deck
Loening Aeronautical Engineering Corp.'s Amphibian. This is the type that successfully penetrated the polar regions.
of the Peary and assembled on the rocky shore, after which they were moored in the harbor and subjected to all the bad weather which featured that month. Yet, Commander Byrd, reporting to the Navy Department, said:

"The Loening planes proved to be the best machines that we could have procured for the sort of work which we were to undertake. They had to be run ashore on wheels and on returning from a flight, landed on the water. We had to fly over land, water, ice and snow.

"We found only four days which one would term fit for flying. Yet during our eighteen days at the Etah base we went out when there was the slightest chance of success. Our objective was the unexplored area in the polar sea between Alaska and the Pole. The center of this blind spot lay 1,000 miles northwest of Etah. To reach it we planned to establish supply bases on Ellesmere Island and Axel Heiberg Island, placing the final base at Cape Thomas Hubbard on the shore of the polar sea."

Byrd and his companions flew repeatedly over mountains and valleys, glaciers and ravines, only to find other and higher ranges to hold them back, simply because the masses of clouds mantled the tops of the mountains and extended up for miles, higher than the loaded machines could go. Only expert navigation enabled Byrd to find his way back to Etah on these flights because they were operating almost on a line between the North Pole and the North Magnetic Pole. Owing to this difficulty, they had to steer a compass course nearly east in order to fly toward the northwest. A sun compass invented especially for the party gave accurate direction when the sun could be seen, but it was useless in snow, fog and clouds, and there was much of all three.

**Planes Menaced by Drifting Icebergs**

On several occasions all hands had to work hard to save the planes from being crushed by drifting icebergs. One of the machines caught fire from burning gasoline on the water. Her wings were destroyed. The planes repeatedly dragged anchors designed to hold twice the weight, and the fliers often remained awake for days at a time to avoid having the machines wrecked.

Notwithstanding these difficulties they flew a total of 6,000 miles and explored 30,000 square miles of surface most of which was uncharted and had never been seen before. They managed to fly about 450 miles from their base and as far as Axel Heiberg Island. Had they found bases, they could have gone on and accomplished their mission.

On Aug. 18th Etah fjord commenced freezing over and Mac-Millan decided to turn back before his ships were frozen in. Byrd
and the other fliers believed they could accomplish their mission if given four days more, but the commander concluded that the risk was too great.

**Amundsen-Ellsworth Expedition**

Captain Roald Amundsen and Lincoln Ellsworth, the American explorer, led the other expedition on the polar quest. They used two Dornier Wahl monoplanes equipped with boat-like bottoms and sled runners to facilitate landing and taking off on either ice or water. Each plane carried three men, including the leaders. The others were Lief Dietrichson and Hjalmar Riiser-Larsen, pilots of the Norwegian Navy; Oscar Omdahl and Feucht, mechanics. They flew away from King's Bay, Spitzbergen, on May 21st and were lost to the world for twenty-four days.

On one flight both planes landed. Ellsworth's was damaged. The two crews combined to get Amundsen's plane into the air, but the worst obstacles confronted them. They worked unceasingly night and day, using knives, gaffs, anything that would make an impression on the rock-like crust. Tons of ice were removed in that manner. Several attempts were made to get into the air.

Everything possible was stripped from the plane. Hundreds of yards of ice had been smoothed. Hundreds of tons of it had been picked up and cast aside, all this by six men working with feverish haste. Finally, on June 5th, worn out yet confident that they would succeed, the party climbed into the machine. Riiser-Larsen was at the controls. The two engines were started. The propellers twirled. Slowly, ever so slowly at first the big machine moved over the runway like a sled; then faster and as the men held their breath in sheer anxiety it stepped off into the air. A few hours later they landed in a cove on the north coast of Spitzbergen where a scaling ship soon found them and took them back to King's Bay. Later, the plane was flown to Oslo, Norway.

**The Next Attempt by Airship**

Both Amundsen and Ellsworth concluded that airplanes were not practical in polar exploration. That opinion was likewise held by MacMillan after the Etah adventure. Amundsen and Ellsworth projected another flight for the spring of 1926, that one to be made in a semi-rigid airship built in Italy. They were to fly from Spitzbergen across the polar sea and if possible, return to their base. If adverse winds held them back, they were to go on to Point Barrow, Alaska.
But Commander Byrd and others still had faith in airplanes. Late in the year Byrd projected another expedition of his own and secured financial support for that undertaking from Edsel B. Ford, John D. Rockefeller, Jr., Vincent Astor, Richard F. Hoyt, F. Trubee Davison and others. His plan was to take two airplanes by ship to King's Bay, Spitzbergen, and there fly supplies to a spot on the coast of Peary Land, the northernmost point of Greenland, where an aerial base would be established. He calculated that two flights from Spitzbergen to Peary Land would give him enough supplies to permit operations toward the Pole and the unknown region. This base would be about 400 miles south of the pole.

His aids were to be Floyd Bennett, second in command; Lieut. G. O. Noville, U. S. X., reserve; Lieut. Alton X. Parker, U. S. M. C., retired; Lieut. Robb C. Oertel, U. S. A. S., reserve, pilots. His ship, the Chantier, carried forty-four men when she sailed out of New York for Spitzbergen on April 5th, 1926. Two planes were carried in the hold.

One was a three-engined Fokker transport, taken because of the remarkable performance which this ship had demonstrated with its three Wright Whirlwind air-cooled engines. Even with full loads the machine could remain in flight with one engine out and the other throttled. That plane was to be used on the exploring flights from Peary Land. The second plane was a Curtiss Oriole, which was to be held in reserve for purposes of rescue or other emergency.

The Wilkins Expedition

Another expedition projected for 1926 was organized by the Detroit Aviation Society under command of Captain George Hubert Wilkins, a noted explorer. Wilkins was to start his polar flight from Point Barrow, Alaska, seek the unknown area and if possible continue across the roof of the world to Spitzbergen. Like Byrd, he was depending on a three-engined Fokker also powered with Wright Whirlwind motors. His reserve plane, which was also to be used in ferrying supplies from Fairbanks, Alaska, to Point Barrow, was a single-engined Fokker.

Carl B. Eieleson, of Fairbanks, was the first U. S. Air Mail pilot to fly a mail route in Alaska (in 1923) was to be the pilot of the Fokker plane, with Wilkins as navigator, on its polar flight. Major Thomas G. Lanphier, commanding officer of the Army Air Service First Pursuit Group at Selfridge Field, Mich., on leave of absence, was to be in charge of the expedition at its bases in Fairbanks and at Point Barrow. Wilkins and Eieleson set out on the first flight to ferry supplies to Point Barrow on April 1st, 1926.
(Top) Typical area marked for appraisal. Note how fence lines and natural ground lines aid in marking property parcels. (Bottom) Typical drainage area. Note water bodies, marshes and higher lands, which give important factors in engineering work.—Photos. Fairchild Aerial Surveys, Inc.
AERIAL photography—DANGER OF GOVERNMENT COMPETITION

AERIAL photography, in 1925, was definitely accepted by civilian engineers and government experts as an accurate, scientific method of making surveys.

This branch of the aircraft industry is on the verge of a tremendous development. Its beneficial influence on other phases of aviation can hardly be overestimated. The one doubt cast upon its future does not involve either civilian equipment or performance, but it does concern governmental policy.

In the past, the engineering and fabricating branches of the Army and Navy Air Service, responding to public opinion, Congressional expression and instructions from the Chiefs and the Secretaries of the Departments, have limited their activities which, for a time, threatened serious injury to the industry as the source of supply. At the same time, the photographic sections of Army, Navy and Marine Corps have been extraordinarily active in doing work not only for their own departments, but for practically every other department. While there has, on the whole, been less competition in taking photographs for civilian clients, the tendency has been to monopolize to the exclusion of the civilian photographic concerns, the growing demands from the Geological Survey, the Coast and Geodetic Survey, the Department of Agriculture, and others.

The theory of our air defense, as enunciated by the President's Aircraft Board and by the Congressional Aircraft Investigating Committee, is that the War and Navy Departments shall maintain only a military nucleus, looking to the aircraft industry and commercial aviation for the creation of a reserve of equipment and primarily trained personnel. This is the policy of the air service chiefs. If it is true of aircraft engineering and construction, it is just as true of aerial photography. If it is unwise for the services to build aircraft, not only for themselves but for other departments, then it is equally unfair and decidedly unwise for them to build up a huge photo system and thus deprive the civilian concerns of legitimate government business.
AERIAL PHOTOGRAPHY NEEDS ENCOURAGEMENT

In 1925, while the civilian aerial photographic business expanded, it did not grow as rapidly as it should. One firm—Underwood and Underwood—retired from the field. Highly technical, requiring large amounts of capital, and demanding devotion to engineering room and laboratory, aerial photography, if it is to prosper, must have encouragement by the Government, not competition. The dominant factors in this phase of the industry are Eastman Kodak Company, Fairchild Aerial Surveys, Inc., Fairchild Aerial Surveys Co. (of Canada), Ltd., Cia Mexicana de Aviacion, the first in manufacturing only, and the latter in both manufacturing and operating. The three latter, controlled by Sherman M. Fairchild, are subsidiaries of the Fairchild Aviation Corporation of New York.

USES IN TAX REAPPRAISAL

During 1924, one of the newest developments in the use of aerial maps, according to Fairchild, was their utilization for tax reappraisal work. During 1925 this use developed very rapidly, until today in the tax reassessment of cities and countries, the more progressive appraisal companies demand the aerial photographic map as a basis for all their work. The photographic map has also stimulated tax reappraisal programs. Hardly any municipality or county in the United States fails to recognize the fact that values of property have changed so rapidly during the past few years, that taxes as now levied are often unquestionably unjust.

It has been impossible to reappraise many of these properties due to the prohibitive cost of ground surveys which must be secured as a basis for such reappraisal work. A photographic map giving this information at approximately a tenth of the cost and giving fully twice as much information encourages the county and municipal authorities to proceed with their program. Thus the stimulation of this method, as an aid toward just taxation, has resulted in one of the greatest benefits to the public during the past year.

USE IN REAL ESTATE DEVELOPMENT

The attention of the public has been focused on real estate for the past year, largely due to the phenomenal boom in Florida. The use of the aerial method in producing the necessary maps for the development of such projects has opened up a new method for the use of real estate operators.

In subdivision work, speed is essential and the photographic map
has been extensively used by real estate operators for preliminary mapping. In Florida, the Fairchild Company during 1925 executed map contracts varying in size from one to fifty square miles each. These maps were produced in a fraction of the time which would have been required by ground methods and not only were of assistance to the engineers, but since they revealed every detail of the ground acted as a powerful and convincing sales argument to the companies' selling organizations.

**Oblique Aerial Photographs**

The use of the oblique aerial views by real estate men requiring pictures essentially for sales purposes has been noted. Nearly every progressive real estate man uses such photos of his property as standard exhibits. They show prospective customers his property without requiring them to leave the office. L. E. Fitzgerald, probably one of the best informed real estate men covering Florida property, expended approximately $25,000 to have a series of oblique pictures taken covering the entire eastern coast of Florida. As a result, he is able actually to effectively show prospective purchasers the exact conditions of any piece of seashore property on the whole eastern coast of Florida at a great saving of time and expense.

Similar conditions on a smaller scale have developed in the metropolitan New York district. One of the larger real estate operators of New Jersey having contracted for a map and series of oblique pictures of an entire county, stipulated that copies of this map or copies of oblique pictures be sold to no other person than himself. It is obvious that this operator has a tremendous advantage over his competitors due to having accurate information regarding the vicinity on file and also an advantage in sales argument by being able to show actual photographs instead of trying to paint a word picture.

**Aerial Photography and Drainage**

During the latter part of 1924, E. H. Sitz, a prominent civil engineer in Florida, undertook an extensive survey of the Istokpoga Drainage District. By the usual ground methods, conditions were so difficult, owing to the broad expanse of marsh lands and lagoons, that the Fairchild organization was called upon to make this map from the air. Previously stadia surveys had been attempted but had proven inadequate since it was impossible by that method to secure enough detailed information to enable the preparation of a proper plan of reclamation.

The original purpose for which this map had been made was
AERIAL PHOTOGRAPHY

well served and it was several months after delivery that in making further studies of the territory, an old dyke was discovered running across the present run of the Kissimmee river near Fort Bassinger. This discovery led to further intensive study of the photographic map which finally disclosed a hitherto unknown outlet to the Atlantic Ocean. It would now appear from further investigation that the information the photographic map has disclosed will permit the drainage of a large area of hitherto practically worthless land by the execution of a small amount of inexpensive dredging. In other words, it would appear that the Everglades situation which has baffled engineers for a decade is now on the road to solution.

Growing Government Competition

The magnitude of governmental business which should be made available to the aircraft industry is convincingly revealed in the following statement headed, "Aerial Photographic Activities of the Army Air Service," as published in No. 6, Vol. 10 of the Air Service News Letter, dated April 16, 1926:

"During the year 1925 there has been a great increase in the demands upon the Army Air Service for aerial photographs for military, map-making and other purposes, and a decided increase in the variety of purposes for which photographs are used. In addition to the routine necessities of training, extensive photographic operations for practically all branches of the Army have been accomplished and photographic mosaics and aerial photographs for map-making and various aerial survey purposes have been furnished to cover areas of approximately 8,000 square miles. By far the greatest demand for aerial photographs has emanated from Federal agencies outside the War Department, particularly the Geological Survey, whose schedule submitted to the Air Service for the fiscal year 1926 calls for the photographing of areas approximating 40,000 square miles. Forty per cent of the entire mapping in the United States for 1925 by the latter Department was accomplished by the aid of aerial photographs furnished by the Army Air Service. In the latter part of the year, active participation was begun in the Geological Survey schedule for mapping the entire United States, according to the Temple Bill Act passed by Congress in March, 1925.

Tremendous Air Mapping Program

"As only about 43 per cent of the country has been covered with topographic maps and many of these maps will have to be revised or the areas resurveyed to provide maps of the present day standard, the Geological Survey estimates that photographs will be required of about two million square miles of areas within the territorial limits of the United States under the Temple Bill program. It is estimated that between ten and fifteen million dollars will be saved on this project by the use of aerial photography as compared with what it would cost if the work was done by ground survey alone. In addition, there is approximately a 50 per cent saving effected in the time consumed over the old methods, and an improvement in the quality
of the maps has resulted. The greatest proportion has come in the work of revising maps. In some instances, nearly the entire work of revision has been accomplished by means of aerial photographs, so that a saving of as much as 75 per cent of the cost of ground methods has been effected. The photographs are being used in standard topographic mapping to prepare plane table field sheets with surface data, such as roads, railroads, streams, woodlands and other features which are ordinarily obtained by ground work. These plane table field sheets are used by topographers who go over the ground to add the contours, names, boundary lines and other information to complete the map.

"The Army Air Service has furnished to the Geological Survey multi-lens photographs during the year of approximately 9,000 square miles in various parts of the country. The total area photographed for the War Department and all other Federal Departments during 1925 was approximately 22,000 square miles. The bulk of the mapping work has been accomplished with the tri-lens camera developed by the co-operative efforts of the Corps of Engineers and the Army Air Service. The four-lens camera, which is an improvement over the tri-lens camera, has been developed and satisfactorily field tested, and a sufficient number of these cameras are being constructed to enable the Air Service to double its capacity for photographing large areas rapidly.

AN AID TO MARINE NAVIGATION

"In addition to the mapping activities outlined, the work of making photographic mosaics and aerial views of the water routes and docking facilities of all the important harbor cities on the Atlantic, Pacific and Gulf Coast for the Board of Rivers and Harbors, was practically completed. In addition, mosaics were made of reservations and training areas occupied by the General Service School, Infantry, Cavalry, Artillery and Medical Schools and West Point for use in their training courses. Mosaics and aerial photographs are also now available of all Army Stations, Forts and Flying Fields in the United States and Insular Possessions.

"The Army Air Service now has fifteen organizations, known as photographic sections in the various Corps Areas throughout the United States and three in our Insular Possessions."

PROJECTS FOR GEOLOGICAL SURVEY

A study of the following list of projects completed during 1925 indicates the variety and extent of the photographic work accomplished by the Army Air Service:

"Nine thousand square miles of area in New Hampshire, Vermont, New York, Illinois, Missouri and Texas for mapping purposes.

PROJECTS FOR THE CORPS OF ENGINEERS

"Mississippi River from the mouth of the Missouri to the mouth of the Ohio.

"A strip of tri-lens photographs covering the course of the Mississippi River for approximately 200 miles.

"Tri-lens photographs of Rainy Lake Watershed, covering the boundary lakes between Minnesota and Canada. Area photographed approximately 1,200 square miles."
"Photographs for river surveys covering total areas of approximately 5,000 square miles in sections of Tennessee, Southern Kentucky, Southwest Virginia and Western North Carolina.

"Photographs of Fort Humphreys and Indian Head Quadrangles, Va., approximately 400 square miles, for use by the Corps of Engineers in course of instructions on aerial photography and map-making at the Engineer School, Fort Humphreys.

"Mosaics and sets of oblique views of the Tennessee River and Wilson Dam, adjacent to Muscle Shoals, Ala., for the Corps of Engineers.

"Mosaics and oblique views of the Horseshoe Falls, Niagara, N. Y., for the District Engineer, Buffalo, N. Y., to be used in the study of erosion.

**PROJECT FOR THE WAR DEPARTMENT**

"Photographs of an area approximately 200 square miles in the vicinity of Gettysburg, Pa., for General Service School, Fort Leavenworth. Completed and delivered.

"Tri-lens photographs of an area of approximately 1,000 square miles of the Reservation at Fort Riley, Kansas, for the Cavalry School.

"Tri-lens photographs of a strip ten miles wide covering the borders of Texas and Mexico, extending from Roma, Texas, to the mouth of the Rio Grande. This project is for the International Boundary Commission, Texas-Mexico.

"Photographic mosaics at a scale of 1/15,000 of the border areas surrounding the proposed Shenandoah and Great Smoky Mountain National Parks in Virginia and Kentucky, approximately 1,500 square miles.

"Photographs of the Nacona Gas Fields, Okla., approximately 400 square miles, for the U. S. Helium Production Plant, Fort Worth, Texas, in the study of proposed routes for pipe lines.

"Photographs of the border territory, El Paso to Fort Quitman, Texas, covering an area of approximately 600 square miles, which takes in both sides of the Rio Grande, for the Mexican Section of the International Boundary Commission.

**PROJECTS FOR OTHER FEDERAL DEPARTMENTS**

"Mosaic to the scale of 1/10,000 of an area ten miles wide paralleling Long Island Sound, extending from the Housatonic River to the New York State Line, for establishing the location of a new highway, made for the Bureau of Public Roads.

"Photographs of the Hudson River vicinity of Croton Point, N. Y., for the U. S. Coast Guard in locating submerged objects.

"Photographs of Rice Fields, between Lake Charles and Lafayette, La., covering an area of approximately 200 square miles, for the Department of Agriculture for use in the study of possibility of crop estimates by aerial photography."

**AERIAL PHOTOS BY NIGHT**

The photographic division of McCook Field, with the co-operation of the Eastman Kodak Co., took the first aerial photograph by night—Lt. George Goddard and Dr. S. M. Burka were the photographers and Lt. Donald Bruner was the pilot. A Martin Bomber
was used. In the ship also Lt. R. C. Coupland of the Ordnance Bureau. The cameras were Eastman. All film was Eastman hypersensitized panchromatic. Two special flash light bombs, attached to parachutes, and each weighing fifty pounds, were used.

On top of the fourteen-story Eastman Building there was installed a special instrument, a photometer, which measures the intensity of light. By prearranged signals—red lights on the building and the searchlight on the plane—there was perfect co-ordination. While the plane was over the Genesee River, the first bomb was dropped. The flash, the photometer showed, was of \( \frac{1}{20} \) second duration. Its brevity may be judged by stating that the human eye can register a flash of only \( \frac{1}{60} \) of a second. The second bomb showed a flash of \( \frac{1}{2} \) a second. The first flash was not visible to the inhabitants of the city, yet with it the better picture was taken. At 3,000 feet, the longer flash perfectly illuminated (to the human eye) three square miles, but the resulting air photo was not so good.

**From Land to Water in a Loening Amphibian**

On Dec. 10, 1925, Lt. E. C. Batten, U. S. A. S., completed six weeks of remarkable flying in a *Loening Amphibian* around the United States-Canadian Boundary in the Rainy Lake Region near Duluth. His mechanician was J. T. King and his photographer, Lt. E. G. Plank, of the Engineers Corporation.

In 8,000 miles of flying, over 1,000 photos were taken in an area of 2,000 square miles. The Loening was flown from McCook Field, Dayton, Ohio, to the Air Mail Field, Chicago, as a land plane and after taking off at Chicago, it became a seaplane.

The expedition was made (with the permission of the Canadian Government) by the U. S. Engineer Corps, in connection with mapping the international boundary and determining the extent and level of the lakes. During the entire period, the weather was below freezing. The plane had to be kept in the open and it was frequently necessary to chop ice from the surfaces. At an altitude of 12,000 feet the temperature was as low as 27 degrees below zero.

Seven hundred and twenty photos were taken with a tri-lens mapping camera and 300 with an oblique camera. The territory covered lies northeast and northwest from Duluth. It is dotted with hundreds of lakes and in all that region no satisfactory land base could be found.

"Owing to the nature of the country over which it was necessary to fly," said Lt. Batten, "the *Loening Amphibian* was the only practical plane to use. In summer when the lakes are all open, the ability of this type to be used as a seaplane is ideal, and during the
winter when the smaller lakes are frozen the Amphibian could land on them as a landplane with its wheels, and at the same time could be used on the larger lakes, which remain open much of the year, as a seaplane.” During all this flying, no forced landings were experienced, and on its return to McCook Field, the Loening Amphibian was found to be in good, serviceable condition.

Mapping Lake Okeechobee

Col. E. Lester Jones, Director of the U. S. Coast and Geodetic Survey, reports:

“In 1925 our principal project was an aerial topographic survey of Lake Okeechobee, Florida, executed in conjunction with the U. S. Naval Air Service. This large freshwater lake in South Florida, pear shaped and varying in width from twenty-five to forty miles, has increased in importance due to the land boom and to the navigation routes across the State afforded by the drainage canals that extend from lake to the east and west coasts of Florida. About 875 photographs were used for this survey which covered all the islands in the lake and a belt one mile or more in width along the shore. The area covered was about 145 square miles.”
CHAPTER VIII

AERONAUTICAL EDUCATION

THE DANIEL GUGGENHEIM FUND FOR THE PROMOTION OF AERONAUTICS

Theoretical and practical courses in aeronautical engineering are offered in a few colleges, universities and preparatory schools and practical mechanical courses in training schools.

According to the latest information only five of our colleges or universities offer aeronautical courses. A few preparatory schools feature aviation classes as part of their regular program. Recently there has been organized a correspondence school of much promise and a complete practical training course is now offered by an established automotive trade school.

By states, the institutions featuring aviation instruction are as follows:

Leland Stanford, Jr., University, Stanford, Cal.
Illinois Military School, Aledo, Ill.
Culver Military Academy, Culver, Ind.
Massachusetts Institute of Technology, Cambridge, Mass.
University of Michigan, Ann Arbor, Mich.
Sweeney Aviation School Co., Kansas City, Mo.
Aviators' Preparatory Institute, New York City.
New York University, Daniel Guggenheim School of Aeronautics, New York City.
University of Washington, Seattle, Wash.

DANIEL GUGGENHEIM SCHOOL OF AERONAUTICS

Of all the events of 1925, none was more significant or encouraging than the grant to New York University of $500,000 by Daniel Guggenheim for the endowment of the Daniel Guggenheim School of Aeronautics. In a letter to the Chancellor of the University, Dr. Elmer E. Brown, dated June 12, 1925, Mr. Guggenheim said:

"For sometime I have been impressed with the need for placing aeronautics on the same educational plane that other branches of engineering enjoy. It has seemed to me that aviation is capable of rendering such service to the
nation's business and economic welfare as well as to its defense that our universities should concern themselves with the education of highly trained engineers, capable of building better and safer commercial aircraft and industrial engineers capable of making the operation of aircraft a business proposition comparable to the operation of railroads. In this way we shall give America a place in the air to which her inventive genius entitles her."

A part of this generous fund was immediately used for the construction of an adequate building to house the school and for the procurement and installation of scientific machinery and laboratory apparatus, including wind tunnels, propeller testing equipment, structural laboratory for testing parts, aeronautical museum, power plant laboratory, flight and instrument laboratory, airship laboratory, etc.

The Daniel Guggenheim School for Aeronautics shortly afterward formed an advisory committee with Orville Wright as Chairman, and Harry F. Guggenheim as Vice Chairman. Prof. Alexander Klemin will be in charge of the work of instruction and of the aeronautical research laboratories.

Work in Other Schools

A highly technical and scientific course, with laboratories and wind tunnel, is offered at the Massachusetts Institute of Technology and at the University of Michigan. The new wind tunnel at Michigan, together with a comprehensive program of special aviation courses under Dr. H. S. Sadler, promises to give Michigan an outstanding place in this field. In most of the other schools instruction to date has been largely theoretical.

A definite need promises to be filled by the Aviators Preparatory Institute of New York City, of which Walter Hinton is President. Mr. Hinton was pilot of the N.C.-4, the first flying machine to cross the Atlantic Ocean, and more recently he had charge of the operating end of the Alexander Hamilton Rice Expedition. The institute proposes to provide, by air-mail correspondence, the fundamentals of aeronautical information, partly practical and partly theoretical.

The Sweeney Aviation School in Kansas City, Mo., was started in December, 1925, and has enrolled about 125 students. E. J. Sweeney, President of this school, is a well known pioneer in the trade school field, having established the Sweeney Automobile School in 1908. This school has had a most successful career. The new aviation school will follow similar methods of instruction. Complete ground courses, including assembly, rigging, wing work, covering,
Members Board of Trustees Daniel Guggenheim Fund for the Promotion of Aeronautics. (Center) Harry F. Guggenheim; (Top Left) Dwight W. Morrow; (Top Right) Gen. George W. Goethals; (Bottom Left) Orville Wright; (Bottom Right) Elihu Root, Jr.
Members Board of Trustees Daniel Guggenheim Fund for the Promotion of Aeronautics. (Center) Rear Admiral H. I. Cone, U.S.N. (Retired); (Top Right) Professor A. A. Michelson; (Bottom Left) F. Trubee Davison; (Bottom Right) John D. Ryan.
fittings, and engine work will be offered as well as complete courses in flying and air navigation.

**The Daniel Guggenheim Fund for the Promotion of Aeronautics, Inc.**

In the winter following Mr. Guggenheim's generous gift to New York University, three important reports were made on aviation—the Congressional, the Hoover, and the President's Aircraft Board. The latter, dated November 30, 1925, said:

“How can the civilian use of aircraft be promoted? This may well be the most important question which aviation presents in its far reaching consequences to our people. A great opportunity lies before the United States. We have natural resources, industrial organizations and long distances free from customs barriers. We may, if we will, take the lead in the world in extending civil aviation.”

Mr. Guggenheim through his past experience as a pioneer in mining and other basic industries had in addition to acquiring great wealth, come to realize the needless delay and waste that is generally met in development of new enterprises due to lack of financial resources for research and investigation. Having been previously impressed with the vital importance of aviation, as the basis for our continued political and economic independence, Mr. Guggenheim with a genuine and generous desire to be of real service to our country, magnificently responded to the above suggestion. Accordingly, on January 16, 1926, in a letter to the Secretary of Commerce, Mr. Guggenheim stated his decision to establish the Daniel Guggenheim Fund for the Promotion of Aeronautics and to place at its disposal the sum of $2,500,000. He broadly defined the general purposes to which this magnificent gift was to be devoted, as follows:

1. To promote aeronautical education both in institutions of learning and among the general public.
2. To assist in the extension of fundamental aeronautical science.
3. To assist in the development of commercial aircraft and aircraft equipment.
4. To further the application of aircraft in business, industry and other economic activities of the nation.

Mr. Guggenheim, while not desiring, in any sense to restrict the free judgment of the trustees of the Fund, expressed the hope
that they would govern themselves as far as possible by the following principles:

1. Restrict the work to civil activities.
2. Avoid duplication of effort with other aeronautical organizations.
3. Avoid work which is properly a Government function.
4. Plan work carefully, to concentrate effort and to carry any investigation or project to a definite conclusion.
5. Maintain a simple, inexpensive directing organization depending upon outside established agencies wherever possible to carry out the aims of the Fund.

The direction and administration of the Fund is in charge of the following officers and directors: The President, Harry F. Guggenheim; Vice President and Treasurer, Rear Admiral H. I. Cone, U. S.N., Retired. Members of the Board of Directors, in addition to the above, are: F. Trubee Davison, Dr. Wm. F. Durand, George W. Goethals, Prof. A. A. Michelson, Dwight W. Morrow, Elihu Root, Jr., John D. Ryan and Orville Wright.

ACTIVITY OF THE GUGGENHEIM FUND

At the present writing, the Fund has just gotten under way. From a preliminary study it has divided its activities into the following:

1. Education.
2. Scientific research.
3. Commercial development.
4. Educational Information.

In keeping with the wishes of the founder and the desire of the Trustees, liaison has been established with such existing bodies as the Aeronautical Chamber of Commerce and an effort is being
made to work out problems which hitherto appeared to be insurmountable, but which now, through the generosity of Mr. Guggenheim, may be approached with confidence and certainty.
CHAPTER IX

AMERICA'S AIRSHIPS

The terrific storm which swept over Ohio on the morning of Sept. 3, 1912, caused the loss of the Navy airship Shenandoah with 14 members of her gallant crew, thus bringing to a tragic end the first rigid airship to be built in this country. People were so accustomed to hearing of the remarkable exploits of the Shenandoah that the accident was particularly shocking. Yet it did not discourage the American effort to develop this field of lighter-than-air.

President Coolidge on learning of the disaster immediately expressed himself as being in favor of replacing the Shenandoah with another and if possible better ship. Secretary of the Navy Wilbur summarized the opinion prevailing among all Americans, both in and out of the service. He said that regrettable as the accident was, causing as it did the loss of so many valuable officers and men, still this nation possessed too much courage to drop that type of aircraft and thereby render futile the sacrifice that had been made, that we should push the development with even greater energy than before. In fact, there was no desire on the part of the Government, the public or the industry at large to abandon rigid airships. If anything, there was more evidence of progress with the development of airships, following the loss of the Shenandoah, than before.

The Shenandoah cast off from the mooring mast at Lakehurst at 2:52 p. m. on Sept. 2 and headed westward into a six-mile an hour breeze. Commander Zachary Lansdowne was in command. The crew included 41 other officers and enlisted men. The ship was under orders to fly a route taking in Pittsburgh, Columbus and Indianapolis, with a stop for fuel at Scott Field, Ill., continuing to Kansas City, Des Moines, Milwaukee, Minneapolis and St. Paul and returning by way of Detroit, refueling there at the mooring mast on the Ford airport, and thence back to Lakehurst by way of Cleveland.

Last Flight of the Shenandoah

The facts regarding the accident were brought out officially by the Naval Court of Inquiry. Its hearings were extensive. Every available witness was given an opportunity to testify at length. It appears that shortly after 3 o'clock on the morning of Sept. 3 the weather became so unfavorable that the officers on board discussed
The navy dirigible *Los Angeles* at the Lakehurst, N. J. mooring mast.

—Photo, P. and A.
the storm signs while for the next two hours the *Shenandoah* made slow progress against the headwinds on the outward route over Ohio.

The following is quoted from the report of the Naval Court of Inquiry:

"The airship at this time had a pressure height of 3,800 feet. At 5:22 a.m. she began to rise under the influence of vertical air currents, rose to a height of 3,150 feet in 8 minutes, was brought under control and steadied at that level for 6 minutes, then rose again and more rapidly to 6,100 feet in 10 minutes, dropped rapidly to 3,000 feet in 3 minutes and finally rose again, sharply by the nose to probably 3,700 where the ship broke. (This was about 35 miles north of Marietta, Ohio.)"

"This last rise was accompanied by a movement of rotation of the whole ship in a horizontal plane and by violent rolling and pitching. During all these movements the ship was out of control. All the above figures are approximate only.

"During this period of uncontrolled movements various recognized methods for bringing the ship under control, such as opening the maneuvering valves for 3 minutes, nosing down by means of controls, speeding up engines and letting go ballast, were utilized, but without result so far as obtaining full control of the movements of the ship was concerned.

"The following sequence of events in the final destruction of the ship is indicated by the evidence. At or about the time the ship was at its highest altitude unusual sounds within the body of the ship were heard. The sounds are variously described by different witnesses, but seem clearly to indicate the existence at that time of unusual stresses in some part or parts of the structure. The sharp rise by the nose, the rotation in horizontal plane and the rolling and pitching of the ship during final uncontrolled rise indicate the existence of large unbalanced external aerodynamic forces acting on the ship at that time. The next abnormal event was a cracking of the struts on the control car. The first break in the main structure of the ship occurred between frames 120 and 130, resulting in separating the ship into two parts, the control car remaining attached to the forward section. In something less than a minute thereafter the control car broke loose from the forward section and dropped to the earth. About the same time a second break occurred in the after section of the ship between frames 100 and 110. The midship section thus broken off, with power cars Nos. 4 and 5 attached thereto, dropped almost directly. The after-section dropped more slowly and was carried by the wind a distance of about one-third of a mile before reaching the earth. The forward section was operated as a free balloon by the personnel left therein and was landed safely about twelve miles from the scene of the disaster.

"During this period the measures taken by the commanding officer to bring the *Shenandoah* under control was in accordance with the best-established practice.

"**HEROISM OF OFFICERS AND CREW**"

"During this period of extreme danger the conduct of all officers and men was deserving of the highest praise. The commanding officer showed skill, courage, and fine qualities of leadership. All other officers and men showed an intimate knowledge of their duties, fine discipline and morale and great courage. The handling of the forward section of the ship as a free balloon
by Lieut. Commander Rosendahl and Lieutenant Mayer was particularly deserving of commendation.


"WE WILL NOT ABANDON THE AIRSHIP"

Rear Admiral W. A. Moffett, Chief of the Bureau of Aeronautics, in his statement before the House Committee on Naval Affairs, Jan. 28, 1926, said:

"The achievements of the Shenandoah during her two years of active life are remarkable. These accomplishments are the solid foundation for the predictions for a modern rigid. In number of cruising hours and distance flown the Shenandoah bettered the record of any ship of her type. On the west coast cruise she traveled 9,317 miles while away from her hangar 19 days and 19 hours, crossing mountain ranges, deserts, plains and sea from the Atlantic to the Pacific and from Canada to Mexico, experiencing all varieties of weather and climate, much of which was adverse.

"The successful outcome of the Shenandoah's battle in a damaged condition with a 70-mile gale is proof that the type of craft is not inherently weak and that it must have been indeed an unusual storm which finally caused her to succumb.

"This point must be given its proper weight: the art of rigid airship building is today at the same relative point as the airplane art was in 1915. It has been estimated that one hundred dollars has been spent on airplane development for every one dollar spent on airship development, and for this reason our airplane industry is well established: but our airship industry is in a decidedly embryonic state."

GOODYEAR READY TO GO AHEAD

Late in the year P. W. Litchfield, President of the Goodyear Tire & Rubber Company, and President of the Goodyear-Zeppelin Corporation, with sixteen years' experience directing the manufacture of lighter-than-air craft, prepared an article for World's Work Magazine in which he outlined the plans for one or more modern Zeppelins. These excerpts are quoted from that magazine:

"A colossal structure of metal and canvas larger than any skyscraper and as thick, yet weighing only a few tons and vibrant with life imparted by throbbing motors and whirling propellers, a leviathan of the air capable of climbing to a height of five miles and flying at about a mile and a half a minute—that is the modern airship.

"No such craft exists today. The Los Angeles is the only approach to a modern rigid dirigible yet constructed. It is too small, only a laboratory
experiment, if you please. It is now possible to build them several times larger than any yet launched. They would be much safer, more powerful and useful than the others.

"In the plant of the Goodyear-Zeppelin Corporation at Akron, Ohio, a number of the important engineers and other executives who built nearly all the Zeppelins, including the Los Angeles, have joined forces with the American group which has been working in lighter-than-air for twenty years. They have projected a modern airship, and the military and naval branches of the government have indicated a desire to have it constructed as quickly as possible.

"This ship, when it is built, will be about 830 feet long as against the 656 feet of the Los Angeles, with 6,500,000 cubic feet gas capacity as against the 2,500,000 cubic feet of the Los Angeles. Inflated with helium it will be able to fly from New York to Paris and return, without stopping.

"Many of the modern characteristics can be easily understood, and are of interest because they are new and should have a bearing on the questions of safety and value. The Shenandoah's control car hung suspended from the hull. That of the Los Angeles is built up against the keel. All compartments, operating and passenger accommodations, will be built inside the hull of the new ship and a part of its construction.

"It will be able to carry about 100 passengers, baggage, food, fuel, supplies for the crew, and auxiliary apparatus for 8,000 miles of flying at 75 miles an hour.

"In all former craft the engines have been swung out in gondolas apart from the main body of the ship. For some time this has been likened to placing the bridge and engine room of a surface vessel outside the hull. The new ship will have all of its engines, save possibly the stern motors, inside the hull and with retractable radiators to prevent freezing in high altitudes. Propellers will be geared out from the sides of the hull to grip a free flow of air.

"The size of the new ship permits new methods of construction, stronger frames and a different assembly of the triangular girders. Instead of one corridor on the keel, as in former ships, this new ship will have two large corridors extending throughout her length, two of equal size and importance, about which the frame of the ship will be assembled, like the corridors through the passenger section of an ocean liner. Constant inspection for leakage of gas cells and other casual damage will be possible on this ship for the first time."

CONGRESS URGED TO APPROVE LARGER SHIPS

Congress late in the year was considering the advisability of authorizing construction of at least one airship and possibly two, in order to reduce the unit cost, of the type designed by the Goodyear-Zeppelin Corporation. Testifying before the House Appropriations Committee Rear Admiral Moffett said that even the experimental Los Angeles had made 33 flights, remaining in the air 639 hours and 37 minutes and flying 25,600 miles during the last fiscal year ending June 30, 1925; but that she was too small commercially. He advocated the larger ship, saying that she would be able to make 40 round trips a year between the United States and Europe, if operated commercially for purposes of training airship personnel.
The Goodyear company during the year completed and delivered to the U. S. Army Air Service the R. S.-1, the first semi-rigid airship to be built in this country. The R. S.-1 is 284 feet long, 66 feet 6 inches high and 74 feet 6 inches wide. Her four balloonets contain 215,000 cubic feet of gas, and she is capable of reaching an altitude of about 13,500 feet. Her control car is 36 feet long, 8 feet wide and 7 feet high. Two power cars suspended below the middle of the keel hold two Liberty engines each, giving a total of 12,000 horsepower. Each power car is 20 feet long, 6 feet wide and 7 feet high. Without bomb racks the ship ready for flight weighs 28,338 pounds and has a useful load carrying capacity of about 13,212 pounds at sea level. She can make 70 miles an hour for 9.4 hours with all motors running, or 55 miles an hour for 18.7 hours on two engines, giving her a range of between 658 and 1,025 miles without refueling.

The Goodyear-Zeppelin Corporation also produced in 1925 the first of its type AD airships, the Goodyear Pilgrim, a non-rigid lighter-than-air yacht adapted to civilian uses. It is 105 feet 6 inches long and the envelope is 31 feet 8 inches in diameter. The balloonet normally contains 13,750 cubic feet of gas, or 27.5 per cent of its volume. This gives the ship a ceiling of 10,500 feet. Its car is 14 feet 6 inches long, 3 feet 9 inches wide and 5 feet 9 inches high and seats four persons comfortably. It is powered with a 60 h.p. Lawrence-Wright air-cooled engine and has a cruising range of between 330 and 525 miles at between 33 and 50 miles an hour.

A. D. Co.'s Metal-Clad Airships

The Aircraft Development Corporation of Detroit, Mich., completed its mooring mast at the Ford Airport during the year and received orders from the U. S. Army Air Service for the construction of a similar mast at Scott Field, Belleville, Ill. The company also completed plans for the first metal-clad airship, and late in the year Congress was considering a proposal to purchase a ship of this type and co-operate in its construction. This proposed rigid airship, the first of its kind, is to be small and experimental, notwithstanding that the officials of the company have so far completed tests on all parts that they felt they are warranted in predicting success from the start. The ship is to be 150 feet in length, with a maximum diameter of 53 feet and a gas capacity of 200,000 cubic feet.

Carl B. Fritsche, General Manager, describing the design before the House Appropriations Committee, said that every conceivable test of materials, structure and performance that could possibly be made before the ship was actually flown indicated that it would be fireproof, weatherproof, durable and permanent in structure, navig-
Lt. Commander R. E. Byrd, Jr., in the *Airft*, of Airships, Incorporated, which he took with him to the Arctic.
able in practically all kinds of weather and economical in the use of gas and ballast. He gave a convincing demonstration of the method of riveting duralumin sheets together so that they would be gas-proof and free from corrosion.

Ralph H. Upson Chief Engineer, in a paper read before the Society of Automotive Engineers, presented a summary of the progress made at the end of 1925, which included the following:

"The structural and aerodynamic efficiencies have been established by both analytical and experimental methods.

"The technical problems involved in the construction have been mastered to a certainty hitherto unapproached in any new design.

"The general design of an airship of demonstration size, 200,000 cu. ft. or one-tenth the size of the Shenandoah has been completed.

"Full-sized structural members of every part of the framework have been built and tested to destruction revealing that the minimum safety factor is double that of the Shenandoah. The longitudinal strength of the metal hull will be more than four times as great as that of the Shenandoah.

"The problem of riveting the metal hull-plating has been solved through the perfection of an automatic riveting-machine.

"The problem of making the metal hull gastight has been solved with surprising efficiency indicating an osmosis of about one-tenth that through gold-beaters skin and only one-hundredth that through rubberized fabric."

**AIRSHIPS INCORPORATED**

Airships Incorporated, of Hammondsport, N. Y., continues its development work. Like the other lighter than air constructors they are preparing for what appears to be the progressive program urged by the Navy Department upon Congress and indorsed by the Administration.

**B. F. GOODRICH RUBBER CO.**

The B. F. Goodrich Rubber Co. during the year prepared new examples of the 20-inch gagmeter valve for installation on the Los Angeles. This valve, placed at the top of the balloonet, functions either automatically or manually.

**HELIUM PRODUCTION**

Steady progress in cheapening the extraction of helium gas is reported by the Helium Board, on which army and navy are represented. In 1925 over 10,000,000 cu. ft. of 94% pure gas was produced at the huge establishment at Fort Worth. Linde Air Products Engineers continue in operating charge, but control of the establishment, as representing the Government, is now under the Bureau of Mines.
CHAPTER X
BASIC LEGISLATION FOR COMMERCIAL AERONAUTICS
AT LAST IN SIGHT

In its report to Congress, the Select Committee of Inquiry into the Operation of the United States Air Services (the Lampert-Perkins Committee) made the following recommendations:

"That Congress provide by law for the regulation and encouragement of commercial flying through a bureau of air navigation in the Department of Commerce. Provision should be made for the charting of airways, for emergency fields, aircraft facilities, night flying, and a specialized weather service."

The Hoover Committee urged:

"That Congress enact a civil aeronautics law providing for: establishment of a bureau of civil aeronautics in the Department of Commerce, with power to regulate civil air navigation in the United States; to license pilots and inspect and register aircraft; to develop, establish or take over and maintain air routes and air navigation facilities; to administer international air navigation regulations as they affect the United States; to encourage and promote civil air transport and the aircraft industry and trade; and to determine and impose civil penalties for violations of regulations."

The President’s Aircraft Board (the Morrow Committee) recommended:

"To the end that this important field should receive the attention that it deserves, we recommend that provisions be made for a Bureau of Air Navigation under an additional Assistant Secretary of Commerce. We recommend the progressive extension of the Air Mail Service, preferably by contract, and also that steps be taken to meet the manifest need of airways and air navigation facilities, including an adequate weather service maintained by public authority and planned with special reference to the needs of air commerce.

"Beyond these general recommendations, we do not presume to suggest the definite legislation which should be passed upon this subject. Congress has already considered it at length. The Department of Commerce has made elaborate studies. We trust that the necessary legislation and appropriations can be made effective in the very near future, and a start made in this vitally important field."

Senator Bingham, of Connecticut, former Colonel in the Air Service, with a distinguished over-sea record, was a member of the President’s Aircraft Board. He brought to it a wide sympathy with the ambitious hopes of the flyers, tempered with the mature judgment of a former Air Service officer and man of public affairs.

Associated with Senator Bingham, on the President’s Aircraft
Board, was Representative James S. Parker, of New York, who, as a member of the House Interstate and Foreign Commerce Committee, had worked for several years on civil air legislation, while Hon. Samuel E. Winslow was chairman of that important group. Mr. Parker and Mr. Bingham became, therefore, the logical sponsors of the proposed legislation in the 69th Congress.

**Senator Bingham Introduces Bill**

The Senate Committee on Commerce, of which Mr. Bingham is a member, immediately on the convening of the 69th Congress, considered aviation matters, and on Dec. 14 Mr. Bingham, for the Committee, reported S-41, entitled "An Act to Encourage and Regulate the Use of Aircraft in Commerce, and for Other Purposes."

In its report on S-41, the Senate Committee on Commerce reviewed the urgent need for such legislation. It sketched the tremendous growth of commercial aeronautics abroad, and pointed out how many foreign nations were spending millions annually to the end that more transport could move by air. Attention was called to the insurance situation, which is conceded to underlie all permanent investment, no matter what amounts may be temporarily attracted to aviation through patriotism or speculation. Facts and figures from the Aircraft Year Book of the Aeronautical Chamber of Commerce were quoted as illustrating the imperative demand that public life and property be conserved.

S-41 was immediately passed by the Senate. There was not an opposing voice. It was transmitted to the House and immediately referred to the Committee on Interstate and Foreign Commerce, to the chairmanship of which Hon. Schuyler Merritt, of Connecticut, had succeeded.

**Thorough Inquiry by House Committee**

On March 17, 1926, Mr. Merritt submitted S-41 to the Committee of the Whole House, with amendments, at the same time presenting a report which reviewed the many efforts made in the past to get such legislation through both branches of Congress. The first bill of the sort was that sponsored by Senator Wadsworth, which passed the Senate in 1922. In January, 1924, the Senate again passed a similar bill. Starting in January, 1923, the House Interstate and Foreign Commerce Committee had devoted many months to an elaborate examination of the whole subject, not simply with respect of aviation, but in its relation to other Governmental and civilian activities. In this study, practically every Government department participated, and, on the whole agreed.
Of S-41, which is frequently known as Bingham-Parker bill, Mr. Merritt, in his Committee report, offering amendments, said: "The committee, in reporting the Bingham-Parker bill, has made only such additions and perfecting amendments thereto as, having due regard to the above sources of information, seem to the committee necessary in order that the bill may be administratively and legally workable and provide the minimum of regulation necessary."

S-41, with amendments as proposed by Mr. Merritt, passed the House of Representatives. At this writing it is in Conference. There is reported to be no vital point of disagreement between the managers for the House and the Senate. All are agreed that basic legislation is necessary. All recognize that wise national policy requires provision, for air navigation, of such indirect aids as interstate airways, fitted with lighting and communicating facilities and provided with emergency landing fields; for meteorological service; for the reasonable examination and inspection of pilots and navigators and of craft. It is, of course, unwise to attempt to forecast the terms of the agreement, but it is certain that an agreement will be reached.
CHAPTER XI
ACCIDENTS—AND THE LACK OF AIR LAW

WHEN the above heading was given to a chapter in the 1925 Aircraft Year Book, it was hoped that the conditions thus described would be corrected before another twelve months had passed. But not so. As late as May, 1926, as noted elsewhere in this volume, Federal regulatory legislation was still pending in Congress.

In the calendar year, 1924, the period covered by the 1925 edition of the Year Book, there were 89 accidents reported, in which 75 people were killed and 91 hurt. In 1925, the period covered by the present volume, there were 112 accidents reported. In these, 112 people were injured and 83 lost their lives. The known total for non-regulated flying since 1921, when the Aeronautical Chamber of Commerce first undertook to keep a record, thus reaches the distressing figure of 354 dead and 554 injured.

Due to the inquiries projected by the Congressional Aircraft Investigating Committee (the Lampert Committee), the Hoover Committee, and the President's Aircraft Board (the Morrow Committee), aviation in 1925 probably was more in the public eye than ever before. In all the discussion of the need for air law there was advanced no argument more consistently convincing than the necessity for protecting public life and property and each year regulatory legislation was delayed added to the total of preventable disaster and unnecessarily increased the handicaps with which air transport had to contend.

Casualty Record for 1925

Here is the analysis of the casualty record for 1925:

<table>
<thead>
<tr>
<th>Error in Flying</th>
<th>Lack of Field or Terminal Facilities</th>
<th>Lack of Weather Data</th>
<th>Lack of Route, Data and Flying Rules</th>
<th>Faulty Craft</th>
<th>Faulty Engine</th>
<th>Faulty Accessory</th>
<th>Starting</th>
<th>Collision in Air</th>
<th>Carelessness on Field</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number Accidents</td>
<td>112</td>
<td>34</td>
<td>8</td>
<td>4</td>
<td>18</td>
<td>8</td>
<td>2</td>
<td>25</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

Number of Persons Killed | 83 |
Number of Persons Injured | 112 |
ACCIDENTS—LACK OF AIR LAW

The foregoing figures were compiled from newspaper reports (the only available medium, lacking an authoritative governmental agency). Aside from the deplorable effects on patrons or unskilled or careless operators, the manner in which these accidents were treated by the newspapers was most regrettable.

In the chapter dealing with operations, it was shown that the attitude generally of the flyers is not antagonistic to regulation, notwithstanding much that has been said to the contrary.

The Aeronautical Chamber of Commerce in soliciting operating reports, requested comments, and in so far as these bear on the hazards of unregulated flying, they are interesting. “Leave out legislation, both national and state,” urges one operator; “Aviation will work itself out alone”—and clipped to this report was an illustration of a stunting airplane with a “dare-devil performer” balanced on the top wing while below are the expectant throngs.

In the hazard analysis for 1925, it is revealed that out of 112 accidents, the principal contributing causes were: Errors in piloting, 34: defective craft, engine or accessory, 28: stunting, 25. Of the 83 fatalities, 21 could actually be attributed to stunting or to stunting practices.

“The only air regulation I favor at present,” writes a flyer, “is some sort of regulation covering ground school. Too many pilots are turned out without sufficient training in aerodynamics, construction, mechanics, maintenance, etc. They do not know the various stresses imposed upon their ships, therefore cannot intelligently do their own inspection. They do not know how to take proper care of a motor to insure a minimum of motor hazards. I have seen fellows fly that did not know the elements of rigging. If a man is too slipshod to learn these things in a regulated school or hasn’t sufficient intelligence to pass a ground examination, he should be barred from the air, for it is no place for slovenly methods or ideas.”

Here is another thought from one who may be classed as a small operator: “In regard to laws regulating commercial aviation, I believe most any regulation at this time, in the form of restrictions, would tend to hinder the commercial operator. However, to see some irresponsibles patch up some old, worn out Jenny and foist themselves on the unsuspecting public, is almost pathetic; so a law to license and inspect the craft of an owner for hire, in my estimation, is about all the regulation we need at this time.”

A man who identifies himself, in so far as quotation is concerned, as “A Private Ship Owner—One of a Thousand,” while observing that regulation should not result in a “wholesale condemnation of ships as dangerous to fly in or carry passengers, as that would immediately
place a ban on flying conditions, as a great majority of the present flyers own war-time material," adds. "However, these ships should be kept in good condition and regulations made regarding carrying passengers and these conditions should govern stunting, low flying, landing, etc., and that in respect to the ability of the pilot to fly, which could be determined by an examination."

The above quotations are typical. To be sure, a few have expressed fear that financial loss may ensue through the requirements of Federal law, but the Editors of the Aircraft Year Book have yet to hear from any individual flyer or operator—fixed base or itinerant—who does not endorse the principle that no business can prosper under dangerous conditions, and that it is the duty of the Government to protect the lives and property of its citizens.

Basic air law, providing indirect aids, such as charted and lighted airways, emergency fields, meteorological and radio service, *in addition* to regulation, will quickly disabuse the public mind of prejudice and fear. Regulation, sympathetically administered, together with the law of progress, which is inherent in engineering, will immediately diminish and should eventually practically eliminate the hazards which have thus far proved so discouraging to the flying pioneers.
CHAPTER XII

CHRONOLOGY OF AERONAUTICAL EVENTS DURING 1925

1 km. 0.621 miles
1 kg. 2.20 pounds

* For Amplification, see end of Chronology.

Jan. 10 Descamps in France makes two new records in DeMonge, plane carrying 500 kg. useful load.
Jan. 20-27 Naval airship Shenandoah makes series of flights working in conjunction with the U. S. Scouting Fleet, during which time she was moored at intervals to a new airship mooring mast on U.S.S. Patoka.
Jan. 24 25 airplanes take scientists and other observers above clouds in Connecticut to view total eclipse of the sun.
Jan. 24 Airship Los Angeles carries scientific staff from Naval Observatory, Washington, to study eclipse of sun, in vicinity of Block Island, R. I.
Feb. 1 Boeing Airplane Co. develops PN-9 flying boat for U. S. Navy.
Feb. 2 The Kelly Bill, authorizing the Postmaster General to contract air mail routes to private parties, is signed by Pres. Coolidge.
Feb. 3-4 Captains Arrachart and Lemaitre, France, in Breguet 10B-2, 480 h.p. Renault eng., make record flight for distance (airline), Etampes to Cisneros, 1987.26 miles.
Feb. 11 First Pursuit Group, U.S.A.S., begin week of winter maneuvers at Oscoda, Mich., flying Curtiss pursuit planes off the ice with skis in zero weather.
Feb. 15 Airplane hooked on to airship in flight by army pilots at Scott Field, Ill.
Feb. 20 Airship Los Angeles leaves Lakehurst, N. J., for Bermuda at 3:25 p. m., arriving there 4:30 a. m. Feb. 21. Departed 10:10 same day and arrives Lakehurst 12:40 a. m.
Feb. 20 U. S. Navy Airship Los Angeles makes flight from Lakehurst, N. J., to Bermuda and return.
Feb. 27 The Army round-the-world pilots awarded Collier and Mackay trophies for greatest achievement and most meritorious flight, respectively.
March 2 Plane furnished by Coco Solo Naval Air Station for U. S. Minister John Glawer Ianth to negotiate with Panama Government to settle uprising by San Blas Indians. This enabled negotiations for peace to be started one week earlier than otherwise could have been done.
March 9 Twelve members of First Pursuit Group, Army, in Curtiss planes, fly from Selfridge Field, Mich., to Miami, Fla., 2,840 miles, in 21 hrs. 55 min. flying time.
Maj. General Sir Sefton Brancker, Controller British Civil Aviation, and Alan Cobham, arrived in London after round trip flight to Karachi, India.

Plane from Naval Air Station, Hampton Roads, Va., leaves for Cuba to assist Hydrographic Officer to map portions of west of Cuba, Isle of Pines and adjacent islands.

Cpr. Harlin R. Utterback, U.A.S.A.S., makes first voluntary jump from plane with parachute at night, at Kelly Field, Texas, from 3,000 ft. with aid of searchlight.

British Govt. establishes an airship base at Karachi, India.

U.S.S. Saratoga, naval aircraft carrier, launched at Camden, N. J.

Brish airship R-33 torn loose from her mooring mast at Pulham, England, but rides out storm with minor damage.

Sergt. Randall L. Rose and Pvt. Arthur Bergo jump from planes at Mitchell Field, L. I., N. Y., at alt. 3,000 ft., falling 1,500 ft. before pulling rip cord, to demonstrate that falling persons remain conscious.

Plans of Navy VT Squadron 20 materially assist local government at Zamboanga, P. I., in pacifying insurgent Moros.


Lt. Webb, U.S.N., makes trial flight of new Wright Cyclone, 450 h.p. air-cooled engine, in DT-6 torpedo plane at Murchio's Field, N. J.

Packard Motor Car Co., produces first inverted aircraft engine, Model 1A-1500, developing 500 h.p.

Business men and financiers in New York, Chicago and other cities organize the National Air Transport, Inc., to carry mail and express—and eventually passengers—between large cities in the United States.

Lt. Oakley G. Kelly, U.S.A.S., conducts successful tests of dusting apple orchards with arsenate of lead to eliminate parasites before Oregon fruit growers.

Airplane ambulances assigned to French army in Moroccan campaign against Riffs, carrying 300 patients during the summer.


Third German glider competition at Rossiten won by Fuchs, aloft 7 hrs. 45 min. 55 sec.

Airship Los Angeles leaves Lakehurst, N. J., at 10 a. m. for Porto Rico, reaching there May 4, 8:15 p. m. Moored to mast on the U.S.S. Patoka. Makes flight over San Juan, Porto Rico, and the Virgin Islands and returns to Lakehurst, reaching there at 3:00 a. m. May 10.

Major De Bernardi, Italy, in Fiat CR makes record speed with 250 kg. load 500 km. at 250 km. hr.
May 20  Air Service Technical School at Rantoul, Ill., carries on radio conversations from planes in the air reaching Chicago stations, 115 miles distant.

June 1  Ford Motor Co. starts air express line between Dearborn and Chicago, using Stout all-metal monoplanes, Liberty 400 h.p. engine.

June 8  M. Painlevé, French Premier tours Riffian front in Morocco by air, 6,000 miles in 8 days.

June 8  Germany closes week of aviation demonstrations with race around important cities. Won by Baumer monoplane with Wright (Amer.) Gable 60 h.p. air-cooled engine.

June 15  Daniel Guggenheim, New York, establishes school of aeronautics at New York University.

June 15  Seventeen Huff-Daland planes put in operation “cotton dusting” in Georgia, Louisiana and Alabama. More than 50,000 acres dusted during the season.

June 18  Capt. Roald Amundsen, Lincoln Ellsworth and companions return from twenty-eight day adventure in Polar Sea.

June 26  Berliner helicopter successfully flown at Anacostia Naval Air Station by Lt. Harris, U.S.A., twelve flights in all being made.

July 1  Giant aerial beacons of 500,000,000 candlepower installed on night flying route of U.S. Air Mail Service between New York and Chicago by B. B. T. Corp. of Philadelphia.

July 1  Cleveland opens its million dollar 1,000-acre municipal air port.

July 1  Ford Mooring Mast for airships completed at Ford Airport, Dearborn, Mich.

July 1-12  U.S. Marine Corps Planes operate special service during Santa Barbara earthquake.

July 1  U.S. Air Mail Service starts daily, except Sunday, night service between New York and Chicago.

July 1  U.S. Helium Production Plant at Fort Worth, Texas, transferred from the jurisdiction of Navy Department to the Bureau of Mines, Dept. of Commerce.

July 4  Defense Day air demonstration held at Mitchel Field, L. I., N. Y.

July 15  Dr. A. Hamilton Rice Expedition, first to employ airplanes in exploration, returns from headwaters of the Amazon, Lt. Walter Hinton having flown Curtiss Scagull flying boat over 1,000 miles of jungle and rapids without accident.

July 15  Postmaster General Harry S. New asks for bids on eight new air mail routes to be opened and privately operated in 1926.

July 18  Goodyear blimp Pilgrim, non-rigid 50,000 cu. ft. airship, makes initial flight at Akron, O.

July 27  B. Grase, Holland, in Fokker F-7, Liberty 400 h.p. engine, remains in air 3 hrs. 3 min. 30 sec. with 3306.94 lbs. pay load.

Aug. 1  First of new series of military planes, the Curtiss Condor, a night bomber, is successfully tested at Garden City, L. I.

Aug. 1  R. S. Fogg in Curtiss Scagull starts first R. F. D. mail route 43 mi. on Lake Winnipesaukee, Vt.

Aug. 3  I. A. Woodring in Waco plane wins efficiency race at Tulsa, Okla., aviation meet.
AIRCRAFT YEAR BOOK

Aug. 7-8-9 Drouhin and Landry, France, in Farman biplane, 450 h.p. Farman engine make world’s endurance record flight at Etampes, 45 hr. 11 min. 59 sec.

Aug. 10 At light airplane meet in Vauville, France, Poèclet plane makes 78 miles an hour with a 45 h.p. engine.

Aug. 15 Ford Motor Company enters commercial aviation with purchase of Stout All-Metal Airplane Co., at Dearborn, Mich.

Aug. 17 International commercial air transport service opened between Munich, Frankfurt and London.

Aug. 23 Ebe and Kawachi, Japanese pilots, finish flight from Tokio to Moscow.

Aug. 25 MacMillan Arctic Expedition completes fifteen days airplane operations with base at Etah, Greenland. Navy flying contingent commanded by Lt. CmDr. Richard E. Byrd, Jr., using three Loening Amphibian planes, flies 6,000 mi. and explores 30,000 sq. mi. of Ellesmere Island inside two weeks.

Aug. 29 Fernand Lasne in Nieuport-Delage, Hispano 500 h.p. engine, makes speed record for 1,000 km., at Istres, France, at 154.283 m. p. h.

Aug. 29 Capt. Radovitch in Breguet plane, makes non-stop flight Paris to Belgrade via Turin and Venice, 1,100 mi. in 9 hrs. 35 min.

Aug. 31 Daniel Julien, France, in Potez biplane makes non-stop flight, Paris to Madrid, 845 mi. in 6 hrs. 55 min.

Aug. 31 *Commander John Rodgers and Lt. Byron Connell, U.S.N., and crew in P.N.-9 seaplane, with 2 Packard 500 h.p. engines, fly from San Pablo Bay, Cal., to near Honolulu, 1,992 statute mi., record seaplane non-stop flight.

Sept. 1 At International Air Conference in Stockholm, Sweden, delegates from majority of European countries agree to co-operate in connecting national airlines.

Sept. 3 U. S. Naval Airship Shenandoah wrecked by storm in Noble county, Ohio, 14 members of crew lost, including her captain, Lt. Commander Zachary Landsdowne, U.S.N.

Sept. 7 Fokker 10 passenger plane makes first flight with 3 Wright Whirlwind 200 h.p. air-cooled engines, showing ability to maintain nearly horizontal flight with only one engine running.

Sept. 15 U. S. Army semi-rigid airship R. S.-1 completed by Goodyear Tire and Rubber Company at Scott Field, Ill.

Sept. 21 Court of Inquiry convened by the Secretary of the Navy to investigate the loss of the Shenandoah.

Sept. 28- Oct. 3 *Ford Reliability Tour between Detroit and Mid-Western cities is flown by sixteen competing planes, all of which complete the tour, a majority with a perfect score.

Oct. 1 Two commercial planes, the Curtiss Carrier Pigeon, for mail and freight carrying, and the Curtiss Lark, for light passenger and freight work, are given final tests at Garden City.

Oct. 3 U. S. S. Lexington, aircraft carrier, launched.

Oct. 3 Aerial sham battle staged over New York financial section attracts millions of spectators.

Oct. 3 Fokker 10-passerenger airliner with three Wright Whirlwind 200 h.p. air-cooled engines makes perfect score in Ford Reliability Tour.
CHRONOLOGY

Oct. 8 Wright-Bellanca six-seater cabin plane with Wright Whirlwind 200 h.p. air-cooled engine wins second place in Merchants’ Association Trophy Race, Mitchel Field, L. I.

Oct. 9 Wright-Bellanca plane with Wright Whirlwind 200 h.p. air-cooled engine, wins efficiency race, Mitchel Field, L. I., scoring more than 30 per cent more than nearest competitor.

Oct. 12 *Lt. Cyrus Bettis, U.S.A.S., in Curtiss-Army R3C1, Curtiss V-1,400 type 619 h.p. engine, wins Pulitzer Trophy race at Mitchel Field, L. I., at 2,489.75 m. p. h., taking world’s record for 100 km. at 249.342 m. p. h., and 200 km. at 248.975 m. p. h.

Oct. 13 Lt. C. S. Schilt, U.S.M.C., in Douglas DT-1, Wright Tornado 600-675 h.p. engine, wins second place in Detroit News race at Mitchel Field, at 118.15 m. p. h.

Oct. 26 *Lt. James H. Doolittle, U.S.A.S., in Curtiss-Army Racer, wins Schneider Cup Race at Bay Shore, Md., at 232 m. p. h., making world’s seaplane records for 100 km. at 234.772 m. p. h. and 200 km. at 234.355 m. p. h.

Oct. 27 Aeronautical Chamber of Commerce dinner, New York Yacht Club, in honor of foreign Government officials and representatives of aircraft constructors participating in the Schneider Cup Race.


Nov. 5 Department of Commerce and American Engineering Council joint committees make report on world aviation situation.

Nov. 6 New deck landing and catapult plane, Wright Apache, single-seater fighter, Wright Simoon 325-350 h.p. air-cooled engine, passes tests at Mitchel Field, L. I., N. Y.

Nov. 7 Commander DePinedo, Italy, completes Rome-Melbourne-Tokio-Rome flight, 34,000 miles, since April 21.

Nov. 10 Major Thomas G. Lanphier, U.S.A.S., flies from Selfridge Field, Mich., to New York, 550 mi., in 3 hrs. 20 min., at 165 m. p. h.

Nov. 16 Capt. Alan Cobham starts flight from London to Cape Town, 8,000 mi., returning to London in March, 1926.

Nov. 16 L. Bossoutrot, France, makes duration record with pay load of 6,000 kg., 1 hr. 12 min. 21 sec., at Le Bourget, in a Farman super Goliath, with 4 Farman engines, 500 h.p. each, also alt. record with that load, 11,765 ft.

Nov. 20 First successful flashlight photo from airplane at night taken by Lt. George W. Goddard, U.S.A.S., in Martin bomber, at Rochester, N. Y.

Nov. 30 Wright-Bellanca, Wright Whirlwind 200 h.p. air-cooled engine, flies from Garden City, L. I., N. Y., to Boston with 1,436 pounds useful load, 182 mi., in 1 hr. 43 min.

Dec. 1 Sikorsky multi-engined S29A passenger and cargo plane completes 86,400 mi. of demonstration flying in twelve months.

Dec. 2 President’s Air Board, Dwight W. Morrow, chm., submits report of its investigation of national aviation situation.
Dec. 10  Lt. E. C. Batten, U.S.A.S., completes 6 weeks' photographic tour along Canadian border, photographing 2,000 square miles of boundary, from Loening Amphibian plane, in temperature ranging from 10 to 17 degrees below zero.

Dec. 12  M. Paumier in Louis Schreck seaplane Hispano 500 h.p. engine, makes record with 1,000 kg. load at Argentine, also altitude record with that load at 13,297 ft.

Dec. 12  Colonial Air Transport Co. organized to carry mail and express between New York and New England centers.

Dec. 14  Select Congressional Committee of Inquiry (Lampert-Perkins Committee) makes report endorsing plans to stimulate aircraft industry and provide for reserve aerial strength.

Dec. 15  Senator Hiram Bingham, Conn., introduces bill providing for national air laws and bureau of civil aviation in Department of Commerce.

Dec. 15  A. H. G. Fokker completes tour of 10 states with tri-motored Fokker transport plane, 3 Wright Whirlwind 200 h.p. air-cooled engines, flying 10,000 miles without accident.

Dec. 15  Macchi plane, Wright Gale 60 h.p. engine, wins Coppa del Mare Race, for efficiency in Italy, scoring 926.29 points against 742.9 of nearest competitor.

Dec. 16  Wright Aeronautical Corp. makes successful 50 hrs. test of new Simon 325-350 h.p. air-cooled engine.


Dec. 21  Florida Airways, Inc., organized to operate between Tampa, Fort Myers, Miami, Jacksonville and Atlanta.

Dec. 27  Daniel Guggenheim, New York, creates $2,500,000 foundation for the promotion of civil aviation in the United States.

Dec. 29  Capt. George H. Wilkins announces expedition to fly over polar regions with Fokker monoplane, powered with three Wright Whirlwind 200 h.p. air-cooled engines.

**THE NAVY PACIFIC FLIGHT**

Commander John Rodgers, U.S.N., on August 31, in the PN-9 Seaplane (2 Packard 500 h.p. Engines) flew 1902 statute miles, from San Pablo, Calif., to a point near Honolulu, although he failed to reach his objective, in Honolulu. This "Failure" constituted a new world record for a non-stop flight by seaplane.

Following are excerpts from the Commander's own story as told to the National Aeronautical Association, Oct. 9, in New York:

"We picked up the first destroyer two hundred miles out of San Francisco, right ahead, and that was a great relief to me. It certainly gave me the assurance that my compass and methods were all right. Soon after we passed the first—about an hour, I think, after we passed the first ship—the other plane, the PN-9-3 was forced down, and a successful landing was made, although of course that plane was still very fully loaded with gasoline, and that full load was—gross load—was twenty thousand pounds, ten tons. That plane made a successful landing at night on a rough sea; and I think it is one of the
greatest pieces of seagoing airmanship that has ever been accomplished. The hull stood up very well under the strain, but the flow was so great that the gasoline tanks, which originally were square, were bulged out so they were perfectly cylindrical.

"We continued the flight and picked up all the station ships without any trouble during the night. In the morning, the clouds cleared up; the sun came out fine and bright; everything was fine. But there wasn't any of that wind that we needed to push us along. Well, we passed the eighth station ship, the sixteen hundred mile mark, and decided to land at the eighteen hundred mile mark. It never occurred to me, that, having picked up all these other ships without any difficulty, we would have any difficulty in picking up the one that we really wanted to pick up. It really didn't make much difference whether we picked up the others or not. Something happened to the navigator or something: I don't know what it was; but anyway when we got to the place where I thought we ought to see this ship, we didn't see her. We flew down a radio bearing, and chased around for about an hour, following different radio bearings, and finally the gasoline gave out, and so naturally the engine wouldn't run any more and we came down. The landing was made under very difficult circumstances, since there was no power. That means that we only had one chance. The pilot, Lieutenant Connell, was at the wheel, and he did it perfectly, although he had been sitting in the pilot's seat all during the flight.

"Well, I kept a record of our courses and I plotted them up, and I found we were about fifty miles north of the Aroostock's position, and a little later I got some sights, and I found out it was right. And then we rigged an antenna, so we could hear messages all right, but we couldn't send because we required the engines to drive the generator, which made the juice, to do the sending; and we didn't have any gas to make the engines go; so we didn't have any juice to send. Well, we didn't worry very much about that. We thought some fellow would come and pick us up pretty soon, and give us a little gas, and we would get off, and go merrily on our way. So we held everything together then; we could see what was going on; we could see when the ships came near, and when they went back and it did not take us long to find out that we were not probably going to get picked up at all. So along about the second day, we stripped the fabric off the lower wing, and rigged them up for sails between the wings, and we started the sails for Nawaiwili, Hawaii. That was the last stopping place in the Hawaiian Islands; and we had to pick that out, because the wind blew in that direction.

"We would have had a very pleasant trip of it, but we didn't have any water, or not much water. We had two quarts apiece when we started. It wasn't until the eighth day that a rainstorm came right over us. Then we got quite a lot of water, a couple of gallons. We were fixed up fine, although the fabric we caught it in had been painted with aluminum paint, and that chipped off and mixed with the water, and it didn't taste very good. But still it didn't prevent us from drinking it.

"On the seventh night we were about forty miles north of the Island of Oahu. That's where all the army is in the city of Honolulu, and that night we saw the army searchlights at Brill, reflected on the prow. So that refreshed everybody, and checked up my navigation all right, which was more of a relief to me than it was to anybody else I think. And then in the morning, we could see through the haze or rain—we could see part of the Island of Oahu; but it did not seem possible that we could make it, although by that time Connell had invented leadboards. He had dug up some metal floor boards and hung them over the side, so that instead of going just before the wind, we could
make fifteen degrees on either side of it. And if he had only been smart enough to think of that about four or five days before, we might have gotten into Honolulu, and gone ashore, and telegraphed to the commandant that we were there.

"That night—that was the last night; it was a rather hard night for me, because I had made the decision to go on, and the responsibility was mine for getting over to the Island of Maui. And sure enough, in the morning, we picked up this Island of Maui, just where we thought we were going to get it, and we headed down for the harbor of Nawiliwili, under full sail."

**Ford Reliability Tour**

In 1925 Edsel Ford set up the Ford Trophy for a commercial airplane reliability tour, which was patterned after the tours made famous in the early days of the motor car industry. The idea of a demonstration of the practicability of commercial airplane by traveling on a pre-determined schedule from town to town originated with the Aeronautical Chamber of Commerce shortly after the close of the war but when advanced met with comparatively little response. In 1925 the Society of Automotive Engineers sponsored the proposal and the Detroit Aviation Society undertook active management of the event.

Under the terms laid down by Mr. Ford, only bona fide aircraft manufacturers could compete. Planes entered had to have a speed greater than 80 miles per hour as loaded for the tour. All planes were required to carry, in addition to the pilot, a pay load of 0.5 lbs. per cubic inch of engine displacement, which could consist of passengers, inert or useless ballast or both. "A perfect score shall be earned," read the rules, "when each leg of course shall have been flown in a time not to exceed 50 per cent more than the scheduled time, providing at least 70 per cent of the legs are flown in a time not to exceed 30 per cent above the scheduled time."

The tour measured nearly 1900 miles and was divided into 10 legs as follows: Detroit to Fort Wayne to Chicago, to Omaha via Iowa City to St. Joseph to Kansas City to St. Louis to Indianapolis to Columbus to Cleveland to Detroit.

The tour was started on time Sept. 28 and on Oct. 4, 15 of the 17 starters returned to Ford Air Port at Dearborn, Mich. Under the rules laid down, 11 airplanes returned with a perfect score, as follows: 3 Travel Airs, 1 Waco, 1 Swallow, 1 Fokker, 1 Curtiss Carrier Pigeon, 2 Martins, 1 Ford and 1 Yackey Sport. There was no contest for leadership. Reliability was the quality sought and all the participants finishing on schedule were considered winners, their names being engraved on Edsel Ford Trophy. Among the engines that were notable for their performance were five Wrights, two E-4's in the Martin Commercial Planes and three 200 horsepower Whirl-
winds in the Fokker. From their starting points it is estimated that these planes flew jointly about 13000 miles without trouble or replacements.

At every city visited the municipal officials and Chambers of Commerce joined in welcoming the pilots. Great crowds were attracted to every flying field and it is certain that very beneficial impressions were made at every stop. After the return to Ford Air Port the participating air men were banqueted in the air port hangar. Following the dinner Wm. B. Mayo, Chief Engineer of the Ford Motor Co., said, “The flight has been successful beyond our highest hopes and argues well for the future of commercial aviation.” At about the same time, Henry Ford was quoted as follows: “We’ll put all the people into the air whenever they want to fly. What I am doing is helping to get ready for the flying generation when it comes. This new art belongs to the younger generation. Here in my own family it is Edsel who is mainly responsible for what we are doing. The airplane is going to enlarge the use of the automobile. The airplane will make short work of big navies, I think. Force and money are still the great delusion. The airplane is going to destroy the delusion of force and that will bring peace.”

Following are the results of the Ford Tour:


NATIONAL AIR RACES AT NEW YORK

The air races at Mitchel Field, L. I., N. Y., early in October attracted the largest number of civilian, commercial and military planes ever seen in this country. For the first time in these national races foreign entrants appeared. They included two Breguet observation planes representing France. The event was also featured by the presence of a host of aircraft manufacturers, noted pilots and government air officials from abroad, all interested in observing the progress being made by this country.

Kenneth W. Montee, of Santa Monica, Cal., won the “On-to-New York” race with a machine he had built and powered with a Curtiss OX5 engine. Basil L. Rowe won the “Free-for-All” race with a Thomas Morse S4E powered with an Aeromarine B motor. His time was 102.9 m.p.h. E. P. Lott in a Thomas Morse S4B, Curtiss OX5, won second place and C. D. Emrick third with a Hartzell FC-2, Curtiss OX5.
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C. S. (Casey) Jones won the "Free-for-All" for two, three and four-seater civilian planes and the prize and trophy of the Merchants Association of New York. He flew a Curtiss Oriole with Curtiss C-6 150 h.p. engine, and his speed averaged 134.2 m.p.h. Frederick H. Becker piloting a Wright-Bellanca was second at an average of 121.8 m.p.h., and Basil L. Rowe was third with an SVA, Aeromarine USD engine, at 121.5 m.p.h. Jones surprised everybody with his speed which was better than that made by Captain LeMaitre who in his French Breguet, Renault 463, h.p. engine, won the Liberty Engine Builders Trophy Race for France. LeMaitre's speed for the race, a triangular 12-mile course of 15 laps, was 129.1 m.p.h.

While the American observation planes had made better speed in other events, they did not beat LeMaitre. Lieut. E. B. Bayley in a Douglas was second at 128.3 m.p.h. Lieut. Henderson piloted a Navy-Boeing into third place at 127.9 m.p.h. and Capt. D'Oisy won fourth place in a plane similar to that piloted by LeMaitre, at a speed of 127.4 m.p.h.

Jones also won the Aviation Country Club of Detroit Trophy Race in his Curtiss Oriole, making the 100 miles at an average speed of 128.4 m.p.h. Rowe in his SVA was second at 119.8 m.p.h., while Becker in his Wright Bellanca was third at 112 m.p.h. Becker won first place in the efficiency test part of that race with 602 points. Jones second with 394.3 points and Richard Depew in a Sikorsky S31A plane was third.

An interesting contest was the light plane race of ten laps over a 5-mile course for the Scientific American and Aero Digest trophies. The planes were of low power, some having motor-cycle engines and a speed of a mile a minute. The winner was Terry C. Dack in a Powell racer, powered with a Bristol Cherub 16.7 h.p. engine. His speed was 76.1 m.p.h. Clyde Emick took second place at 67.5 m.p.h. in his Johnson Bumble Bee with a Henderson motorcycle engine. E. Dormoy was third with his own plane powered with a Henderson engine, making a speed of 52.2 m.p.h.

The John L. Mitchell Trophy Race for army pursuit planes was won by Lieut. Thomas K. Matthews at an average speed of 161.5 m.p.h. for the ten laps, a total of 120 miles. Lieuts. G. F. Schulgen and A. J. Lyon were tied for second place at 158.7 m.p.h. and Lieut. Frank O'D. Hunter was fourth at 157.5 m.p.h. All planes were Curtiss P.W.-8 pursuit types, with Curtiss D-12, 440 h.p. engines.

The Pulitzer Trophy Race

The principal object of the Pulitzer Trophy contestants this year was to test the latest improvements made in the design of pursuit
type planes and engines. Accordingly, the Army and Navy were the only competitors, there being no foreign entrants, because of the different standards prevailing in other countries. In Europe a distinction is made between a racer and standard equipment, that is, a racer is not designed or built to meet the rigid requirements of safety demanded in service machines. In the United States the racers must have the same factor of safety or better; and must have a landing speed of not over 75 m.p.h., a requirement not specified in European speed contests, and one which tends to limit the high speed of the plane. The foreign racers, if built to attain such speeds as would win a race, would not meet the specifications outlined in the rules governing the contest.

The Army and Navy ordered similar designs for the contest and the Curtiss Aeroplane & Motor Company was authorized to build three machines exactly alike. They were to be powered with the new Curtiss V-1400 type pursuit engine, an improved model of the standard D-12. This new engine was 20 per cent more powerful than the older engine. Though the same size as the other, it developed 610 horsepower and weighed 30 pounds less. Its weight of 685 pounds gave it 1.12 pounds weight per horsepower. This was remarkable, considering that it was less than a third of the weight per horsepower of the best engine built eight years ago.

Although retaining in general the same combination of cleverly engineered construction and clean appearance which made the 1923 racer so successful, the plane itself represented distinct engineering progress over the 1923 type. One of the features was a new wing section, developed in the Curtiss laboratory, and possessing the best high-speed characteristics ever developed in a wing. Another example of engineering progress was the Curtiss-Reed propeller of a forged type, even more efficient than the twisted Curtiss-Reed propeller previously used. The wing radiators were longer than in former Curtiss racers, and were made of brass sheeting .004 inch thick (thinner than paper), and through these radiators, twelve gallons of water circulated at the rate of 75 gallons a minute.

Materials used in the racers were unusually strong, a special bronze, for example, being used which had a tensile strength of 105,000 pounds per square inch, as compared with 60,000 pounds for ordinary bronze. The racers were put through the most rigorous strength tests and demonstrated the remarkably high factor of safety of more than twelve.

The safety and comfort of the pilot were very carefully considered in the new designs. A careful rearrangement of the major parts of the machine provided greatly improved vision forward, extremely
Lt. Cyrus Bettis, U.S.A.S., and Curtiss Racer (Curtiss V1.400, 619 h.p. engine), winner 1925 Pulitzer race at 248.975 m.p.h.
important from the pilots standpoint. The tiny cockpit was so designed that in case of emergency it could be split open by a single motion, thus enabling the pilot to leave the machine easily and to take his parachute. A specially geared system of controls did away with the extreme sensitiveness that marked former racers and in these planes the pilots, for the first time, were able to remove their hands from the controls in straight flight.

Lieut. Cyrus Bettis, winner of the 1924 John L. Mitchell race, represented the Army Air Service. Lieut. Alfred Williams, winner of the 1923 Pulitzer, again represented the Navy Bureau of Aeronautics. A storm caused a postponement of the race on Oct. 10. On the mid-afternoon of the 12th the weather cleared sufficiently; and though there was a haze over the course and other signs of rain, Bettis and Williams elected to fly.

Some days before they had flipped a coin for choice of machines. The Navy won and Williams now flew the second of the three racers to be built, with an engine also of the Navy's selection. Williams took off first and flew around the field warming his engine. Two minutes later Bettis was in the air, just as the Navy plane started off across the course. Spectators who had been expecting a neck and neck race were disappointed, for the two machines crossed the starting point at different times, and this interval of nearly two minutes made the contest appear more a test than a real race. Under the new rules prohibiting diving at the start the planes had crossed the line on the level and flew approximately 300 feet high throughout the course. The absence of terrific noise, once common in racers, was attributed to the improved propellers.

The race was now a speed trial and it was easily seen that Bettis was improving his speed lap by lap while that of Williams was being reduced until in the fourth and last lap, he hardly equalled that of his first. Bettis finished the winner at an average speed of 248.99 m.p.h., on the closed course of 50 kilometers flown four times, or 200 k.m., (124.47 miles). The time made by Williams was 241.71 m.p.h. Yet the winner's time was only slightly more than 5 miles faster than that made by Williams in the Pulitzer race at St. Louis in 1923. This indifferent gain made by planes admittedly superior in many respects was attributed to adverse weather. The high wind made flying difficult and held back the machines. More time was lost rounding the pylons on the irregular triangular course and the haze over the Long Island fields gave both pilots some trouble. The fact that they could not dive for the starting line also reduced their average time, as evidence by the 247.8 miles an hour made by Bettis on the first lap and from 248.7 to 249.97 m.p.h. on the others. Still, he won the
world’s record for a closed circuit, for speed over 100 km, at 249.34 m.p.h., and for 200 km, at 248.975 m.p.h.

Four Curtiss pursuit planes, because they were in a slower class, started in the second heat of the Pulitzer race, and this was won by Lieut. Leo H. Dawson, Army Air Service, at 169.9 m.p.h. He was awarded third prize. Lieut. H. J. Norton won fourth prize for the Navy at an average speed of 168.8 m.p.h.

THE SCHNEIDER CUP RACE

The greatest number of aircraft celebrities ever gathered in this country watched Lieut. James H. Doolittle, with an exhibition of masterly flying, win the international Schneider Cup Race for the Army Air Service, at Bay Shore Park, Baltimore, Md., on Oct. 26, 1925. He piloted the Army-Curtiss racer with which Lieut. Cyrus Bettis had won the Pulitzer race a few days before. The tiny airplane was transformed into a seaplane by substituting regulation navy pontoons for wheels. Doolittle’s speed for the 7 laps of a closed course of 50 km., a total of 350 km., (266.35 miles) was 232.573 m.p.h. This broke several records.

Captain Henry Biard, a former winner of the Schneider contest, was scratched when his Supermarine-Napier S.4 700 h.p., a British entry, crashed during the preliminary trials. Bert Hinkler, reserve member of the British team, was scratched when his Gloster-Napier was wrecked in rough water during navigability trials. Riccardo Morselli, Italy, was scratched when the engine of his Macchi plane developed trouble just before the start.

That left three American, one British and one Italian entries in the race. Lieut. George T. Cuddihy, flew the Navy-Curtiss racer used by Lieut. Alford Williams in the Pulitzer, and was forced down near the finish line on the last lap when his engine was overheated by exhaustion of the oil supply. Lieut. Ralph A. Ofstie, the second Navy entrant, flying a similar machine, was forced down by engine trouble in the sixth lap. Captain Hubert Broad in his British Gloster Napier 111. 700 h.p., which in appearance resembled the Army-Curtiss racer, but was stronger by 100 horsepower, flew an excellent race, making approximately the same time on each lap, the fastest two laps at 202.474 m.p.h.,—the British record for 100 km. with seaplanes—and won second place in the race at 199.169 m.p.h. H. G. deBriganti in his Italian Macchi flying boat, a new model racer, powered with an old type Curtiss D-12 engine with a wooden propeller, also flew a masterly race, finishing in third place at 168.444 m.p.h.

The U. S. Naval entries would have taken second and third places
had they finished, however, as Cuddihy’s speed for his 6 laps averaged more than 220 m.p.h., while Ofstie’s speed for his five laps averaged more than 218 m.p.h. de Briganti, after crossing the finish line, continued on the course instead of landing. He had seen the two Navy planes down far out in Chesapeake Bay and went back to render assistance. Meanwhile, both machines had been towed to shore. But de Briganti did not know this. He landed and remained on the spot where he had last seen the machines. For this he received an ovation when he finally arrived in Baltimore.

Externally, at least, the Curtiss racers appeared to be a much more finished product than the Gloster-Napier which did not have wing radiators and carried two brace wires which were not streamlined. The pontoons of the British entries were especially made for racing and were better streamlined than those on the American planes, theirs having the same seaworthy lines as used on the service machines.

The Supermarine racer was one of the most beautiful machines seen and followed in general lines the French Ferbois racer, holder of the world’s 3 kilometer speed record. The Italian Macchi planes were pronounced by engineers to be the most original for over-water racers, being monoplane flying boats with the engine mounted above the pilot. Though the wing might have been damaged in heavy swells, the planes were easily controlled in the air, and de Briganti made vertical banks and as sharp turns as Doolittle whose flying was acclaimed perfect.

In his race the army pilot made three records, the world’s seaplane record for the Schneider Cup Race and closed course, the world’s records for 100 km., at 234.772 m.p.h., and for 200 km. at 234.355 m.p.h. The best prior time for that race had been made by Lieut. Rittenhouse, U. S. Navy, in a Curtiss racer, winning the Schneider race at Cowes, England, in 1923, at 177.38 m.p.h. If the Schneider Cup is won again by Americans in 1926 or 1927 it will remain in this country.

The day after the race Lieut. Doolittle broke the world’s straightway 3 kilometer speed record for seaplanes, flying at 245.713 m.p.h.

**General Mitchell’s Retirement from the Army**

In the summer of 1925 Brigadier General William Mitchell who, since shortly after the Armistice, had been Assistant Chief of Air Service was not re-detailed to this post. Reasons given ranged from the official one that he was long overdue for his tour of duty in the field to the extreme view that his radical arguments for a separate Air Service had made him persona non grata with the General Staff.
of the Army. Whatever the reason, the President did not send his name to the Senate for approval and therefore he reverted to his regular rank of Colonel and was assigned as Air Officer of the Eighth Corps Area with headquarters at San Antonio, Texas.

From this station Colonel Mitchell, early in September shortly after the airship Shenandoah was wrecked and before the Navy Trans-Pacific flying boat turned up safely off the coast of Hawaii, issued a statement which was so broad in its denunciation of alleged abuses in the Air Services that it attracted nation-wide attention. The inevitable court-martial was promptly ordered and the attendant publicity precipitated another investigation of aviation, by the appointment of the President's Aircraft Board.

In substantiation of his plea for a Department of National Defense, wherein the Air Service would be raised to a status equal with that of the Army and Navy, General Mitchell introduced certain opinions and purported statements of fact, the key note of which was incompetency and hostility on the part of the officers in control of the War and Navy Departments. Of the Shenandoah and the Trans-Pacific accident General Mitchell said: "These accidents are the direct results of the incompetency, criminal negligence and almost treasonable administration of the National Defense by the Navy and War Departments. In their attempt to keep down the development of Aviation into an independent department, separate from the Army and Navy, and handled by Aeronautical experts, and to maintain existing systems, they have gone to the utmost length to carry their point. All Aviation policies, schemes and systems are dictated by the non-flying officers of the Army or Navy, who know practically nothing about it.

"The lives of the air men are being used merely as pawns in their hands. The great Congress of the United States that makes laws for the organization and use of our air, land and water forces is treated by these two Departments as if it were an organization created for their benefit, to which evidence of any kind, whether true or not, can be given without restraint. Officers and agents sent by the War and Navy Departments to Congress have almost always given incomplete, miserly or false information about Aeronautics, which either they know to be false when given or was the result of such gross ignorance of the question, that they should not be allowed to appear before a legislative body."

General Mitchell was immediately placed under arrest and the slow machinery of military trial set into operation. On Oct. 28, 1925 Colonel Mitchell was brought to trial. The trial which lasted many weeks commanded astonishing publicity. Colonel Mitchell's chief
civilian counsel was Hon. Frank R. Reid, Member of Congress from Illinois, who the year before had achieved notable distinction as a Member of the Congressional Select Committee of Inquiry into the Operations of the United States Air Services. Scores of witnesses were called by both sides. In support of Colonel Mitchell there appeared some of the best known and most highly regarded officers of the Army Air Service. There also appeared in support of his extreme theories many men who had achieved distinction in the Air Service during the War, but who since have retired to private life.

Against the statements of fact or belief as advanced by these witnesses for the defense, the prosecution brought forward testimony also of alleged statements of fact and belief to such a degree that through the columns of newspaper publicity, charge and counter-charge, accusation and defense, condemnation and justification, the public mind sank bewildered.

At the morning Session of the Court, Dec. 17, all witnesses having been heard, Colonel Mitchell made his concluding statement as follows:

"May it please the court: My trial before this court martial is the culmination of the efforts of the General Staff of the Army and the General Board of the Navy to deprecate the value of air power and keep it in an auxiliary position, which absolutely compromises our whole system of National defense.

"These efforts to keep down our air power were begun as soon as the sound of the cannon had ceased on the Western front in 1919. When we sunk the battleships off the Virginia Capes in 1921 and again in 1923, and proved to the world that air power had revolutionized all schemes of National defense, these efforts were redoubled and have continued to this day.

"The truth of every statement which I have made, has been proved by good and sufficient evidence before this court, not by men who gained their knowledge of aviation by staying on the ground and having their statements prepared by numerous staffs to bolster up their predetermined ideas, but by actual fliers who have gained their knowledge first hand in war and in peace.

"I wish to invite particular attention to the letter of former Secretary Weeks to the President of the United States, asking that I be not reappointed as Assistant Chief of the Air Service on account of evidence given by me to a Congressional committee.

"I testified that the Air Service had only nine modern airplanes fit for war and that all others were obsolete and many dangerous. The evidence before this court bears out these facts in their entirety. It has been shown that at present we have only one standard plane in the service.

"Secretary Weeks and, indirectly, the President of the United States, were wrongly and untruthfully informed as to the condition of our Aviation and our National defense, by persons furnishing the data on which his letter was based.

"This court has refrained from ruling whether the truth in this case constitutes an absolute defense or not. To proceed further with the case would
serve no useful purpose. I have therefore directed my counsel to entirely close our part of the proceeding without argument."

Shortly after the announcement of the decision of the court martial was made as follows:

"The court upon secret written ballot, two-thirds of the members present at the time the vote was taken, concurring in each finding of guilty, finds the accused guilty of all specifications and of the charge.

"Upon secret written ballot the court sentences the accused to be suspended from rank, command and duty, with forfeiture of all pay and allowances for five years.

"The court is thus lenient because of the military record of the accused during the World War, two-thirds of the members present at the time the vote was taken, concurring."

On Jan. 25, 1926, the findings of the court martial had been submitted to President Coolidge for approval. The statement of the President modifying somewhat the sentence of the court is as follows:

"In the foregoing case of Colonel William Mitchell, Air Service, the following action is hereby taken:

"A duly constituted court martial has determined that the accused has been guilty of highly censurable conduct. The country has every reason to expect that its officers, especially those who hold positions of high rank and have had long experience in the Service, will, at all times, be strictly obedient to the provisions of the law and the requirements of the rules by which they are governed.

"The court martial has found that, on Sept. 3, 1925, the Naval Airship Shenandoah was destroyed in a storm and that destruction involved the loss of fourteen persons of her crew. Two days later, and at a time when the Naval Airplane, PX-9, was supposed to be lost and all members of her crew drowned, the accused, taking advantage of the horror stricken state of mind of the people and their natural desire to learn the causes of such losses and their readiness to listen to the views of persons having, or supposed to have, expert knowledge of such subjects, published his statement of Sept. 5, 1925, set out in the charges, in which he violently assailed the War Department and the Navy Department.

"He characterized the administration of those departments as incompetent, criminally negligent and almost treasonable. He charged those administering those departments with ignorance, suppression of the truth and with giving misleading, if not false, information concerning the Air Service to Congress and the people. The Board of Review finds that those statements were made without basis, in fact. In his statement of Sept. 9, 1925, set out in the charges, he employed expressions which cannot be construed otherwise than as breathing defiance toward his military superiors.

"The theory of Government implies that every official, so long as he retains office, shall deport himself with respect toward his superiors. This is especially true to those in the military service. Unless this rule is applied, there could be no discipline in the Army and Navy, without which those two forces would not only be without value as a means of defense, but would become actually a menace to society. Discipline is the whole basis of military training."
"The sentence is approved and will be duly executed, except as hereinafter provided. * * *

The President modified somewhat the pay and allowance forfeitures imposed by the court.

On Jan. 27, Colonel Mitchell submitted his resignation from the Army to take effect Feb. 1. The resignation was accepted and Colonel Mitchell's remarkable career of some twenty-eight years in the military service of his country was brought to an end.
CHAPTER XIII

REVIEW OF AERONAUTICS THROUGHOUT THE WORLD

The following data have been compiled from reports received from representatives or correspondents of the Aeronautical Chamber of Commerce; from the Air Service, United States Army; Bureau of Aeronautics, United States Navy; commercial attachés, Department of Commerce and the air attachés of England, France and Italy, stationed at Washington. The Editors wish to acknowledge gratefully assistance given by R. C. Wood, formerly Liaison Officer of the U. S. Naval Base at Brest. Mr. Wood is Chairman of the Aviation Committee of the American Legion, Paris Post No. 1.

INTERNATIONAL

The international aeronautical situation, in 1925, as, indeed, every year since the Armistice, involved political relations between Germany on the one hand and France, England, Italy, the Netherlands, Czecho-Slovakia and Poland, on the other, becoming more and more acute, up to the signing of the Locarno Treaties. It will be recalled that, following the Treaty of Versailles, the Council of Ambassadors imposed Nine Rules upon Germany. These rules, together with limitations set forth at Versailles, were designed to prevent intensive military aeronautical development in Germany.

The lapse of years brought the operating period of these rules to an end. But, as set forth in the German section of this chapter, Germany would seem to have emerged all the stronger, in so far as practical aviation is concerned. It was curious, if not ironical, that restrictions imposed by the Allies worked in part to the actual benefit of Germany, while hampering aviation for the Allies.

One of the principal difficulties was that presented by the necessity to fly over German territory, if the most direct air routes to the East were to be developed—and this development, as is seen in the present chapter, involves directly some of the most serious political efforts of France, Great Britain and Germany, and, to a lesser extent, Italy. The Germans, with keen business sense, have continued to urge the advisability of international air co-operation. This was favorably regarded by the British. At length, on May 7, 1926, there were signed in Paris, two Franco-German conventions which assured immediate operation of German lines into French
AIRCRAFT YEAR BOOK

territory, and French lines into German. A few days later, the first
German airplane of peace delivered its cargo of freight, passengers
and mail in Paris, and the French lines reciprocated with commerce
into Berlin, and through the Reich into Czecho-Slovakia and on
down to Constantinople, the coveted air gateway to the East.

INTERNATIONAL AIR TRAFFIC ASSOCIATION

In the meantime there had been brought into existence, the Inter­
national Air Traffic Association, in which French, German, English,
Dutch, Belgian, Italian, and other air transport lines co-operated.
This association met in Stockholm, Sept. 28 to 30, 1925, when it was
unanimously decided that only by international co-operation and fair
competition could civil aviation be established on a firm economic
basis and developed successfully as a means of transport. Other
matters discussed included: lines to be operated, time tables and
connections, inter-line traffic arrangements, tariffs, technical phases,
etc.

INTERNATIONAL AERONAUTIC FEDERATION

The International Aeronautic Federation convened at Prague in
September, 1925. Twenty-seven states were represented. The third
Prague aviation meet was held at the same time, attracting 50,000
spectators.

AERIAL NAVIGATION CONGRESS

The third International Congress of Aerial Navigation was held
in Brussels, Oct. 6 to 10, 1925.

WORLD AIR TRANSPORT SERVICES
(Other than those in the United States)

The following list is made up from the best available sources.
The situation is constantly changing, and allowances must con­
sequently be made. Tabulation is by country. Name of the oper­
ating organization is given in capitals, then the cities served. The
initials M, E, or P indicate, respectively, that mails, express or pas­
sengers are transported. Schedules quoted are approximate.

ALBANIA

ADRIA AERO LLOYD. Tirana-Scutari-Kortcha-Valona. MEP. Irregular.

ARGENTINA

JUNKERS. Cordoba-Villa Dolores-Rio Cuarto. MEP. Tri-weekly.
Tucuman-Rio Honda-Santiago del Estero. MEP. Irregular.
ARGENTINE AERO CLUB. Tucuman-Tafí del Valle. P. Irregular.
AUSTRALIA

WESTERN AUSTRALIAN AIRWAYS, LTD. Perth-Derby. MEP. Weekly.

QUEENSLAND AND NORTHERN TERRITORY AERIAL SERVICES, LTD. Charlestonville-Camooweal. MEP. Weekly.

LARKIN AIRCRAFT SUPPLY CO. Adelaide-Cootamunda. MEP. Weekly.

Broken Hill-Mildura. MEP. Bi-weekly.

Melbourne-Hay. MEP. Bi-weekly.

BELGIUM

SOCIETE ANONYME BELGE D’EXPLOITATION DE LA NAVIGATION ARIENNE (SABENA). Leopoldville-Ilebo-Kanda Kanda-Gule-Bandundu-Luebo-Bukama, all in Belgian Congo. MEP. Every 18 days, connecting with steamers.

BOLIVIA

LLOYD AERIEN (JUNKERS). Cochabamba-Santa Cruz. EP. Tri-weekly.

Cochambamba Oruro-La Paz. EP. Tri-weekly.

BRAZIL


CANADA

DOMINION AERIAL EXPLORATION CO. Hudson-Red Lake. MEP. Irregular.

NORTHERN AIR SERVICE, LTD. Haileybury-Rouyn. MEP. Irregular.

CHINA

CHINESE GOVERNMENT. Peking-Petaitao. P. Irregular.

COLOMBIA

SOCIEDAD COLOMBO ALEMANA DE TRANSPORTES AEROS. Barranquila-Girardot. MEP. Tri-weekly.

Girardot-Neiva. MEP. Bi-weekly.

Barranquila-Cartagena. MEP. Bi-weekly.

Czecho-Slovakia


STATE AIR LINES. Prague-Bratislava-Kasice. Irregular.

AERO CO. Prague-Marienbad. P. Irregular.

DENMARK

DANSKE LUFTFARTSELSKEB. Copenhagen-Berlin.

Copenhagen-Hamburg. EP. Both services round trip daily, July 1-Oct. 1.
FINLAND

Helsingfors-Stockholm. EP. Irregular.

FRANCE


LA COMPAGNIE GENERALE D'ENTERPRISES AERONAUTIQUES
Casablanca-Oran. MEP. Weekly.
Alicante-Oran. MEP. Four times a week.
Alicante-Aigiers. MEP. Weekly.
Marseilles-Perpignan. MEP. Daily except Monday.
Agadir-Gap Judy-Villa Gesuinos-Port Etienne-Casablanca-Saint Louis-Dakar. MEP. Weekly.

LA SOCIETE GENERALE DE TRANSPORT AERIEN (FARMAN).
Paris-Brussels-Amsterdam. MEP. Round trip daily.

LA COMPAGNIE INTERNATIONALE DE NAVIGATION AERIENNE
Prague-Warsaw.
Prague-Vienna.
Vienna-Budapest.
Budapest-Belgrade. MEP. Intermittent.

GERMANY

DEUTSCHER AERO-LLOYD, A. G. AND JUNKERS-WERKE, A. G.
Berlin-Malmö-Copenhagen (Gothenburg-Oslo). Junkers Luftverkehr in conjunction with Scandinavian companies.
(Berlin)-Koenigsberg-Memel-Riga-Reval-Helsingfors-(Leningrad). (Junkers-Nord Europa Union.)
Frankfort-Furth-Nuremberg-Munich. (Junkers-Trans Europa Union.)
Munich-Vienna-Budapest. (Junkers-Trans Europa Union.)
Berlin-Hanover-Ruhr. (Luftverkehrs Ges. Ruhrgebiet A. G., a Junkers subsidiary.)
Frankfort-Karlsruhe-Zurich. (Badisch Luftverkehrs G.m.b.h.)
Berlin-Dresden-(Prague-Vienna.) (Sachische Luftverkehr A. G.)
Berlin-Breslau-Gleiwitz. (Schlesischen Luftverkehr A. G. and Gleiwitz Luftverkehrs A. G.)
Berlin-Stockholm Overnight Service. (Experimental).
Berlin-Hanover-Amsterdam-London. (Deutsche Aero-Lloyd in conjunction with Imperial Airways, Ltd., of Great Britain.)
(Berlin)-Koenigsberg-Kovno-Moscow. (Deutsche-Russische Luftverkehrs Ges.)
Berlin-Copenhagen. (Deutsche Aero-Lloyd in conjunction with Danske Luftfartselskab of Denmark.)
Bremen-Hanover-Leipzig-Chemnitz-Prague. (Mitteldeutsche Aero-Lloyd A. G.)
Munich-Reichenhall.
Berlin-Hanover-Dortmund.
Dortmund-Rotterdam-Amsterdam.
Leipzig-Halle-Dortmund.
Berlin-Hamburg-Kiel.
Berlin-Hamburg (night service.)
Hamburg-Hanover-Frankfort.
Mannheim-Karlsruhe-Baden Baden-Villingen-Constance.
Constance-Lindau.
Karlsruhe-Stuttgart.
Berlin-Basle.
(All of above being reorganized, due to amalgamation of two big operators.
Virtually all MEP. Daily between principal cities.)

GREAT BRITAIN

London-Brussels-Cologne.
London-Amsterdam.
(All MEP. Daily, subject to modification in winter months.)

HUNGARY

MAGYAR LEGIFORGALMI R. T. Budapest-Vienna. MEP. Daily.

ITALY

SOCIETA ITALIANA SERVISI AEREA. Turin-Venice-Trieste.
SOCIETA ANONIMA AERO ESPRESSO. Naples-Brindisi-Athens-Constantinople.
SOCIETA IN ACCOMANDITA LA TRANSALPINA. Lausanne-Milan.
(All MEP and scheduled daily, under subsidy.)

JAPAN

GOVERNMENT SUBSIDIZED. Tokio-Osaka.
Osaka-Mitajiri.
Mitajiri-Beppu.
Sakai-Takamatsu-Tokushima. Intermittent.

JUGO-SLAVIA

AERO CLUB. Zagrab-Belgrade-Salejika. Intermittent.

LATVIA

LATVIAN AIR SERVICE CO. Riga-Memel-Koenigsberg.
Riga-Reval-Helsingsfors. MEP. Daily.

MEXICO

CIA. MEXICANA DA AVIACION, S. A. Tampico-Mexico City. Irregular.
Netherlands
Amsterdam-Rotterdam-London.
Rotterdam-Amsterdam-Hamburg-Copenhagen.
Amsterdam-Rotterdam-Dortmund.
(All MEP and daily, subject to seasons.)

Peru
LA AVIACION COMERCIAL. Lima-Tumbes.

Poland
POLSKA LINJA LOTNICZA (AEROLOT). Danzig-Warsaw-Lemberg.
Warsaw-Cracow-Vienna.
Lemberg-Cracow.
(All MEP. Daily, except Sunday.)

Russia
DERULUFT (DEUTSCHER AERO-LLOYD). Moscow-Koenigsberg.
MEP. Daily.
UKRVOSSDUHKPUT (DEUTSCHER AERO-LLOYD). Moscow-Khar-
koff-Rostoff on Don. MEP. Tri-weekly.
DOBRILOOT. Khivo-Bokhara. MEP. Tri-weekly.
Bokhara-Duchambe. MEP. Tri-weekly.
Moscow-Peking. (In formation with assistance of Junkers.)

South Africa
JUNKERS. Capetown-Durban. MEP. Bi-weekly.

Spain
JORGE LORING MARTINEZ. Seville-Larache-Mogador-Agadir-Cape Juby-
Las Palmas-Santa Cruz de Teneriffe. Irregular.
LA AERO ESPANOLA. San Sebastian-Canary Islands. Irregular.

Sweden
AKTB. AEROTRANSPORT. Malmo-Copenhagen-Hamburg-Amsterdam.
Stockholm-Helsingfors.
Malmo-Copenhagen.
(All MEP. Irregular.)

REPORT OF COUNTRIES

Albania
The Adria Aero Lloyd conducts a well patronized service between the capital of Albania, Tirana, and Scutari, Kortcha and Valona. The company operates three planes for mail and passengers only and the service is irregular.
The Argentine, having a length of 2,000 miles and a width of 1,000 miles, most of it dependent in some way on the capital and much of it having no railway service, offers an unusual opportunity for the development of aviation. Practically all the pioneer development has been done by British interests, although French and Italian missions have been active for several years. The German Junkers Co. is, however, the one which has finally persuaded the Argentine government definitely to support aviation.

The following services were operated in 1925:

Cordoba-Villa Dolores-Rio Cuarto. U.S. Trade Commissioner George S. Brady, reported that the province of Cordoba had increased the subsidy to the Junkers company “Aero Lloyd Cordoba” from 4,000 to 7,000 pesos a month on condition that the Rio Cuarto service be added to the Cordoba-Villa Dolores line. Service is operated three times a week with 185 h.p. Junkers. The distance from Cordoba to Villa Dolores is 75 miles and takes 45 minutes by plane, 7 hours by automobile. It is 375 miles by train requiring three changes.

Tucuman-Rio Honda-Santiago del Estero line operated during the summer of 1925 with 185 h.p. Junkers.

An air mail service between Buenos Aires and Montevideo was opened March 1, 1926, a contract having been signed between the Junkers Co. and the Argentine postal authorities for a tri-weekly service, employing a Junkers hydroairplane. Four passengers may also be carried, at a charge of 50 pesos, (about $20) for one way. Extra postal charges are graded from 15 centavos for 20 grams.

During March and April a service was operated between Tucuman and Tafi del Valle with 160 h.p. Curtiss Orioles, under the patronage of the local Aero Club. Suspended during the winter months, the service was resumed in September.

The Argentine Army Air Service has contracted with the Curtiss Aeroplane and Motor Co. for ten training planes. The Navy has purchased eight training planes from Huff-Daland Airplanes, Inc.

AUSTRALIA

The Minister of Defense is responsible for the control of the Civil Aviation Department. Civil aviation is in charge of Lt. Col. H. C. Brinsmead, O.B.E., N.C., Controller of Civil Aviation, a civilian officer functioning independently of the Royal Australian Air Force.

Three air transport companies are operating regularly in Australia.
It is claimed that these lines have the highest percentage of regularity of any in the world.

Western Australian Airways Ltd. operates from Perth to Derby, 1,442 miles, with a weekly service in each direction, stopping at seven intermediate points. They operate seven, three and four passenger planes. Since December, 1921, they have transported 2,124 passengers, 17,390 lbs. of goods and 498,264 letters, flying 390,000 miles. This company is now carrying over 20,000 letters per month. They cover the western coastal area where there is a widely scattered population, making connections with the trans-continental trains for Melbourne, the 3,600 miles thus being covered the sixth day. During the period January-August, 1925, the mileage was 105,723; passengers carried, 631; letters, 145,018; goods, 4,809 lbs.

Queensland and Northern Territory Aerial Services Ltd. operates between Charlesville and Camooweal, 825 miles, once weekly in each direction, using seven planes of the same type as the Western. From November, 1922 to November, 1925, this line had carried 1,808 passengers, 14,984 lbs. of goods and 37,785 letters, flying 173,716 miles.

In 1925 the passengers on this route increased 72 per cent, the mails 100 per cent and the freight 130 per cent. From January to August, the mileage was 55,261; passengers, 761; letters, 11,886 and goods 7,504 lbs. This route covers ideal flying country over open stretches of land where prosperous communities are not reached by railroads. Camooweal is the gateway to the most fertile portion of the Commonwealth, wholly pastoral, mostly with absentee ownership. Speedy communication is desirable. The distance requires nine days by train.

The Larkin Aircraft Supply Co. operates three lines. That from Adelaide to Cootamunda is 578 miles, from Broken Hill to Mildura is 189 miles and from Melbourne to Hay, 233 miles. The latter two are feeders to the first. The first line runs once weekly and the others twice weekly. Six planes are flown in this service. From June, 1924 to November, 1925, the second and third services having been open only since July 21, 1925, 114 passengers, 72 lbs. of goods and 3,785 letters have been carried; the mileage being 17,116.

Passenger and freight rates differ according to sections and distances but the maximum charges are under 1s. per mile for passengers and 2/6d. per lb. per trip for freight.

These companies are subsidized by the Australian government, the maximum subsidy being four shillings per mile flown in accordance with contract schedule. Subsidies are disbursed monthly. Contracts are for three years and contain provision for possible reduc-
tion at the end of the first and second years. The government does not pay for the carriage of mails on subsidized services, certain space being reserved for the carriage of surcharged first class mail for the postal department. The surcharge is 1½d. per ounce, the operating company deriving no revenue from that source.

The aerial defense of Australia is regarded as of extreme importance. Owing to its isolated position an army would be of little service in case of attack and it is obvious that a population of 5,000,000 people could not afford to maintain or build a naval fleet of effective size. It is evident that Australia's cheapest and most effective form of defence must be an adequate air force. Pending a more elaborate program of constructing an aerial force the Australian government has followed the example of Great Britain and is assisting in the formation of an Australian Citizen Air Force.

AUSTRIA

Austria has no military airplane service. Commercial activities are coordinated and controlled by the Aviation Department which is a part of the Ministry of Commerce and Transportation. Dr. Victor von Krauss is chief of the Department of Aeronautics. No financial aid is given aviation. It provides indirect aid such as landing fields and daily weather reports.

BELGIUM

Interest in aviation in Belgium centers about the problem of closer connections between the mother country and the colonies, and the development of the postal transport and night flying.

Military aviation comes under the Service de l'Aeronautique of the Ministry of National Defense. There is no naval aviation service. The government has no civilian aviation but commercial air services are under the control of the Administration de l'Aeronautique attached to the Ministry of Railroads, Marine, Posts, Telegraphs, Telephones and Aviation, at the head of which is General-Major Van Crombrugge, assisted by Captain-Commandant Vrabbe. This service has no flying material but maintains government civilian fields. Appropriations provided for in the 1926 budget are: Military aviation, frs. 26,650,000, of which 1,700,000 frs. go to subsidize Civilian Aviation Schools; and Civilian Aviation, frs. 7,938,961, of which 3,100,000 frs. constitute subsidies to S.A.B.E.N.A. and 1,500,000 frs. for other subsidies.

The Societe Anonyme Belge d'Exploitation de la Navigation Aerienne (Sabena) is the only commercial line in Belgium. Sabena
is not operating in Europe in 1926 but has transferred its activities to the Congo. During 1925 Sabena operated as follows:

<table>
<thead>
<tr>
<th></th>
<th>Europe</th>
<th>Congo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours of flight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Popularization</td>
<td>196</td>
<td>82</td>
</tr>
<tr>
<td>Regular transport</td>
<td>1,673</td>
<td>321</td>
</tr>
<tr>
<td>Kilometers covered</td>
<td>232,844</td>
<td>460,899</td>
</tr>
<tr>
<td>Passenger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Popularization</td>
<td>2,819</td>
<td>288</td>
</tr>
<tr>
<td>Regular</td>
<td>1,584</td>
<td>25</td>
</tr>
<tr>
<td>Merchandise (Kilograms)</td>
<td>77,275</td>
<td>515</td>
</tr>
<tr>
<td>Mail (Kilograms)</td>
<td>10,967</td>
<td>28,634</td>
</tr>
</tbody>
</table>

In 1925 Sabena operated an Amsterdam-Brussels-Basel service with 19 planes, 8 pilots and 24 other employees.

The operations in the Belgian Congo began in April 1925, with the opening of the Leopoldville-Luebo line, Feb. 9, 1926 this was extended to Gule and at present covers the following route: Leopoldville, Ilebo, Kanda-Kanda, Gule, Bandundu, Luebo, Bukama. Flights correspond with the arrival and departure of the Antwerp-Matadi boat service and take place about every 18 days. There are 9 planes in service.

The necessity of economy restricts the possibilities of developing air lines in Belgium and the government is not likely to increase subsidies until after the present agreement expires in 1927. Because of the small subsidy the Sabena has turned its attention to the more profitable lines, the Congo line being practically self-supporting.

The mails carried by this line monthly increased from 40 to 500 kilogrammes in the first 7 months operation. The regularity was 100 per cent in spite of the rainy season. During these 7 months, 21,725 kilogrammes of mails, 1,660 kg. of goods and 221 passengers were carried.

BOLIVIA

Military Aviation in Bolivia is under the War Department. Commercial aviation is beginning to develop. In July, 1925, a Junkers airplane was bought by private subscription and presented to the government. The government has been asked to grant a subsidy to privately operated air lines.

A commercial aviation company, termed "Lloyd Aerien," has been organized with a projected capital of 400,000 bolivianos ($130,000). At present there is only one regular service, three times per week, between Cochabamba-Santa Cruz (300 km.), and Cochabamba-Oruro-La Paz (450 km.). These routes are flown in from
two to two and one-half hours, the only other means of communication being mule back and requiring from 10 to 12 days. The fare is 300 bolivianos.

**Brazil**

The French Latocoere Co. have long planned a commercial air service between Europe, Africa and South America. It was part of their original plan to begin the South American end of the line by establishing a Buenos-Aires-Pernambuco service. This service after long delays was started Dec. 15, 1925. Four planes are in use in the service. A decree of the President of Brazil issued in October, conceded to the Companhia Brasileira de Empreendimentos Aeronautics the right to operate a regular line of air transportation between Recife (Pernambuco) and Porto Alegre with stops at Maceia, San Salvador, Caravellas, Victoria, Rio de Janeiro, Perangua and Florianopolis, a distance of 2,175 kilometers.

Dr. Francisco Sa, Minister of Communications, has approved the plans of organization of the Bureau of Aerial Navigation, which will function under the Federal Bureau of Inspection of Navigation. The new bureau is to have charge of commercial aerial lines, including laws, decrees, and a general map of the country, as well as the planning of air fields, lighthouses, and other matters pertaining to aviation.

Coronel Alvaro Octavia de Alencastro and Coronel Pedro Diaz de Campos are officials in charge of the federal army aviation unit and the Lao Paulo state police air service.

**Bulgaria**

In October, 1925, the Direction of Aviation in Sofia announced that the Bulgarian Government invited offers covering the following: (1) Establishing a factory to manufacture airplanes and (2) organization and operation of air navigation lines throughout Bulgaria. In December the Ministry of Railways, Posts and Telegraphs published specifications relative to the operation of aerial lines. Contracts are to be given to companies already operating aerial lines or to Bulgarian firms.

**Canada**

The Minister of National Defense is responsible for “all matter relating to defense including the military, naval and air services of Canada.” The control of civil and commercial aviation is carried out under his authority by the Royal Canadian Air Force. Flight Lieutenant A. T. Cowley is Controller of Civil Aviation.
Expenditures of the Government on aviation for the fiscal year ending March 31, 1925, totaled $1,377,328. Estimates for 1926-1927 total $1,880,850.

On Sept. 29, 1925, there were in force certificates and licenses as follows: Private air pilots' certificates, 7; commercial air pilots' certificates, 29; air engineers' certificates, 86; registration of aircraft certificates, 36; air harbor licenses, 24. Most of the work has been in connection with forest patrol, survey and aerial photography, the transportation of mails and passengers not being profitable. Inasmuch as the Air Force devotes ten times as many hours of flying to forest, fisheries and customs patrol as it does to service flying it is apparent that the Government's aerial operations are primarily for useful services of a civil nature. The economic advantages to the country are considered inestimable.

The Canadian Government does not pay subsidies or make any special appropriations for commercial air services. No payment is made for air mail service. The operators of the Haileybury-Rouyn and Hudson-Red Lake services are authorized to carry mail bearing a special stamp issued by them.

Statistics of operations of air transport companies for 1925 are as follows:

- Dominion Aerial Exploration Company, general survey work. Passengers, 336; mail, 50 pounds; freight, 16,000 pounds; machines, 4; pilots, 4; total personnel, 23; hours of flying, 405; distance, 2,600 miles.
- Fairchild Aerial Surveys Company (of Canada) Ltd., general survey work. Passengers, 156; machines, 4; pilots, 2; total personnel, 4; hours of flying, 268; distance, 17,878 miles.
- Laurentide Air Services, Ltd., general survey work, mostly in the Yukon. Passengers, 130; machines, 1; pilots, 2; total personnel, 3; hours of flying, 95; distance, 8,075 miles.
- Northern Air Service, Ltd., air mail, passenger and freight service from Haileybury, Ont., into the Rouyn gold fields. Fares were $1 per mile and postal rate 25 cents per letter. Passengers, 50; goods, 100 pounds; machines, 1; pilots, 1; total personnel, 4; hours of flying, 13; distance, 700 miles.
- J. V. Eliot, passenger carrying and pleasure flying. Passengers, 664; machines, 4; pilots, 5; total personnel, 9; hours of flying, 153; distance, 6,900 miles.
- O. H. Clearwater, passenger carrying and pleasure flying. Passengers, 353; machines, 1; pilots, 1; total personnel, 2; hours of flying, 160; distance, 11,295 miles.
- W. P. A. Straith, passenger carrying and pleasure flying. Passengers, 21; machines, 1; pilots, 1; total personnel, 5; hours of flying, 15; distance, 1050 miles.
- K. R. Kerr, passenger carrying and pleasure flying. Passengers, 50; machines, 1; pilots, 1; total personnel, 3; hours of flying, 13; distance, 700 miles.
Brock and Weymouth.
Passengers, 48; machines, 1; pilots, 1; total personnel, 2; hours of flying, 47; distance, 4200 miles.

Forestry Branch, Ontario Provincial Government,—fire prevention, forest patrol, aerial photography and mapping.
Passengers carried, 2624; goods carried, 533,540 pounds; machines, 17; pilots, 16; total personnel, 53; hours of flying, 2740; distance 165,853 miles.

Pacific Airways, Ltd., general coastal work.
Passengers, 12; machines, 1; pilots, 1; total personnel, 2; hours of flying, 26; distance, 1200 miles.

Edward Hubbard,—mail service.
Mail, 61,000 pounds, machines, 1; pilots, 1; total personnel, 3; hours of flying, 265; distance, 20,660 miles.

CHILE

Military aviation in Chile is under the Minister of War. Major Elias Veloso is Director General of Military Aeronautics. Vice-Admiral Juan Schroeder is Director of Naval Aeronautics. All government-civilian and commercial aviation are also under the War Ministry. Aviation appropriations in 1925 were: Army, $235,716; navy, $207,000.

A contract between the government and Don Louis Testart authorizes the latter to establish for a period of 12 years an air line between Iquique and Puerto Montt with landings at any intermediate towns, and to carry the mails to the Argentine Republic by air.

It is reported that the Chilean Government has ordered 19 Junkers aircraft of the three engine type for military use.

CHINA

Aircraft material is contraband of war in China and is not permitted to be imported. According to G. W. Northridge, chief pilot for the Chinese government, it is the opinion of military officials of that country that were properly equipped fighting and bombing machines and a small quantity of war equipment allowed to be sold to the Peking government, China would be completely united in a few months and remain so.

Commercial aviation has not met with great success in China. The government ran a sight-seeing service in connection with the American Express Co. to the Great Wall, Ming Tombs, Forbidden City and other places of interest, all of which could be covered by plane in a couple of hours as against three days any other way, at a charge of only $20. They also ran a service during the summer to and from Peitaiho, a summer resort 20 miles from Peking. These services, however, were used only to a very slight degree and entirely by foreigners.
Colombia

Colombia was the first of the Latin-American countries to develop commercial aviation. The operations of the Sociedad Colombo-Alemana de Transportes Aereos were described in the Year Book for 1925. During 1925, 527 flights were made in 2,322 hours flying. The mileage was 183,206. The number of paid passengers was 1,134. The total pay load was 225,300 lbs., of which 26,343 pounds was mail.

The factors which the Scadta emphasize in their service are Time, Safety, Reliability and Comfort. This is considered as an example of a financially sound and successful aviation company, being one of the first in the world to more than pay its own way. The routes flown are: Barranquilla-Girardot, 622 miles, 3 times weekly; Girardot-Neiva, 94 miles, 2 times weekly; Barranquilla-Cartagena, 75 miles, 2 times weekly.

During 1925, valuables and currency to the amount of $1,895,426 were carried. First class mail is transported at 30 cents for every postal ounce of weight. The passenger fare from Barranquilla to Girardot is $200 one way and $150 for return trip. The flight takes about eight hours, all metal Junkers seaplanes being used. The company’s success has been attained partly by adequate terminal connections in the different cities. Colombia is the only country having a Federal law which provides that every railroad must organize a special gasoline car service to connect with arriving and departing airplanes on its established routes. The air mail from Barranquilla to Bogota takes 24 hours instead of 10 days by ordinary mail.

The company has an authorized capital of $200,000. Cash dividends have been paid as follows: 1922, 3%; 1923, 6%; 1924, 5%; 1925, 10%. The Scadta co-operates very closely with the government and is recognized as a necessity by the coffee growers, banks and by commercial interests and the public in general. The government recently has granted a special fund to be used by the Scadta Co. for the introduction of Dornier Wal ten-passenger seaplanes on the main airlines.

Cuba

The only air activities in Cuba are those of a small aviation section that the Cuban army has stationed at Camp Columbia. Military appropriations for 1925-1926 were $108,580.

Czecho-Slovakia

With the resumption of French and British flying across German territory and of German flying across Czecho-Slovakian territory,
Voughts (Wright J-4 engines) manufactured for Cuban Government.
all of which seemed likely in the spring of 1926, Czecho-Slovakia is destined to become the cross roads of many of the great international airways of the future.

Governmental civilian aviation (mails, patrol, etc.) and commercial aviation are under the control of the Aviation Section of the Ministry of Public Works. The total appropriation for commercial aviation for 1926 is 22,385,000 Czecho-Slovak crowns, including 6,600,000 crowns in subsidies. There are three air transport companies in operation, one foreign and two domestic.

The Compagnie Internationale de Navigation Aéronautique, of France, with a branch office at Prague, maintains a service between Prague, Vienna, Budapest, Belgrade, Bucharest, Constantinople and Angora. The route from Prague, via Strassbourg to Paris has been operated only in the section Strassbourg-Paris, owing to Germany's prohibition of flights over its territory. With this prohibition removed the service will shortly be opened. The company also operates the line Prague-Warsaw. It has 11 machines in Prague. Ten pilots and 80 laborers are also employed there. Czecho-Slovakia has acquired one-fifth of the capital of the C. I. D. N. A. and is represented on the board of the company. In return it pays one-fourth of the subsidy earned by the company.

The Czechoslovak State Air Lines (Československe Statní Aerolinie), controlled by the government, maintains an air service over the course Prague-Bratislava-Kosice, the total distance being 643 kilometers. The company has 17 machines. Eight Farman Goliaths are under construction. Ninety people are employed, of whom 8 are pilots.

The other domestic commercial line is operated by the Aero Co. between Prague and Marienbad, 120 kilometers.

Traffic data for 1925 is as follows:

<table>
<thead>
<tr>
<th>CIDNA</th>
<th>State Air Lines</th>
<th>Aero</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of flights</td>
<td>875</td>
<td>870</td>
</tr>
<tr>
<td>Kilometers covered</td>
<td>393,600</td>
<td>279,300</td>
</tr>
<tr>
<td>Hours flown</td>
<td>2,626</td>
<td>2,174</td>
</tr>
<tr>
<td>Passengers</td>
<td>541</td>
<td>602</td>
</tr>
<tr>
<td>Weight of merchandise in kilog</td>
<td>46,150</td>
<td>18,024</td>
</tr>
<tr>
<td>Weight of letters in kilog</td>
<td>1,130</td>
<td>284</td>
</tr>
<tr>
<td>Percentage of regularity</td>
<td>89</td>
<td>92</td>
</tr>
</tbody>
</table>

The Aeronautical League was formed by President Masaryk in March, 1926, Masaryk has also formed an Aeronautic Foundation, bringing together the various ministries for the development and propaganda of aviation.
DENMARK

Commercial aviation has been subsidized for the four years 1925-1928 with 350,000 Danish crowns per year. This has been given to the Danske Luftfartsselskab, which, in connection with the Deutscher Aero Lloyd, runs services Copenhagen-Berlin and Copenhagen-Hamburg and independently runs a morning service from Copenhagen to Hamburg, returning the same afternoon, this line being open only from July 1 to October 1. From September 4 to October 13 this company also carried out a series of trial flights between Copenhagen-Amsterdam-Paris.

These companies during 1924 covered 229,742 kilometers and carried 1,400 passengers, 22,949 kilograms of goods and 2,301 kilograms of mail. The Danske Luftfartsselskab flew 126,837 kilometers and carried 766 passengers, 12,813 kilograms of goods and 1,307 kilograms of mail. Besides these accounts, the company carried 3,304 persons on pleasure flights, covering 20,010 kilometers and flew 6,135 kilometers on extra flights and 14,400 kilometers on the Copenhagen-Paris flights. The service from Copenhagen to Berlin was operated with 90% regularity and Copenhagen-Hamburg with 97.5%.

Early in 1925 a new air traffic company, the Dansk Luftransport, was formed at Copenhagen. This company was fostered by the German Junkers Co., which held one-third of the capital, Junkers planes being used. This company was incorporated into the Europa Union.

EGYPT

Egypt is fast becoming an indispensable aerial junction on the ever broadening World airways. During the past winter, three long-distance flights have made Cairo an important stop before proceeding to the Far East or southward to Cape Town. The International character of these expeditions indicates likewise that airports in Egypt will figure prominently in the future development of commercial and military air transport in the eastern hemisphere.

Preparations have been started to construct suitable landing fields, and mooring masts at Kantara (on the Suez Canal) in connection with the British Air Lines to India which were surveyed in 1925. The forerunner of this activity and interest is presumably the successful fortnightly mail service between Cairo and Baghdad which the Royal Air Force has sponsored during the past several years.

Until a definite Egyptian Government air policy can be formulated, matters pertaining strictly to an Egyptian aviation service in all of its ramifications are attended to by the Egyptian Ministry of
Communications. At the present time, however, the British military forces are the only active factor in aviation.

FINLAND

Military aviation in Finland forms a special arm, independent of other branches. Civil aviation is directed by the Minister of Communications. There is one air transport company, the A. B. Aero O. Y., which operates as follows: Helsingfors-Reval (Estonia); Helsingfors-Stockholm (Sweden). The first line operates daily all the year. The trip by steamer takes four hours in the summer time and 24 hours in winter. Time by air is three-quarters of an hour. The trip from Helsingfors to Stockholm takes 6 hours by train in addition to 17 by steamer. It takes three-fourths of an hour by plane, flying along the coast.

FRANCE

France has remained supreme in the air in the number of military and civil planes, the number of first line military planes at the close of 1925 being something over 2,000. The French aircraft industry has an output of 3,000 planes a year. In all French industry there is no example of closer co-operation between public and private agencies than that presented by aviation. The industry is tributary to the French Under Secretary for Aeronautics, this contact between the government and the industry covering technical, manufacturing and commercial problems. After the war capital deserted the industry and applied itself to other interests. The government, determined to hold its dominant position among other nations with respect to aviation, created in the Ministry of Public Works an office of Under Secretary for Aeronautics, and since 1920 France has regenerated its aviation industry and commerce, subsidized factories and airlines and developed aviation to a very high degree, from the standpoint both of industrial production and commercial and military exploitation.

In 1925, most of the world records were held by the French. The control and management of French aviation is divided among four ministers: military aviation under the War Ministry; naval aviation under the Navy Department; aviation in the colonies under the Department of Colonies; and commercial aviation and general co-ordination under the Under Secretary of State for Aeronautics and Air Transports. This latter department is a division of the Ministry of Public Works. It really constitutes the French Air Ministry.
The functions of the Under Secretary of State for Aeronautics and Air Transport are to co-ordinate and supervise:

1. The technical development of French aviation material.
2. To place the orders for all the aviation material used by the War and Navy Departments and the Department of the Colonies.
3. To supervise and develop the various air transport lines.
4. To supervise and develop the meteorological bureau.

In order to perform these functions various bureaus have been created. The War, Navy and Colonial departments and the commercial lines, which use aviation material, submit their programs to the technical service (or bureau) which, after study, submits them, in a technical form, to the airplane constructors. "Prototypes," or first models, are constructed and when constructed are tested by the technical service. When satisfactory tests have been made, the different ministries place their orders. At this stage the Fabrication Service (or bureau) assumes charge. This service supervises the manufacture of the materials and planes ordered at all stages of their construction, beginning with raw materials and continuing up to the final trial tests. Many of the world records held by France were attained at these tests. The testing period of a plane is sometimes lengthened to two or three years. The great value of this system is to aid the entire industry and prevent over crowding any one firm with orders. Payment is made on a basis of cost plus a reasonable profit. The government reserves the right to purchase the license to construct any new type of apparatus.

The Air Navigation Service (or bureau) includes among its functions:

1. The establishing of air line systems.
2. The supervision of the personnel and of the material of these companies.
3. The granting of concessions to air lines to be operated.
4. The supervision of the companies operating the various air lines.

The Meteorological Office gives out weather reports to all air navigators, military, naval and civilian. It is in constant touch with all the territories traversed by all commercial air lines. Its scientific section is constantly seeking and testing the latest technical developments.

The Under Secretary of State for Aeronautics establishes liaison between the various ministries, holding periodical inter-ministerial conferences. Laurent Eynac is Under Secretary of State for Aero-
nautics and M. Camerman is Director of the Department of Aerial Navigation.

There are five French air transport companies:

The Air Union Co.
La Compagnie Generale d'Enterprises Aeronautiques. (Latecoere Lines.)
La Societe Generale de Transport Aeriien. (Farman Lines.)
La Compagnie Internationale de Navigation Aerienne. (Formerly known as the Franco-Roumaine Co.)
L'Aeronavale Co.

These companies operate in and serve distinctly separate sections of France and adjoining countries. There is no competition. The companies are supervised by, have contracts with and receive subsidies from the French Government. These companies have a total fleet of about 200 planes. In 1925, 4,712,888 kilometers (about 2,945,000 miles) were flown; 19,768 passengers were carried; 949,125 kilograms of express and 980,515 kilograms of mail were carried.

Government support of commercial air transportation is more liberal in France than in any other country. The Air Union and the Latecoere Lines have a ten-year contract with the government, the others only annual contracts. The companies are required to use only flying apparatus of French construction and to have French citizens as their presidents, managing directors, accounting officers and directing personnel, as well as two-thirds of their boards of directors.

Subsidies are of three kinds, a purchasing premium, amounting as a rule to half the final cost, a premium in proportion to the distance flown, increasing with the size of the airplanes employed and a premium in accordance with the useful or pay load which the airplane will carry. Thus the Air Union receives 15.75 francs per kilometer flown with Goliaths and 7 francs per kilometer flown with Breguets or Spads, and in addition 1.75 francs for each 200 kilograms of useful load capacity in flight. An extra premium is given at the end of the year to cover actual deficits not in excess of one-half of the “route premium” for ten-year contracts or more than one-third the “route premium” for annual contracts. If a company shows a profit, it is divided on a basis of 40 per cent to the company and 60 per cent to the government. The budget for civil aeronautics for 1925 totalled 152,581,700 francs, including 57,330,000 francs in subsidies. For 1926 the total was 152,575,000, including 70,045,000 for subsidies. Military and naval appropriations are not available for publication.

The Air Union Co. in 1925 operated between Paris and London,
375 kilometers, or 233 miles. The company is required to make one flight daily, except Sunday, to and from London. From May 1 to October 1, two daily services are required, with departures at 12:30 and 4 o'clock. Planes operated depend on the number of passengers. The maximum number of passengers carried for any one day during 1925 was on August 1, when ten planes departed and nine arrived. One hundred and twenty-one passengers were transported, of which 63 went from Paris to London. During 1925 this company flew 617,890 kilometers and carried 7,708 passengers, 514,925 kilograms of express and 1,251 kilograms of mail. The subsidy given this company in 1925 was 8,500,000 francs. The Air Union's fleet numbers sixteen planes, of which twelve are multimotored Goliaths. Two new 18-passenger ships are under construction.

The Air Union has one chief pilot, nine other pilots and eleven mechanics who fly on the planes. The non-flying staff is composed of two engineers, two superintendents and 130 mechanics. The shops are at Le Bourget (Paris) Airport and at Croydon (London). The Latecoere Lines operate from the south and east of France to Morocco and along the Spanish coast to the French Colonies, in Northern and Eastern Africa. Starting from Toulouse this line touches at Perpignan, Alicante, Malaga, Tangiers, Rabat and Casablanca. From Casablanca there are extensions to Fez, Oran and Algiers. The service between Toulouse and Casablanca is daily, that between Casablanca and Oran weekly, while a branch from Alicante to Oran runs four times a week and a branch from Alicante to Algiers weekly. A line from Marseilles to Perpignan runs daily, except Monday. A weekly service is operated down the west coast of Africa from Casablanca to Dakar. A line of fast steamers is projected to run from Dakar to Pernambuco, Brazil, to make connections with an air line down the South American coast reaching Rio de Janeiro, Buenos Aires and Montevideo. The line along the African coast touches Agadir, Gap Judy, Ville Gisneros, Port Etienne, Saint Louis and Dakar.

Latecoere traffic during 1925 was as follows:

<table>
<thead>
<tr>
<th>Kilometers Flown</th>
<th>Passengers</th>
<th>Express, Kg.</th>
<th>Mail, Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toulouse-Casablanca</td>
<td>1,497,318</td>
<td>4,866</td>
<td>70,280</td>
</tr>
<tr>
<td>Casablanca-Oran</td>
<td>158,403</td>
<td>576</td>
<td>3,927</td>
</tr>
<tr>
<td>Marseilles-Perpignan</td>
<td>173,449</td>
<td>153</td>
<td>1,070</td>
</tr>
<tr>
<td>Oran-Alicante</td>
<td>124,090</td>
<td>38</td>
<td>2,178</td>
</tr>
<tr>
<td>Alicante-Algiers</td>
<td>51,458</td>
<td>18</td>
<td>226</td>
</tr>
<tr>
<td>Casablanca-Dakar</td>
<td>398,570</td>
<td>312</td>
<td>886</td>
</tr>
<tr>
<td>Total</td>
<td>2,403,288</td>
<td>5,903</td>
<td>78,567</td>
</tr>
</tbody>
</table>
Latecoere is the only French company that carries mail to any great extent. More than two-thirds of the mail between France and Morocco goes by air. Letters carried in 1919 numbered 9,124. In 1925 they numbered 7,502,191. The total number of planes used by this company is 120. Of these 100 are Brequet “No. 1,” a single motor two-seater biplane, carrying five passengers and a commercial load of 635 kilograms. The company employs 60 pilots and 200 mechanics. The shops are at Toulouse and Casablanca.

La Societe Generale de Transport Aerien (Farman Lines) operates between Paris-Brussels-Amsterdam, 460 kilometers. At Amsterdam it connects for Hamburg-Copenhagen and Malmo, through traffic arrangements with the Dutch Co., K. L. M., the Danish Co., D. D. L., and the Swedish Co., A. B. Aero Transport. In the event of an agreement being reached, the Farman Lines will, it is expected, operate the route, Paris-Cologne-Berlin, jointly with the Deutsche Luft Hansa, the Farman company operating one day and the German the next. Between Paris and Amsterdam there is one service each way daily, the fare from Paris to Amsterdam being 350 francs one way or 660 francs return and the fare from Paris to Brussels, 250 francs.

The Farman Lines were paid a subsidy of 2,600,000 francs in 1925.

Traffic in 1925 was as follows:

<table>
<thead>
<tr>
<th>Kilometers Flown</th>
<th>Passengers</th>
<th>Express, Kg.</th>
<th>Mail, Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris-Amsterdam</td>
<td>311,139</td>
<td>3,081</td>
<td>105,761</td>
</tr>
</tbody>
</table>

Eight planes were used, most of them being multimotored. The company personnel numbers 28, including 8 pilots.

La Compagnie International de Navigation Aerienne (formerly Franco-Roumaine Co.), connects Paris with Prague, Vienna, Budapest, Belgrade, Bucharest and Constantinople. Its lines traverse Czecho-Slovakia, Poland, Austria, Hungary, Jugo-Slavia, Roumania and Turkey. It is the intention of the company to extend its lines into Mesopotamia and Syria during 1926 and to India, in conjunction with the British Air Lines.

The German Junkers Co. and the Dutch Air Line, K. L. M., and the Franco-Roumaine Co. have struggled since 1922 to gain control of the air traffic to the far east. Great Britain likewise was desirous of opening a route to Constantinople and thence to India. As Constantinople seemed to be the gateway to all the feasible routes to the east, each of these countries have tried to establish a foothold there.
It now seems likely that the scheme will become international and that a continuous air service from Europe to the Far East is nearing realization. Owing to its various agreements with the countries of the Little Entente as well as with Austria, Hungary and Bulgaria, Cidna is very strongly entrenched, politically and economically, on the route from Paris to Constantinople. The company has come to an agreement under which Cidna will run the service from Paris to Bagdad while the Imperial Airways will operate from there on to India and Burma.

Present negotiations between the Germans and French will probably result in some sort of agreement as to handling their interests in the East, although the Junkers system and the French system vary greatly.

During 1925, owing to the interdiction of the German Government for French planes to fly over Germany, Cinda, in order to reach Central Europe by the most direct route, has been obliged to make a detour, flying by way of Basle and Innsbruck. This route is longer and entails the crossing of mountain ranges.

The first trial flight of a commercial plane between Paris-Constantinople-Teheran by way of Syria was made by Cinda in 1925. The 3,316 kilometers were traversed in 34 hours.

During 1925 traffic by Cinda was as follows:

<table>
<thead>
<tr>
<th>Kilometers Flown</th>
<th>Passengers</th>
<th>Express Kg.</th>
<th>Mail Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris-Constantinople 1,045,550</td>
<td>2,283</td>
<td>238,530</td>
<td>3,944</td>
</tr>
<tr>
<td>Prague-Warsaw 263,145</td>
<td>195</td>
<td>11,037</td>
<td>633</td>
</tr>
<tr>
<td><strong>Total</strong> 1,308,695</td>
<td>2,478</td>
<td>249,567</td>
<td>4,577</td>
</tr>
</tbody>
</table>

Fares from Paris to Bucharest were 1,770 francs, from Paris to Warsaw 1,300 francs, from Paris to Constantinople 2,400 francs, and from Paris to Angora 2,800 francs. The subsidy received by this company was 15,250,000 francs from France and a total of about 3,000,000 additional from Czecho-Slovakia, Poland, Jugo-Slavia and Roumania. The equipment of Cidna consists of 80 planes. The company employs 50 pilots and 500 mechanics.

The Aeronavale Company operates a line of seaplanes between Antibes, France, and Ajjaccio, Corsica. During 1924 and 1925 the company also undertook a series of trial flights to Tunis. At the close of 1925 everything was in readiness for the opening of lines, Antibes-Ajjaccio-Tunis and Antibes-Ajjaccio-Bone. The regular service in 1925 has been between Antibes-Ajjaccio, 240 kilometers, trips being made three times weekly. The seaplanes are equipped
with radio and are in constant communication with the termini of the line. Traffic during 1925 was as follows:

<table>
<thead>
<tr>
<th>Kilometers Flown</th>
<th>Passengers</th>
<th>Express Kg.</th>
<th>Mail Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibes-Ajaccio</td>
<td>71,818</td>
<td>53</td>
<td>314</td>
</tr>
</tbody>
</table>

Subsidies amounting to 1,925,000 francs were paid this company. The fare was 220 francs one way. Equipment consisted of 13 seaplanes. The company has 8 pilots and 30 other employees.

In March, 1925, the French Air Force numbered 140 squadrons, besides those in process of formation. At the close of 1925 there were in the service 2,180 first line planes. There are two pursuit regiments, two day and two night bombardment regiments and nine observation regiments.

At the beginning of 1925, French naval aviation was composed of 10 squadrons, 220 officers and 3,650 men. Naval aeronautics has been undergoing important modifications as the Secretary of the Navy found it expedient to give flying a more prominent position. A bill is pending which will put naval aviation on more or less the same status as army aviation. The plan is to increase the navy air force to 50 squadrons of 500 machines, of which 35 squadrons will be kept at full strength.

The War Department places at the disposal of the Department of the Colonies a certain number of aviation units. There are 78 machines in the service of the Colonies in Indo-China and at Dakar.

There are forty factories manufacturing airplanes in France, ten of which are classed as important. Of the 21 companies producing aircraft engines, 7 are relatively important. In 1925 about 3,000 planes were produced. It is estimated that under war conditions at the end of six months, France could produce from 12,000 to 15,000 aircraft yearly.

La Bourget, the Paris airport, is probably the largest and best appointed airdrome in the world. The meteorological service has been very carefully developed and modern night flying installations are being made. Statistics show that about 45 per cent of the passengers arriving and leaving the airdrome are Americans, about 30 per cent English and the rest scattering. French aircraft exports are as follows:

<table>
<thead>
<tr>
<th>Exported fr.</th>
<th>1921</th>
<th>16,070,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1922</td>
<td>29,646,000</td>
<td></td>
</tr>
<tr>
<td>1923</td>
<td>60,848,000</td>
<td></td>
</tr>
<tr>
<td>1924</td>
<td>125,736,000</td>
<td></td>
</tr>
</tbody>
</table>
GERMANY

Undeterred by the limitations imposed upon her by the Versailles Treaty, Germany continues to expand her civil air fleet and today is perhaps the leading nation in commercial aviation. These very limitations, indeed, are frequently credited with being to a considerable extent responsible for the expansion. Prevented from building military airplanes, Germany turned its attention to developing planes designed exclusively for civil traffic. Other countries contented themselves with converting military planes to traffic purposes. The greater steadiness, comfort and safety of the newer German planes, backed by a definite national policy, have made the Germans accept and use air navigation much sooner and more generally than other countries. The planes being low powered, a large number of lines can be run at minimum expense, the Germans finding them cheaper and more speedy than first class accommodations on their railways. Germany has today more than 45 air lines, while Great Britain has 5. Germany has 19,000 miles of airways in its borders, England has 70. Of the 132 lines operating in the world, Germany controls 62.

In discussing the new developments in German commercial aviation, Lord Thomson, Air Minister in the British Labour Government, said that, "By the use of new devices they have succeeded in cheapening this form of locomotion. The keenness of the German people for air travel holds out the prospect of mass production in airplanes and consequent reduction in running costs. The German Government is taking advantage of these facts to build up a commercial air service and subsidizing the firms concerned. As a commercial service will in the future be a valuable reserve for the Air Force," he added, "the motive behind this action is obvious."

The avowed purpose of Germany is non-militaristic, the phrase of "peaceful penetration" having been adapted to air activities. It is summed up in the words of the general manager of the Junkers Airways Companies:

"The first necessity for commercial air transport is to discover a mode of co-operation free from the oppression of political force and thus to establish the basis for an understanding in air policy. An imperialistic air policy is unsuited to progress in air transport. The German concerns must try early to utilize the fund of their commercial and technical capacity in the service of transcontinental traffic whilst avoiding the temptation to seek the honors of economic imperialism."

"If we want peace in Europe and with America a considerable part of German commerce must look, not overseas, but to the Asiatic
Continent for a market and for a source of raw materials. The time has come when the financial and economic forces of Central Europe seek the road to the East. Thus European air policy stands before the task of uniting all efforts in enduring unions (associations of air lines in different countries) which shall draw the nations together.”

French papers have declared that Germany was carrying out mass production of metal airplane parts in highly organized German factories in Holland, Switzerland, Russia and Italy and that she would require less than a night for thousands of military airplanes to fly to numerous airdromes over Germany. They insist, also, that large numbers of pilots are being trained as commercial pilots, in order that a force may be ready to fly these assembled ships. Both accusations are denied by the Germans. The first military airplanes to be constructed by German engineers since the World War have just been completed by the Svensk Flug Organization in Malmo, Linghamn, Sweden. This firm, while organized under a Junkers contract and license, is capitalized sufficiently by Swedish money to enable it to avoid the treaty restrictions. Six armored planes, which are built of duralumin, having an armored cabin with a revolving turret and with space for two operators and two heavy machine guns, capable of shooting in all directions, have been sold to Chile.

There is, doubtless, a compelling force in Germany behind their amazing growth in aviation. The nation is being educated into a belief, if it is not already convinced, that its future is bound up with ariel development and that through it the nation will eventually re-establish a dominant position in world affairs. The obvious determination of the government is not only to develop aviation but by its means to extend its power into other nations. It has already bound together the northern European countries and has gained a foothold in Eastern Europe, Asia, South Africa and South America. The British papers frequently express fear that the German lines are planning to operate in England. The plan of penetration, as carried out by the Junkers Company, is to start a concern under the flag of a foreign country, but direct and finance it so that it is essentially a German company.

Meanwhile the Nine Rules imposed by its victors in the World War seem to have a more deterrent effect upon Great Britain than upon Germany, and many officials in Great Britain are urging that they be abolished. Large British planes needed for passenger traffic, especially on long routes, are not permitted to fly across Germany. France, likewise, is compelled to seek routes across Switzerland, where the high altitudes require high powered ships. Negotiations
are being carried on and it is hoped that the restrictions will be abolished.

The most important event in German aviation was the amalgamation early in 1926 of the Aero-Lloyd and the Junkers Aircraft Company, the new company being called the Deutsche Luft Hansa A. G. The Government was represented at the time of the fusion and will have some voice in the control of the company. In fact, it is said that the Reich, rather than scatter its subsidies among individual competitive units, forced the amalgamation. The two companies having operated on radically different principles it was necessary to cease all operations for a few months, the new services starting in April. Both the Aero-Lloyd and the Junkers were extremely large concerns, operating extensive air lines throughout Germany and neighboring countries. The Aero-Lloyd was exclusively an air transport company. It employed such airplanes as appeared to the operating staff to be most suitable to the particular service, regardless of the constructors, provided that they were of German manufacture. This policy developed the construction of economic, low-powered planes. This company also co-operated with other air transportation companies in Europe, notably the British Imperial Airways, and the Dutch K. L. M.

The Junkers Air Transport was, in reality, more interested in providing a market for Junkers planes, being of the opinion that it is vitally important for the technical engineers to work in closest connection with the operators. The Junkers Company, therefore, entered into the amalgamation unwillingly. The Junkers Constructional Company will remain independent, taking no direct part in the operation of subsidized lines in Germany. Prior to this amalgamation the Junkers Company had obtained control of companies in northern and eastern Europe by providing machines, taking shares in payment and controlling or supervising the management. In May, 1925, the company had formed the Europe Union, comprising 21 companies, and the largest air traffic combination in the world.

The government subsidy is to be continued, provided that it does not exceed 11 pfennigs for each person in Germany, which makes a total of about 7,000,000 marks. The new organization is in control of all the principal air routes in Germany. Their plans announced for April, 1926, including 45 routes, comprising 17,000 kilometers, the planes flying 34,000 kilometers each day. One hundred and twenty planes are in service, a large portion being multi-motored.

German air traffic in 1925 was much greater than in 1924. Express traffic was one hundred times and air mail thirty times as great. From January to the end of November, 1925, The Junkers
Company made 30,000 flights, carrying 80,000 passengers, 370 tons of freight and 250 tons of mails. 2,812,500 miles were flown. In 1921, 2,230 passengers were carried; in 1922, 11,005; in 1923, 26,509; in 1924, 40,298, and in 1925, 93,242. An experimental night service was run between Copenhagen and Warnemunde. Night flying over the Baltic Sea was carried on for seven months. In the first month the route Berlin-Stockholm was flown but later it was extended to Copenhagen. In the last four months this route was run with 100 per cent regularity. Lines added in 1925 were Berlin-Dorsten-Amsterdam, Brremen-Wangeroog-Norderney-Borkum; Bre­men-Borkum, Frankfurt-Giessen, Hamburg-Westerland. (See Air­craft Year Book, 1925.)

During the first six months of 1925, the Aero-Lloyd Company flew 900,000 kilometers, carried 15,200 passengers and 103,000 kilograms of freight and luggage. Statistics of the company show that 45 per cent of the persons using the air traffic are merchants, 15 per cent belong to technical professions, 14 per cent are farmers, actors and hotel proprietors, 11 per cent doctors, 8 per cent officials and 7 per cent lawyers.

During November the Aero-Lloyd Company transported books and papers; electric and chemical articles; automobile, motorcycle and pianoforte parts; clothing and textiles; flowers; musical instruments; films; hides; glass and porcelain; lamps; precious metals and live stock. Night air mail service was operated from July 1 to October 1, more than ten tons of mail, newspapers and goods being carried. New routes started in 1925 were Munich-Reichenhall, Berlin-Hanover-Dortmund, Dortmund-Rotterdam-Amsterdam, Leipzig-Halle-Dortmund, Berlin-Hamburg-Kiel, Berlin-Hamburg (night service), Hamburg-Hanover-Frankfort, Mannheim-Karlsruhe-Baden-Baden-Villingen-Constance, Constance-Lindau, Karlsruhe-Stuttgart, Berlin-Basle. (See Aircraft Year Book, 1925.)

Reports show that in various localities small operating companies are constantly being started by communities. Among those not included in the amalgamation are: Luftreederei Magdeburg, G.m.b.H., Magdeburg, Gr. Krakauer Anger; Luftverkehr Osnabrueck, G.m.b.H., Osnabrueck; Luftbild, G.m.b.H., Berlin W 10, Rauchstrasse 23; Paul Straehle, Scherndorf, Wuerttemberg; Stahlwerk Mark, Breslau A.G., Breslau 2, Osthandelshaus, Teichstrasse 21, and Berlin W 8, Friedrichstrasse 181; Dietrich Flugzeugwerke A.G., Cassel, Wolfs­angerstrasse 21a; Deutsche Luft-Licht-Reklame, G.m.b.H., Dresden A, Rossener Strasse 2; Caspar-Werke A.G., Travemuends-Privall; Aero-Sport, G.m.b.H., Warnemuende; Baumer Aero, G.m.b.H., Hamburg-Fuhlsbuettel, Flugplatz; Ahrens & Schulz, Hamburg 36,
Officially there are no military or naval appropriations because forbidden by the Treaty of Versailles. To make up for this deficit there are federal, state, provincial and municipal appropriations for commercial aviation, altogether estimated at about 30,000,000 marks for the calendar year 1926.

Federal subsidies are made through the Ministry of Transport and Communication. They take the form mainly of a bonus for every kilometer flown. This bonus amounts on the average to about 2 marks per kilometer, operating costs being about 2.90 marks per kilometer.

Besides the bonus there are also federal grants of a smaller nature for radio direction finding apparatus, technical exhibitions, competitions, prizes, weather reports, insurance, scientific research, etc. These grants are considerably increased for 1926.

State and municipal subsidies are as a rule for ground work upkeep, lighting equipment and other installations too expensive for private initiative. In the second week of February, 1926, an appropriation of 2,500,000 marks was voted by the Prussian Landtag to purchase shares in the new Luft Hansa corporation.

All air companies are required to carry air mail against payment if required to do so by the postoffice. The air companies are obliged to carry 100 kilograms of air mail free on all stages for which they receive state subsidy. Exceeding that amount payment is settled between the contractor and the postoffice. All postoffices are provided with posters giving a map of the air mail system, time tables, etc. The postoffice issues a guide containing information and distributes leaflets giving information. Letters are stamped with the words “Use the air-mail” and special air mail boxes are set up in larger towns.

There are 26 companies in Germany equipped for the manufacture of airplanes and 7 for the production of engines. Five of these are important, three of medium size and the others small. Besides these there are Junkers factories in Russia, Sweden and Poland, Fokker plants in Holland, Dornier plants in Switzerland and Italy, Rohlback Works in Denmark and Casper in Sweden.

Beginning May 31, 1925, the “Rundflug,” a series of trials for light airplanes, was held. Prizes totalling $75,000 were offered and
ninety-one planes were entered. The race was flown over five courses, extending into practically every part of Germany. Reliability and safety in landing were the important points in the contest.

**GREAT BRITAIN**

Adjustment and preparation, rather than any spectacular advancement, marked the development of aviation in Great Britain during 1925. Commercial operating companies were attempting to get on a practical, safe and paying basis, and development of military aviation along the lines of defence was made conformable to the spirit of the Treaty of Locarno.

British commercial services are under the direction of the Air Ministry. The Department of the Air Ministry dealing specifically with civil air service is the Directorate of Civil Aviation. Air Marshall Sir W. Sefton Brancker, K.C.B., A.F.C., is the Director. He is the responsible member of the Air Council and Under Secretary of State for Air.

The only company which operated regular air transport services in England during 1925 was Imperial Airways Ltd., Air Port of London, Croydon and Wolseley House, 157, Picadilly, W. I. Sir Eric Geddes, G.C.B., G.B.E., is Chairman of the Company. Lines were operated as follows:

**Winter.**

- London-Amsterdam: Once daily, except Sunday.
- London-Berlin: January and February machines flew through from Amsterdam to Berlin on alternate days in conjunction with Deutscher Aero Lloyd. November and February—No service.
- Southampton-Guernsey: Channel Island service was suspended ten months of the year and a series of experimental flights carried on during the next two months. In December the route was reopened and now operates once a week in each direction, leaving Southampton each Wednesday morning and return from Guernsey that afternoon.

**Summer.**

- London-Paris (Basle-Zurich): Three return services a day were flown to Paris, the early morning service from London flying through from Paris to Basle and Zurich. This London-Paris-Basle-Zurich Service commenced April 7, and continued until October 3. It was not possible to continue throughout the winter as the Swiss authorities could not keep the airdromes open specially for this line.
- London-Ostend-Brussels-Cologne: An early morning and an afternoon service to Ostend was carried out daily including Sunday from June 15 to August 30. One service to Cologne flew direct and another service flew to Cologne after landing at Brussels.
London-Amsterdam: One service a day was carried out which was duplicated as and when required. This service connected with the Deutscher Aero Lloyd and with the Aero Transport Co., Ltd., at Amsterdam.

**Intermediate Months.**

London-Paris: Once daily, including Sundays.
London-Brussels-Cologne: Once daily, including Sundays.
London-Amsterdam: Once daily, excluding Sundays.

The number of passengers carried during 1925 was 11,027. Freight amounted to 1,171,912 lbs. and mail to 65,760 lbs. The total mileage was 805,685 miles. The Imperial Airways fleet consisted of 16 planes, of which six were multimotored. Employees numbered as follows: pilots, 18; other personnel (summer), 353, including 243 technical staff; (winter), 270, including 171 technical staff.

The summer season for 1926 began on April 19 with the following services:

London-Paris: Three flights daily, each direction.
London-Paris-Basle-Zurich: Once daily, each direction.
London-Brussels-Cologne: Once daily each way connecting at Cologne with air services to Berlin, Frankfort, Stuttgart and Munich, Hamburg and Copenhagen.
London-Amsterdam: Once daily each way, connecting at Amsterdam with services to Hamburg, Berlin, Danzig, Konigsberg, Kowno, Smolensk and Moscow, connecting at Hamburg with services to Copenhagen and Malmo.

There has been an increase in the weight of letter mail dispatched by air, the total now being 15,520 lbs. The increase has been most marked in the mails to Paris and to Morocco and Algeria, which have increased by 19 per cent and 33 per cent respectively. By the latter service, 2,500 lbs. of letters was dispatched during the year.

The air parcels service continues to carry a substantially greater volume of mails than the letter service. The total weight of the parcel air mails on the whole of the continental services in operation was 50,000 lbs., including Paris express, 13,600 lbs.; non-express, 10,200 lbs.; Holland, 13,200 lbs.; Germany, including the Rhine Army, 13,000 lbs.

A provisional agreement has been signed by the Air Ministry with Imperial Airways for the operation of an air route from Katara, Egypt, to Baghdad, Iraq, and Karachi, India. The points of call on this route will be Gaza, Palestine, Baghdad, Basra, Bushire and Bunder Abbas. Operations will start in January, 1927, with a fortnightly service which will be increased as traffic develops. This route covers 2,500 miles and the distance will be covered in 2½ days.
as compared to 8 days at present. The Royal Air Force is now carrying mail over this route. It is expected that eventually it will be a part of an airship route from London to India.

According to an agreement made early in 1924, at the time of the amalgamation of various operating companies into the Imperial Airways, Ltd., a subsidy amounting to £137,000 was paid this company during 1925. This agreement called for a subsidy or “loan” of £1,000,000 spread over 10 years. This company is also to receive a yearly subsidy of £93,000 for five years in connection with the route from Katara to Karachi. The government also provides airdromes and hangars.

Making due allowances for difficulties that accompanied the attempt of the Imperial Airways to amalgamate four services into one, including a strike during the summer of 1924, the experience of the company has not been entirely satisfactory either as regards financial returns or service. At the first ordinary general meeting of the company, held in December, 1925, it was indicated that great progress was anticipated within the next few years. In the year 1924 the net loss was £15,217. A large proportion of the deficit is accounted for, by items in round numbers, of £20,000 for insurance, £23,000 for obsolescence, and £63,500 for maintenance and ordinary depreciation. Although the item for maintenance seemed very large, it was stated that an analysis of French, German and American figures showed that the English lines were the most economically operated. The item of obsolescences will decrease as the old aircraft of the original fleet are displaced by modern planes.

The record also shows a decrease of traffic in 1925. Up to the first of April, 1925, records showed that while the total number of passengers carried between England and the continent increased to 17,835 (a net gain of about 3,000), those carried in British aircraft decreased from 11,648 to 10,350. French traffic on these routes rose from 2,107 to 5,645, and that of Dutch machines from 991 to 1,830. It is a matter of record that many passengers booked to ride on the Imperial Airways machines were turned over to French machines because British machines were unfit for duty or because they could accommodate comparatively few passengers. Complaints were made that flights were not made on schedule and that laxity was shown in the handling of mails. In regard to goods, however, the figures show an increase from 427.1 to 507 tons. The monetary value of air imports has increased from £604,570 to £841,103, and for exports from £278,663 to £487,292.

According to the agreement with the Air Ministry, Imperial Airways must fly on an average of 1,000,000 miles yearly for the first
four years. Criticism has been made to the effect that it was often cheaper not to make scheduled flights as long as the required mileage was flown, the few passengers the planes could carry not paying the expenses of the trip. The costs of running big machines were proved to be lower in proportion to the load carried, but their subsidy earning value on the two-shilling per mile basis was proportionately less than that of the small craft. Thus the spirit of the original agreement which was intended to encourage commercial flying seemed to have been defeated.

A new agreement has, therefore, been made with regard to the subsidy. High powered aircraft are to be subsidized at a proportionally higher rate, the agreement being to pay subsidy of two shillings per mile on every 425 horsepower. For marine craft one mile is equal to one and one-half mile of land craft. Thus the subsidy can be earned by less mileage and fewer journeys at an increase in the commercial load carried. This arrangement is likewise open to criticism, at least as far as short continental routes are concerned. Larger machines and fewer flights, doubtless more economical on long flights, are hardly expected to solve the problem where frequency of service is as important an item as it is between England and the continent.

Imperial Airways has announced plans for the purchase of large three-engined planes, but have up to the present replaced their old craft with a fleet of Handley Page W 10s, six of which were ready in April, 1926. These machines have two engines and accommodate 14 passengers.

In reviewing his six years' experience in civil aeronautics, Sir W. Sefton Brancker, on the occasion of his assuming the presidency of the Royal Aeronautical Society, made the statement that he was convinced of two facts. "First that we cannot attain commercial progress without considerable further technical progress, and secondly, that we can not insure this technical progress without a growing body of operational experience. Today the production of military aircraft offers great rewards to designer and constructor alike. There will come a day," said Sir Sefton, "when the demand for military aircraft will sink into insignificance besides the requirements of the air routes of the world. We, as a nation, must keep our place in the front rank of this new industry. We depend on our communications for our existence to a far greater degree than any other people in the world, and unless we maintain these communications at the highest pitch of efficiency and rapidity made possible by every new scientific engineering and mechanical development, our great empire will assuredly melt away into the mists of the past."
Total estimates on civil aviation for 1925 were £357,000, and for 1926, £462,000. The latter included £180,000 for subsidies and £60,000 for fields and routes.

Aircraft other than on established routes flew 139,000 miles and carried 43,766 passengers from March, 1924, to March, 1925.

The DeHaviland Aeroplane Hire Service continued its taxi service and the activities of its flying school showed a marked increase in the number of pupils. Many highly successful flights were carried out to distant points on the continent.

The Berkshire Aviation Tours carried over 32,000 passengers during 1925. J. D. Parkinson, the senior pilot of this company, carried more than 10,000 passengers during the year without injury to passengers or damage to machines. This firm has paid a dividend of 7½% on its capital each year for four years.

The Savage Skywriting Co. have operated in Great Britain, the United States, France, Canada, Cuba and the Scandinavian countries. During the year 800 hours were flown. The company operates 22 machines with 4 more under construction.

There were, at the end of 1925, 12 aircraft manufacturing plants in Great Britain. There were four firms producing engines as well as one large firm specializing in the manufacture of aircraft instruments. The combined capitalization of these companies is £3,077,000. This includes, however, the total capital of Vickers, Napier, Rolls Royce and smaller companies in which aircraft work is a small proportion of their activities. Approximately 12,000 employees are engaged in the manufacture of planes, engines, and instruments. The estimated 1925 production of this industry was 900 planes, of which 500 were for land operations, 250 for the marine, and 100 for civilian use.

It is estimated that the potential production in the British aircraft industry, at the end of six months, is 4,000 planes per year, with twice that number at the end of a year, provided sufficient spruce could be imported, instruments assembled, etc.

A start has been made which will give London the finest airplane station in the world, the plan being to spend £225,000 in improving the Croydon airdrome.

In 1925 Great Britain imported aeronautical material to the value of £7,939. Her exports amounted to £948,258.

The Secretary of State for Air and President of the Air Council is Lieut.-Colonel The Right Honourable Sir Samuel John Gurney Hoare, Bart., C.M.G., M.P. Major Sir Philip A. G. D. Sasson, Bart., G.B.E., M.P., is Under Secretary of State for Air and Vice-
President of the Air Council. Air Chief Marshal Sir H. M. Trenchard, Bart., G.B.C., D.S.O., is Chief of the Air Staff.

The Air Estimates for 1926-1927 show a net increase over the 1925-1926 estimates of £486,990. The gross estimate is £20,864,500, but appropriations-in-aid are expected to reach £4,864,500, thus reducing the total to £16,000,000 as compared with a net budget of £15,513,010 for last year. The total air personnel is 35,000.

As a result of the Locarno pact the government has agreed to "postpone" or slow down the scheme of expansion in the Air Force which was initiated in 1923. At that time the home defense was to be increased to 52 squadrons (39 regular) by the year 1928. This slackening has made it possible to avoid large increase in expenditures and left the way open for review, in accordance with international discussions on disarmament, although the delay is only temporary.

In anticipating this action, Sir Samuel Hoare announced that England was in the fortunate position of being able to consider expenditure upon defense in a calm atmosphere. While too early to say how completely the hopes of Locarno would be realized, in the minds of many the signing of the treaty had turned the thoughts of governments from the threatenings of war to the pursuits of peace.

The Royal Air Force, which has now 61 squadrons all told in the Empire, has been officially recognized by Parliament as the first line of defense of the British Empire.

The estimates of 1926 carry the airship program of Great Britain into its third year. In accordance with this program a contract for a 5,000,000 cubic foot airship has been placed with the Airship Guarantee Company and progress has been made in its design and of that of another of similar capacity which will be constructed by the Air Ministry.

GREECE

In August, 1925, a national aircraft defense organization was established in Greece by legislative decree, composed of officials, bankers, merchants and industrials. Its task is to collect the necessary funds for the development of the military and naval air services of Greece. Appropriations for the year 1925-1926 are: Army, Drs. 7,000,000; navy, Drs. 21,000,000.

HUNGARY

The Hungarian Air Traffic Co. (Magyar Legiforgalmi R. T.) operates a daily air service between Budapest and Vienna. This company began operating in 1923 and during 1923 and 1924 made 518 trips, flying 70,855 miles and carrying 1,054 passengers, 21,699
pounds of freight and 35,942 pounds of mail. No mail was carried during 1923. There were no fatalities and only 15 trips were abandoned because of unfavorable weather. The company uses six-passenger Fokker machines.

INDIA

In March, April and May, 1925, the Royal Air Force in India conducted a campaign in Waziristan against recalcitrant sections of the Mahsuds. The operations were carried out by 26 machines. The area covered was some fifty-sixty square miles in extent, including about forty objectives vulnerable to bomb attacks, varying from the larger villages of the Faridai and Maresai to the cave dwellings of the Abdur Rahman Khel and the scattered huts of the Guri Khel. This was the first occasion in India that the R. A. F. was used independently of the army for dealing with a situation which had gotten beyond the resources of the political officers. It is too early to judge how lasting the effect of this display of air power will be but it is claimed that the operations prove that in the R. A. F. the Government of India have a weapon which is more economical of men and money and more merciful in its action than other forms of armed force for dealing with the majority of problems which arise beyond the administrative frontier.

IRAQ

“Control without Occupation” is the phrase which Sir Samuel Hoare has given to denote the manner in which Iraq, thanks to the handing over of the command to the Royal Air Force, is supervised by Great Britain. This system by which the government is able to police the territory and to maintain law and order, was possible, before the advent of aviation, only by a relatively large army costing a great deal of money and tying up large numbers of men. The cost of administration in Iraq has dropped from £38,500,000 in 1920 to less than £4,000,000. Air Marshal Sir John Salmond said in April, 1925, that from a heterogeneous collection of wild and inarticulate tribes had emerged an ordered system of representative government by vote with a legislative assembly elected by the people themselves.

ITALY

By the organization of a separate Ministry for Air, with himself temporarily at the head, Premier Mussolini, already Minister of War and Minister of the Navy, has unified under his direct control the three ministries of national defense.
Everything pertaining to Civil Aviation is taken care of by the Civil Aviation and Air Traffic Office, which is subdivided as follows:

(a) Transportation.—This section supervises all commercial lines, establishes commercial routes, controls all private air navigation;
(b) Legislation;
(c) Aerology;
(d) Communications.—This section makes use of all means of communications to broadcast weather reports and supervises all means of communication directly used by the Air Corps;
(e) Administration.

Expenditures of the Royal Air Corps have been: 1924-25, 461,708,566 lire; 1925-26, 549,000,000 lire. According to the budget for the year 1926-27 an approximate amount of 629,000,000 lire will be required. The amount of 26,000,000 lire allotted to Civil aviation included only a small amount for subsidies, practically the entire amount being absorbed by general organization expenses, the building of landing fields and navigational facilities.

With the awakening of Military Aviation a great step forward has been made by Civil Aviation. Up to April, 1925, no Italian routes were in operation but now a fairly extensive scheme is being established.

"The Air Service," Mussolini writes, "has already assumed a well defined organization and corresponds, within its military framework, to the aims which it is called upon to attain in the important duty of collaborating to the defense of the realm. * * * The special difficulties which the geographical constitution of our country imposes on the development of commercial aviation are being gradually overcome and in the very near future Italian wings will cross the skies and the Mediterranean connecting with an intimate link its Western and Eastern shores. * * * Italian aviation projects its forces towards the future with a passionate faith in the fundamental importance which, in modern civilization, attaches to every attempt at the mastery of the air."

The following companies have been organized:

Società Italiana Servizi Aerei, Rome. (Turin-Venice-Trieste.)
Società Anonima di Navigazione Aerea, Genoa. (Genoa-Rome-Naples-Palermo and Genoa-Barcelona.)
Società Anonima Aero Espresso, Rome. (Naples-Brindisi-Athens-Constantinople.)
Società in Accomandita "La Transalpina", Rome. (Lousanne-Milan.)
Società Anonima Transadriatica Ancona, Ancona.
Compagnia Nazionale Aeronautica, Rome.
Airone, Campo di Ponte S. Pietro near Bergamo.

The routes starting April 1 were:

Trieste-Venice-Pavia-Turin. Three times a week for the first three months and daily thereafter. Six planes are used. The route is 575 kilometers. Ten
pilots and 24 other personnel are employed. The company has radio stations at Turin, Pavia and Trieste and leases one from the government at Venice. The state’s subsidy to the company is 11.44 lire per kilometer actually flown up to a maximum of 328,000 km. Besides this the company receives 1,500,000 lire a year for each 28,500 kg. of mail carried at no more than 80 kg. per trip. For excess mail the company receives 15 lire for each kg. of domestic mail and 25 lire for each kg. of foreign mail matter. The grant to the company is for ten years.

Genoa-Rome-Naples-Palermo. Twice weekly for the first month, three times weekly for the second month, four times weekly for the fourth month and daily thereafter. The distance is 1,070 km. Seven Dornier-Wal planes are used. Fourteen pilots and 20 other personnel are employed. The state’s subsidy is 3 lire for each km. flown during the first three months and 50,000 km. a year thereafter plus 800,000 lire for the Rome-Genoa-Barcelona route.

Brindisi-Athens-Constantinople. Three times a week for the first three months and daily thereafter. The distance is 1,300 km. Six S.55 planes are used. The state’s subsidy is 800,000 lire a year. Twelve pilots and 30 other experts are employed.

Marchese de Pinedo’s round trip flight to Tokio was the most remarkable flying achievement of the year in Italy. He left Rome in his Savoi S. 16 flying boat, fitted with a Lorraine-Dietrich 450 h. p. engine, April 21, and in six and a half months covered 3,500 miles. He flew over Baghdad, across India, down the Malay Peninsula, around Australia and to the Philippines. There he was forced down by a storm but reached Japan on Sept. 26, leaving Oct. 17. He returned more directly, flying by Rangoon and Bangkok to Calcutta, accomplishing the 15,000 miles of the return trip in twenty-two days.

JAPAN

The following air transport services are being conducted experimentally in Japan: Tokio-Osaka; Osaka-Mitajiri-Fukuoks, with a branch line from Mitajiri to Beppu; Sakai-Takamatsu-Tokushima. The total number of machines in use is 30. Each of these routes receives a Government subsidy of about 25,000 Y (about $10,000) per annum.

Many elaborate schemes for transport companies have been projected. At the session of the Diet in December, 1925, the Kato Government presented a proposal for a five year subsidy to an aerial transport company to operate between Japan and China, from Osaki to Shanghai and from Tokio to Darien. Ten million dollars would be required. Fifty planes would be used on this service.

The subsidy for the encouragement of civil aviation for the year 1925-1926 is 271,800 yen (a little more than $100,000) as compared with 80,000 yen for the previous year.

Although Japan is economizing strictly on its navy and other
departments, the Air Service is generously provided for. Japan is making particular efforts to discover the most powerful type of long range seaplanes.

The Japanese aviators, Captain Abe and Mr. Kawachi, made a noteworthy flight from Tokio to the capitals of Western Europe, flying over Siberia. The Japanese newspaper *Asahi* organized the flight with the help of the government.

Information regarding manufacture of planes and motors is not available as no statements have been published.

**Jugo-Slavia**

The Department of Aeronautics in the government of Jugo-Slavia is a part of the Ministry of War. There are two commercial air transport companies operating: La Societe Internationale de la Navigation Aeriennne, (French) from Budapest-Belgrade-Bucharest; a Jugo Slav company organized by the Aero Club of the Kingdom, starting in the spring of 1926, between Zagreb-Belgrade-Salejika, 820 kilometers along the River Sava, using seaplanes of its own construction. These companies are subsidized by the government. Airports are being established by the government.

**Latvia**

In accordance with an agreement signed between the Latvian Ministry of Communications and the Latvian Air Service Co., the following lines were operated by the company during 1925: Riga-Memel-Koenigsberg; Riga-Reval-Helsingfors. Daily service in each direction was required, the company used five passenger Junkers planes which were to be replaced by two-seater machines.

**Mexico**

The Director of the Aviation of the Mexican War Department is General Miguel Gonzales. The 1925 budget for military aviation was $1,894,108 pesos. The 1926 budget calls for the purchase of 25 new military planes. No subsidies have been granted for commercial aviation. The only government civilian aircraft operation is the employment by the Department of Agriculture of an American pilot with one plane in the State of Oaxaca, for dusting the crops in that region in an effort to exterminate the grasshopper plague. General aerial transport or other activity is carried on for profit by private individuals or corporations. The government has no policy towards development of air transport other than the fact that the only commercial company now operating has been allowed to bring in planes and engines free of duty and has been exempted from the payment of all taxes except income and stamp.
The Cia. Mexicana de Aviacion, S.A., based in Tampico, works primarily for the oil producing companies and does not operate on a schedule but it carries passengers or express whenever there is opportunity. One thousand three hundred hours were thus flown in 1925. The company charges $50 an hour. It is a Mexican stock company with a capital of 50,000 pesos. It operates four Hisco Standard planes.

Fairchild Aerial Survey, Inc., of New York, is operating in Mexico, making a survey of the Temesi and Penuco Rivers in the State of Tamaulipas for the oil companies and also on the West Coast on the properties of the former president of Mexico, General Alvaro Obregon.

A Mexican firm has started an aerial transport company in the large cotton district of Laguna, where automobile roads and railroad services are poor. The company carries passengers and pay rolls to the large cotton ranches. Three Curtiss ships are being used and five are on order.

The National Aircraft Factory of Mexico recently produced several new types of military airplanes. The government has purchased 20 new planes of German make for use in preventing smuggling along the coasts and frontiers.

**NETHERLANDS**

All commercial aviation is controlled by the Air Navigation Division of the Department of Public Works. The most important officials in Government Aviation are: Lieutenant-Colonel Donk of General Staff for special aviation duties; Lieutenant-Colonel Hardenberg, Commandant of the Army Air force; Admiral Zeeman, Chief of Material of Naval Air Service; Mr. Schonfeld, Mr. DeVeer and Dr. Wolff of the Department of Public Works.

Subsidies of 1,400,000 guilders were allotted to the Koninklijke Luchtvaart Maatschappij (K. L. M.) for the period 1923-1926. In 1925 the total amount appropriated for commercial aviation was 485,000 guilders, of which 300,000 was given to the K. L. M., the rest being spent for wireless and meteorological services, emergency landing fields and research.

As the present Government subsidy agreement will expire at the end of 1926, the K. L. M. is now requesting one of 4,000,000 guilders to cover 1927-1934, after which it is expected no further subsidy will be necessary.

Lines operated by the K. L. M. are: Amsterdam-Rotterdam-Paris; Amsterdam - Rotterdam - London; Rotterdam - Amsterdam-Hamburg-Copenhagen; Amsterdam-Rotterdam-Dortmund, in con-
junction with the German Aero-Lloyd. During 1925, K. L. M. flew 8,177 hours, covering 1,103,895 kilometers. The number of passengers was 5,729; goods, 225,471 kg.; parcel post, 7,065 kg.; and lettermail, 2,081 kg.

The fleet consisted of 14 machines, with 10 pilots. The planes used are Fokker monoplanes. Fares are: Amsterdam to London, Paris or Hamburg, 48 guilders; to Bremen, 36 guilders; to Copenhagen, 75 guilders. In 1925 the receipts were about 50 per cent of the total expense.

Other lines operating in the Netherlands are: Amsterdam-Assen (Nederl-Wereldverkeer Mij.); Paris-Brussels-Amsterdam (S. G. T. A., Farman Lines); Amsterdam-Hamburg-Copenhagen-Malmö (Aero Transport); London-Amsterdam (Imperial Airways, Ltd.); Berlin-Amsterdam (German Aero-Lloyd); Amsterdam-Rotterdam-Brussels-Bale (Sabena).

In April, 1925, the three young pilots who flew from Amsterdam to Batavia, Van der Hoop, Van Weerden Poelman and Van den Broeke, returned to Amsterdam. This flight was to investigate the possibilities of air lines to the Dutch Indies and to promulgate interest in flying in the islands. Poor communications between the various islands and the fact that the towns are far apart make an air traffic system imperative.

The three manufacturing firms of Holland, including Fokker, show great activity.

Norway

The only Norwegian civil air traffic company in operation has been registered at Oslo under the name Norsk Lufttrafik Aktieselskab, founded by the pilot, Lief Lier. Passengers are carried from Holtekilen on taxi flights.

Persia

The Persian Government is considering offers made by the French Company, Compagnie Internationale de Navigation Arienne, and also offers made by the Junkers German Co. for establishing air lines in Persia. Both companies have sent representatives to Teheran by airplane to carry on negotiations.

Peru

There is no civil aviation in Peru. Both the Military and Naval aviation services are under the supervision of the National Director of Aviation, Senor Juan Leguia. Appropriations for 1926, the same as for 1925, were $150,000 for military and $40,000 for naval avia-
tion. By a resolution of November, 1925, $75,000 each were turned over to the Minister of War and to the Minister of Navy for the air services from the $7,500,000 American petroleum loan.

There is but one commercial aviation company in Peru, the La Aviacion Commercial. Operations extend northward to Tumbes and south to Moquegua.

The chief owner, pilot and mechanic, as well as the only civilian commercial aviator in the country, is Elmer J. Fawcett, an American. The equipment consists of one Curtiss C-6 Oriole Biplane. Fawcett makes a specialty of emergency flights up and down the coast. He flew about 35,000 miles and carried some 300 passengers in 1925.

Poland

The Air Section of the Ministry of War of Poland was temporarily in charge of Colonel Boreysza. The Commercial Aviation Section of the Ministry of Railways was headed by Mr. Witold Capski. The amount budgeted for subsidies to commercial aviation companies during 1925 was 2,850,000 zloty. The policy of the Government is favorable toward the development of commercial aviation, principally because the latter can be converted to war purposes on short notice. The commercial operating lines are:

1. Polish Airline “Aerolot” (Polska Linja Lotnicza “Aerolot” S. A.). Services operated are: Danzig-Warsaw-Lemberg; Warsaw-Cracow-Vienna; Lemberg-Cracow. These services were run daily except Sunday during 1925 but pending negotiations between Poland and Czecho-Slovakia, the Cracow-Vienna line has been suspended. Negotiations with the Italian government were carried on preparatory to extending the Cracow-Vienna line to Rome, via Trieste. As a result of the Danish-Polish-Swedish air traffic conference held at Copenhagen in March, 1925, these three governments granted the Polish Airline Co. a ten year concession and monopoly on the air route between Warsaw-Danzig-Malmo-Copenhagen. Traffic statistics from 1922 to June 31, 1925, are: Number of flights, 2,996; distance in km., 952,818; passengers, 6,589; mail in kg., 1,841; freight in kg., 81,430; regularity, 98 per cent.

2. The “Aero” Co. Services: Posen-Warsaw. Traffic: During 1925, 764 passengers, 285 kg. of mail and 13,790 kg. of baggage, express and freight were carried.


Twenty-one planes are operated by “Aerolot” and “Aero” Co. They employ 16 pilots and 110 other persons.
A new air service in Roumania was begun in September, 1925, between Bucharest and Galatz, only letters and parcels being carried. The Roumanian Military Air Service has received 29 Potez military planes from France and 50 Fokker fighters from Holland. The exploitation of aerial transport lines in the interior of Roumania are to be reserved to national air navigators.

Back of the expansion of aviation in Russia is the tremendous interest fostered by the O. D. V. F., or Friends of Aviation Society, which has a membership of 225,000, of whom 47 per cent are workmen and 30 per cent are officials. More than 7,000,000 gold rubles have been contributed toward strengthening the Red air force. The fact, however, that most of the subscriptions have been deducted from salaries has made the organization somewhat unpopular. Soviet Russia is making every effort to create a powerful air fleet. In July there were 987 airplanes and seaplanes on the active list. Of these 625 were observation, 295 were fighters and 66 heavy bombers. The Soviet Air Fleet in July numbered 98 squadrons of 12 machines each, few of which were up to quota. It is reported that the Russian Air Program calls for buying 1,030 new airplanes of which 500 are to be built in Russia, chiefly by the Russian Junkers Company, 330 are to be ordered from the Fokker Company, and 200 from several Italian firms.

Considerable expansion of the Russian air transport companies was carried out in 1925. M. V. Frounze, the people's commissary for War and Marine, said at a meeting of the "Aviochim" Society in July, that the rapid economic development of Russia and the strengthening of its defense depended largely upon aviation. Russia, a country of over 22,000,000 square kilometers and a population of over 135,000,000, with its immense resources in raw materials, is poor in means of transport. The Soviet regime demands economic reorganization and faster communications.

The oldest air transport company is the Deruluft, operating between Moscow and Koenigsberg. In 1922 this company ran services twice a week, in 1923 three times a week, and in 1925 daily. In 1925, 428 flights were made, 446,736 kilometers were flown, 1,328 passengers, 64,704 kilograms of express and 5,435 kilograms of mail were carried. In addition to regular flights 24,150 kilometers were flown on other flights and 473 passengers carried. The Deruluft is managed by the Deutscher Aero Lloyd. As the line London-
Berlin is operated by the Aero Lloyd, which has also taken over the Ukrvosdukhput line. Moscow-Kiev-Kharkoff-Odessa, the transcontinental route from London to Odessa and thence to Moscow, is within the sphere of interest of the Aero Lloyd. The Deruluft uses Fokker planes with 360 h.p. Rolls-Royce engines.

The Ukrvosdukhput operates three times a week between Moscow-Kharkoff-Rostoff on Don and between Moscow-Kharkoff-Kiev and Odessa. It uses six Dornier Komet planes and the Soviet factory, "Krasni Letchik," is to supply planes with Bristol Lucifer 100 h.p. engines.

The Dobroliot operates between Khiva-Bokhara, three times weekly in each direction. This line has been extended to Teschaus. The same company operates three times weekly between Bokhara and Duchambe. It is proposed to extend this line to Kuliaba. When desired service is available between Puchpee and Alma-Perna. During 1925, this company made 546 flights, covering 330,537 kilometers, carrying 1,626 passengers, express and mails amounting to 16,452 kilograms.

Aided by the Society of Friends of the Air Fleet and by the German Junkers Co. the Dobroliot or Dobrolet, are undertaking plans to establish a line from Moscow to Peking, a project which is regarded by the British as steps toward an entente between China and Russia.

The Friends of the Red Air Fleet have constructed 30 airdromes and the Army authorities have built nine new ones. There are about 100 seaplanes in the Black Sea, 65 being of the latest types. Squadrons for use in the Caspian Sea and the Pacific Ocean are being organized. At present there are about 20 seaplanes on the Far Eastern Coast.

The railway and river transport workers of Soviet Russia presented to the Moscow government in May, 1925, a fleet of 31 airplanes.

**Salvador**

Oct. 24, 1925, the President of Salvador issued regulations for the aviation school which is to give a military aviation course for Salvadoran pilots. The Salvadoran airplanes, S-1, S-2, and S-3 were flown during the national holidays Sept. 15-18 to Guatemala City. The Colombo-German hydroairplane company is endeavoring to establish an air passenger and mail service between Barranquilla, Colombia, Key West, Florida, Panama, the Central American Republics and Havana.
SOUTH AFRICA

Early in 1925, the Postal Department of the Union of South Africa organized an experimental air service between Cape Town and Durban. This route, 1,000 miles and entirely coastal, was operated with 10 military D. H.s, the gift of the Imperial Government to the Union. The service was to provide data which it was hoped would show that a civil company would find the route profitable without too heavy a subsidy. From a technical point of view the service was successful. Two trips a week were made for six weeks, 12,000 miles being flown without a single failure to arrive on time, a remarkable record for flying over a sparsely inhabited, mountainous country. The cost of operations was 15 cents a mile. The amount of European mail to Durban which was expected to be the standby of the service was disappointing. The route was discontinued June 1 and the Union entered into negotiations with two British, one German and one Dutch firm for operating the service. Early in 1926 a contract was made with the Junkers Co. for a service between Cape Town and Durban and Durban and Johannesburg. The South African government is to subsidize the company at £8,000, provided the company is formed in South Africa with only British subjects on the board and the service operated exclusively by South African personnel. Weekly service is agreed upon.

SPAIN

The great event in Spanish aviation history and one which takes place among the foremost events recorded in the aviation records of all nations is the fine flight across the South Atlantic, from Spain to South America, which was successfully accomplished, Jan. 22 to Jan. 31, 1926, by Commandante Franco, Pilot; Captain Ruiz de Alda, navigator; Lieut. Duran and Sen. Rada. The entire distance, 3,544 miles, was covered in 35 hours flying time. The route chosen was as follows: Palos to Las Palmas, Canary Islands, 817 miles; Las Palmas to Porto Praya, Cape Verde Islands, 1,056 miles; Porto Praya to Fernando do Noronha, off the Brazilian coast, 1,432 miles; Noronha to Pernambuco, 279 miles.

The first stage of the flight was completed the first day, Jan. 22, when bad weather prevented a resumption of the flight until Jan. 26. The second stage was then completed and in the early hours of the morning of January 30 the plane set out on the most difficult section of the journey, a flight of almost 1,500 miles across the Atlantic Ocean. Just before eight o’clock that evening they were sighted from Fernando Noronha, passing overhead in the direction of Pernambuco. They had not gone far, however, when they were seen.
to descend on the sea and signal for assistance. They were running short of fuel and weather conditions were rough. Eventually they succeeded in getting back to Fernando Noronha but boats were unable to reach them to take them ashore and they remained on board all night. The machine rode out the storm well, although one of the propellers was damaged.

Commandante Franco had accomplished the second longest non-stop overseas flight yet made and had covered the distance of almost 1,500 miles in less than 14 hours. At three p.m. the next day they made a start for Pernambuco. Within sight of their goal the broken propeller refused to work and they made a hasty conclusion of the flight on one engine, landing just outside Pernambuco, boats going at once to their assistance. The navigators were received with greatest enthusiasm and continued a triumphal flight down the coast to Buenos Aires. The flight was made in a Dornier “Wal” seaplane, the Ne Plus Ultra, equipped with two Napier Lion engines of 450 h.p. each.

The most important aviation center is at Guadalajara, where the best organized field is located. The field at Cuerto-Vienetos includes the aeronautical laboratories and army aircraft factory under the engineer officers of the service. Both of these are near Madrid.

There are three commercial air bases, Madrid, Leon and Seville, and two hydro bases, Los Alcazares and El Ttalayon.

The first step toward the establishment of an air service between Spain and South America was taken in May, 1925, when a 10-year concession between Seville and the Canary Islands was granted to Jorge Loring Martinez. The itinerary is to be Seville, Larache, Mogador, Agadir, Cape Juby, Las Palmas, Santa Cruz de Teneriffe. A royal Order was also published granting to Don Manuel Juer, the managing director of the company, “La Aero Espanola,” a concession for the establishment of an air line between Irun or San Sebastian and the Canary Islands, touching at Irun, San Sebastian, Bilboa, Vitoria, Burgos, Valladolid, Segovia, Madrid, Ciudad Real, Cordoba, Seville, Cadiz, Tangier, Casablanca, Mogador, Agadir, Cabo Juby, Las Palmas, Santa Cruz de Teneriffe and Rio de Oro.

One of the most interesting technical developments of the year was that of the Autogiro, by Senor de la Cierva. This machine, combining the properties of the ordinary airplane, the helicopter and the ornithopter, was tested in England at Farnborough before Sir Samuel Hoare, Air Minister; Maj. Gen. Sir Sefton Brancker, Director of Civil Aviation; Sir Geoffrey Salmond, and many other aeronautical experts. Five of the machines were ordered by the British Air Ministry. When the machine is in motion the four
blades of the lifting screw flap like the wings of a bird. The machine has demonstrated its ability to fly at 20 miles per hour, to hover and to make a vertical descent.

SWEDEN

Civil aviation is under the supervision of the Royal Department of Communications, a section known as the Bureau of Aeronautics being in direct control. The chief of this bureau is Kansliradet C. Carlberg and his assistant Lt. Lennart Högberg. The bureau is located at Stockholm. For the budget year ending June 30, 1926, total military and naval appropriations were 2,395,800 crowns. The civil budget for 1925-1926 was 631,030 crowns, including 500,000 crowns subsidy to air routes divided as follows: Malmo-Amsterdam, 378,000 crowns; Stockholm-Helsingfors, 62,000 crowns; Oslo-Göthenburg-Copenhagen-Malmo, 60,000 crowns. On the first of these lines a subsidy of 1.75 crowns per flying kilometer was paid; on the second 1.50 crowns per flying kilometer. Both these lines were operated in conjunction with Germany and Finland. Only the Malmo-Copenhagen portion of the third route was operated during 1925 and consequently only 10,000 crowns were paid to the company. The Swedish Aeronautical Society received a grant of 5,000 crowns to be used to promote aviation interests and activities.

For the next budget year, 1926-1927, 6,455,600 crowns are proposed for the Aviation Department. Civil aviation has requested a total appropriation of 1,522,000 crowns of which 995,000 crowns is for the purchase of equipment and 525,000 crowns for the operation of air lines. The report of the Ministry of Communications proposes that the amount of the subsidy remain the same and that the loan fund be increased by 600,000 crowns.

Only one Swedish company operated commercial air services during, 1925 the Akth. Aerotransport. This company had in 1925 a paid in capital of 666,000 crowns, all the stock being owned by Swedes. The company operated 10 planes, employed 10 pilots and 40 mechanics. Three routes were operated: Malmo-Copenhagen-Hamburg-Amsterdam; Stockholm-Helsingfors; Malmo-Copenhagen. Traffic was as follows on all three lines:

<table>
<thead>
<tr>
<th>Route</th>
<th>1924</th>
<th>1925</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malmo-Copenhagen-Hamburg-Amsterdam</td>
<td>5,228</td>
<td>10,026</td>
</tr>
<tr>
<td>Stockholm-Helsingfors</td>
<td>1,155</td>
<td>7,958</td>
</tr>
<tr>
<td>Malmo-Copenhagen</td>
<td>410</td>
<td>48,984</td>
</tr>
<tr>
<td>Distance covered</td>
<td>154,860</td>
<td>397,984</td>
</tr>
</tbody>
</table>

The revenue from passengers during 1925 was 189,800 crowns. The Nordiska Flygrederiet, a branch of the Deutscher Aero
Lloyd, maintained a line between Stockholm and Danzig via the Island of Gottland in the Baltic. This service was operated most of the season, but was not a successful venture. It was not subsidized in Sweden but was assisted by the German government to the extent of two gold marks per kilo. A Polish company has been given permission to operate a line from Warsaw to Copenhagen, via Malmo. The German Junkers Co. has received permission to operate a strictly commercial line for goods and mail only between Berlin and Stockholm.

**Switzerland**

Commercial aviation has developed most satisfactory the past year. On account of the central location of the country in relation to the rest of Europe, Switzerland becomes the meeting point of airline systems, as it is of the railways. The value of the airplane to the tourist trade of the country is also much appreciated. Federal, Cantonal and Municipal governments are deeply interested in aviation. The Federal government has assisted in two ways: by donating 79,000 Swiss francs to be spent on special premiums for planes carrying out their schedules with punctuality, on premiums for airline systems that exceed a certain minimum of flying hours, and on the expenses of the administration of the Federal Air Office, and secondly, 147,000 Swiss francs spent by the Post Office for the mails carried by airplanes and for the weather report service. The Cantonal and Municipal governments which possess flying fields, Zurich, Basle, Lausanne and Geneva, have made definite contributions to the air lines landing on their territories and have improved the flying fields and erected hangars and other administrative buildings at their expense. Lausanne has spent more than a half million francs on its aviation field. The Canton and City of Zurich have erected a new waiting room and radio station costing 118,000 francs. Berne, Chaux-de-Fonds, St. Gall and St. Moritz are making efforts to attract air lines to their districts.

Lines operating in Switzerland during 1925 included the Imperial Airways Co., London-Paris-Bale-Zurich; the Aero-Transalpina of Lausanne, and the Ad Astra-Aero Co. of Zurich. In 1926 the French line, the Air Union, will make connections at Geneva and perhaps with Milan, by way of Lausanne. The Aero-Transalpine has made trial flights. One of their pilots made more than 36 successful flights across the Alps that lie between Switzerland and Italy, flying successfully in all kinds of weather. The mountains are no longer regarded as unsurmountable obstacles. Trans-Alps air routes give direct connections to Egypt and the Orient.
Turkey

All forms of aviation in Turkey are controlled by the Ministry of National Defense, the Council of Ministers co-ordinating all matters pertaining to aviation. Constantinople is regarded as the gateway of the air routes to the far east. France, Germany and Italy have projected air transportation lines to Constantinople. An Aviation Association has been formed with the object of collecting funds for the purchase of airplanes to be presented to the State.

Uruguay

Military aviation in Uruguay is under the control of the General Staff of the Army. There is no naval aviation and no governmental supervision of civil aviation, although subsidies are granted. The Anglo-Argentine Air Navigation Co., organized by Anglo-Argentine interests, operates between Montevideo and Buenos Aires, 220 kilometers. Ten planes are used.

Venezuela

Venezuela seems to offer opportunities for the development of aviation and a market for planes. At present the War Department has about twelve French planes, some of which are old. There is only one plane being operated for commercial purposes. This is a hydroairplane of the Junkers Limousine type. The company owning it has mapped 2,470,000 acres by aerial photography. The importation of airplanes is forbidden except by special permission of the Federal Executive. The success of the Scadta company in Colombia has led German interests to try to obtain exclusive concessions for commercial flying in Venezuela.
CHAPTER XIV

TECHNICAL DEVELOPMENT IN AIRCRAFT DURING 1925

The technical development of the year not only shows marked progress along military lines as in the past, but also a more determined effort in the industry to produce aircraft which may truly be called commercial.

In previous years while the needs of the Services were taken care of satisfactorily, remodeled and adapted military machines, with few exceptions, represented our entire effort in the development of types for civil or commercial use. Due partly to the disappearance of war-time stocks and to the organization of a number of responsible air transport companies, during 1925 much real achievement in the commercial field was accomplished. Activity worthy of note is seen along almost every line of endeavor. Improved aircraft, engines, accessories, equipment and materials have appeared not only from the factories of those long associated with aviation but also from concerns newly organized. Characteristics insuring increased economy in air transport operation have been an encouraging feature of development and progress during the year.

Noteworthy examples of commercial types have been produced by the industry for the Government Air Mail Service, private companies carrying mail on contract, passenger transportation, concerns interested in crop control projects, aerial mapping, photography—and other uses. For these purposes large pay-load, economical operation, higher cruising speeds, safety, convenience, and accessibility have been sought. To meet these requirements there have appeared transport types with high speeds of about 135 m.p.h., approximating the pursuit types of a few years ago, and carrying actual pay-loads ranging from 750 to 1250 lbs. Some of these planes equipped with engines of 400 h.p. are in some cases the natural outgrowth of military observation types. As such, they reflect the stimulus of various design competitions held by the Government. Other smaller examples of commercial types include those powered with engines of 90 to 200 h.p., designed to carry from two to three passengers in addition to the pilot or an equivalent weight of cargo or equipment at speed ranging from 100 to 135 m.p.h.

In the larger cargo carriers, some few examples of multi-engined airplanes have made their appearance in this country. These
TECHNICAL DEVELOPMENT

machines, designed to carry heavy pay loads and to offer a greater dependability than the single engine plane, will undoubtedly find a place in commercial aviation. This should be especially true as air lines are extended and passenger carrying increases over territory not favorably situated from the standpoint of emergency landing. The speed of this type of craft varies from 100 to 120 miles per hour and it has been possible even with a pay-load of over 2000 lbs. to maintain level flight or better with only two engines running.

For some years there has been an effort to produce a practical amphibian equally adapted to operate from land or water. During the past year this has been attained. In a recent polar flight this type of craft, originally developed for the Army Air Service, was used to advantage. While, obviously, an amphibian so built can hardly be expected to be as efficient for either use as one built for a single purpose, the progress made during the year has established the practicability and value of this type.

In the military field a decrease in the number of types in use has been made possible by an increase in the performance characteristics of each standard type. In the Army Air Service the number has decreased from fifteen to five. This has been possible by means of designs permitting two or more uses by interchangeable equipment and the increased initial performance.

In the Navy the same trend is apparent in the continuance of the development of the CS-three-purpose type of bomber, torpedo plane and scout. This machine has also been adapted by redesign for operation aboard ship.

In the development of the new pursuit planes for the Army, greater speed and maneuverability have been attained than in any other country. These new fighting machines owe much in their development to the lessons learned in the past few years in building the world's fastest racers.

Experimental development in bombardment types is exemplified in the light bomber developed by the industry for the Army. Equipped with only one engine, this machine has a total weight loaded of over 10,000 pounds, approximately that of conventional twin-engine bombers.

The result of the observation competitions is evident in the development by the industry for the army, of new two-seaters with metal fuselages, which are capable of speeds and maneuverability almost equal to pursuit types.

The Army is also continuing its policy of encouraging experimental work by the industry on all-metal craft.

New training planes have been built using 150 and 180 horse-
power engines which show marked improvement for primary and advanced training.

Transport planes have been designed to carry two pilots and six passengers with a Liberty 400 h.p. engine.

The Army was responsible for having built a special airplane solely for ambulance purposes. This machine, designed by the Air Service Engineering Division in cooperation with the Medical Corps, accommodates a pilot, a flight surgeon, and two patients.

The racers designed and built for the Army and Navy showed gratifying improvement over previous models, being about 10% faster than their predecessors. This increase was due to greater horse-power, better streamlining and other refinements.

The Navy's development of the patrol seaplane is another creditable achievement. The successful mounting of the two powerful 800 h.p. engines in tandem in this craft and the use of metal wing structure, fabric covered, are of interest from a technical standpoint.

The improvement of aircraft instruments and navigational accessories for the Army and Navy and commercial uses has been marked. Some of these, such as bomb sights and bomb racks, were adapted only to Service uses, while others such as navigation instruments and beacons will also be of benefit to commercial aviation.

A record of the year's effort in the production of power plants indicates that it will not be long before engines more suitable for modern aircraft may be generally available for use at lower prices. It has been realized for sometime that particularly in commercial work, the conventional water-cooled motor had certain disadvantages which might be eliminated if a reliable air-cooled type were available. During the past year not only has great progress been made in the experimental development of air-cooled motors with performance approximating those obtained with our best water-cooled types, but there has actually appeared commercially a 200 h.p. air-cooled engine, which has this far given excellent service. In the water-cooled types marked improvement has been made, greater horse-powers have been attained together with considerably reduced weights per horse-power. In these engines much has been done to increase the life of the engine, make it more accessible and to reduce its cost of operation. The power rating has been anywhere from 400 to 800 or more horse-power and several types have not only successfully passed official tests but have been thoroughly proven in actual service. The differences in requirements for commercial and military use now seem to be more generally appreciated, with the result that many new engines both of larger and smaller horse-powers than those mentioned, are being developed. This tendency cannot do other than
result in the availability of engines that will assist materially in the development of all phases of aeronautics.

The year's progress in technical development has also included considerable effort along the line of lighter-than-air craft. Both the Army and the Navy have done creditable work in this connection and certain commercial interests have devoted much time and attention to the subject. For the Army small training airships, as well as improved nonrigid types, have been built by the industry. At the present time, in addition to perfected plans for large airships of 6,000,000 cubic feet capacity, a metal-clad type of rigid airship based upon an entirely new principle of design promises to prove of interest from a technical standpoint, both for commercial and military purposes.

Airplanes

The Aerial Service Corporation of Hammondsport, New York, has in addition to its other activities, produced the Mercury Jr. plane designed for varied commercial use. Powered with a Wright J4, the power loading is 12.48 per horse-power and the wing loading 8.17 lbs. per sq. ft. The total weight is 2495 lbs. of which 500 lbs. is payload. Fuel for four hours cruising at 112 m.p.h. is carried and the maximum speed is given as 132 m.p.h. A Curtiss C 6-A engine may also be used. Balanced control surfaces, except elevators, are used and the special landing gear is designed to give a snubbing action similar to the oleo type. The Aerial Service Corporation has also developed a combination wheel and ski type of landing gear which is said to be extremely practical.

The Atlantic Aircraft Corporation, of Hasbrouck Heights, New Jersey, has continued its production work on remodeled DH4 airplanes for the Army and has also produced a commercial airplane called the Fokker Universal. This machine, powered with a Wright 200 h.p. engine, carries four to six passengers with sufficient fuel for nearly six hours flight and attains a high speed of 122 m.p.h. It is a typical Fokker monoplane, with a thick veneer-covered wing.

Production work is also in progress in this company's plant on the Fokker Trimotor which appeared during the last year. Fitted with three 200 h.p. Wright engines, it carries a useful load of 4000 lbs. This is equivalent to ten passengers and 540 lbs. of baggage, two pilots and fuel for five hours. With a high speed of 125 m.p.h. this airplane has a climb of 720 ft. in the first minute and its performance on two engines is designed to prevent the possibility of forced landings due to engine failure. This machine also is a monoplane.

The Boeing Airplane Company of Seattle, Washington, con-
structured during 1925 production orders for military airplanes and also a new Patrol Type, known as the Boeing PB-1 seaplane for the U.S. Navy. This airplane, capable of making 2500 miles in non-stop flight, is powered with two 800 h.p. Packard engines in tandem. It is built for the most part of a light metal alloy and weighs fully loaded approximately 25,000 pounds. The total span of the plane is 87 feet 8 inches. Of its total weight 11,000 pounds is fuel. The crew consists of five men.

The Boeing Company also continued the development of Pursuit Types for the Army. The PW-9A, a refinement of the PW-9, a single bay tractor biplane, is regularly equipped with the Curtiss D-12 engine, but adaptable to the use of other motors. When equipped with Wright P-1 engine it is known as Model FB-4. With slight modifications and equipped with Packard 1-1500 with supercharger, it is known as Model XP-4. Its general characteristics are: Overall span 32 feet; overall length 23 feet 7 inches; 242 square feet of supporting surface; with D-12 engine rated at high speed of 163 m.p.h., and landing speed of 65 m.p.h., with a rate of climb of 1,710 feet a minute and service ceiling of 20,175 feet.

In addition to the military types, the Boeing Company has built a plane for the U.S. Air Mail Service. This machine weighs empty 3425 pounds and fully loaded 5495 pounds, of which 1000 pounds is mail. It makes a high speed of 135 m.p.h. and is powered with a 400 h.p. Liberty engine. Its span is 44 ft. 2 in. and its total area 547 square feet. It climbs to 10,000 feet in 18.5 minutes and has an endurance of 7 hours at cruising speed.

The Buhl-Verville Aircraft Company, Detroit, Mich., entered the field of American aircraft manufacturers during the year and under the guidance of Alfred V. Verville designed and built a commercial plane called The Airster. It is a tractor biplane with folding wings and optionally fitted with Curtiss OX-5 90 h.p. or Wright J-4 200 h.p. engines. The design is such that certain other engines of intermediate h.p. may be used if desired. Pontoons may also be fitted for marine use. The fuselage is of welded steel tubing. With the 200 h.p. Wright engine it has a high speed of 130 m.p.h. and a rate of climb of 950 ft. per minute at the ground. At cruising speed the range is 600 miles and its service ceiling 16,000 ft. The wing span is 35 ft. 8 in. extended and 12 ft. 6 in. when folded. The total area is 303 sq. ft. and the weight empty (with Wright J-4 engine) 1570 lbs. Fully loaded the weight is 2462 lbs. of which 330 lbs. is pay-load.

The Consolidated Aircraft Corporation of Buffalo, New York, improved their training plane for the Army Air Service, which has a
Curtiss Aeroplane and Motor Co.'s *Falcon* (At Top) and Curtiss Metal fuselage pursuit (Wright engine).
high speed of 100 m.p.h. and a service ceiling of 16,000 ft. Its weight fully loaded is 2500 lbs. and it has a range of 250 miles. Production orders for this type of machine for the Army and Navy have been executed.

The Curtiss Aeroplane and Motor Company, Inc., of Garden City and Buffalo, N. Y. has contributed to the airplane's technical development not only by producing improved commercial and military airplanes, but also as in previous years in the design of its Pulitzer Racers. The 1925 Curtiss Army Racer won the two speed classics of the year—the Pulitzer Trophy Race and the Schneider Cup Race. The plane used in the two races was the same, except that for the Schneider Cup Race the landing gear was replaced with twin floats and increased gasoline capacity was provided. These swiftest of airplanes have an overall span of 22 ft., a length of 20 ft. and a total supporting surface of 144 sq. ft. They are powered with the Curtiss V-1400 high compression engine which develops 600 h.p. at 2350 r.p.m. The total weight of the land plane 2181.5 lbs. and of the seaplane 2738.4 lbs. The high speed of the former is 263.9 m.p.h. and of the latter 245.7 m.p.h.

While these machines do not differ greatly in appearance from previous Curtiss racers, there are several important changes in the design, in addition to the substitution of the Curtiss V-1400 engine for the Curtiss D-12A engine. Chief among these changes is the use of a new airfoil which is the most efficient for racing purposes yet developed, having a higher ratio of maximum lift to minimum drag than any other airfoil in existence. This airfoil, like all those used on Curtiss racers since 1922, was developed in the Curtiss aerodynamical laboratory. Other changes in the racers include the use of a forged Curtiss-Reed duralumin propeller in place of the usual twisted Curtiss-Reed Propeller, and refinement of design to provide better vision, easier control, and parachute equipment for the pilot.

In military airplanes the Curtiss Company has produced for the Army and Navy Air Services refined designs of the Hawk Pursuit plane which has been adopted as standard and is being built in quantities to replace older types. This plane is a single-bay tractor biplane having an overall span of 31 ft. 6 in., a pronounced stagger of 38.5 inches and a total supporting surface of 250 sq. ft. It is 22 ft. 5½ in. in overall length and has a gross weight of 2808 lbs. The Curtiss D-12 motor is the standard power plant for service use but the Curtiss V-1400 engine has been installed in some ships giving a speed of 172 m.p.h. Its rate of climb is 2170 ft. per minute and its absolute ceiling is 24,400 ft. At 15,000 ft. altitude and 1900 r.p.m. the Hawk has a speed of 151 m.p.h. Of the total weight, 325 lbs. is fuel and
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oil, the total useful load being 794 lbs. This airplane adapted to marine use has been recently adopted by the Navy and equipped as an interchangeable seaplane and deck-landing airplane. As a seaplane with the D-12 motor, it shows a high speed at sea level of 159 m.p.h. with a gross weight of 3263 lbs. Its service ceiling is 18,100 ft. and its rate of climb 1600 ft. per minute. At 15,000 ft. it has a speed of 138.7 m.p.h.

The 1925 Curtiss Falcon is a redesign of the 1924 plane of the same name which won the U. S. Army competition for observation airplanes. The new machine is interchangeably powered with the Curtiss D-12 and the Liberty engines. The O-i, or Falcon, has an overall span of 38 ft., a length of 27 ft. 10 in., total supporting area of 353 sq. ft., and weighs fully loaded 4136 lbs. It carries a useful load of 1748 lbs. of which 756 is fuel and oil. Its sea level high speed with the Curtiss D-12 engine is about 150 m.p.h., the initial rate of climb 1235 ft. per min., and service ceiling 18,700 ft. These characteristics, combined with exceptional maneuverability, place the Falcon, in point of performance, almost in the pursuit class.

Contributions of the Curtiss Company for the year to commercial aeronautics include the Carrier Pigeon and the Lark.

The Carrier Pigeon designed for the U. S. Air Mail, has been built in quantities for one commercial operator. The 1925 model is purely a commercial cargo carrier for air mail, freight and express. It is especially designed for this type of service, having interchangeable surfaces, welded steel fuselage, etc., and is so built as to be of low maintenance and operation cost. It is completely equipped for night flying operations, has a pressure fire extinguisher system and an asbestos and metal lined cargo compartment. The power plant is the Liberty 400 h.p. engine with which the Pigeon has a high speed at sea level of approximately 121 m.p.h. and a landing speed of 56 m.p.h. It has an endurance of 5 hours at cruising speed and carries a payload of 1000-1250 lbs. Its total weight loaded is 5600 lbs. The span is 41 ft. 11 in. with an overall length of 12 ft. 1 in. The total supporting surface is 505 sq. ft. It climbs 6140 ft. in 10 minutes and has a service ceiling of 12,800 ft.

The latter of these machines is a medium powered plane designed to carry either four passengers, or an equivalent cargo weight. The Lark is equipped with either the 200 h.p. Wright Whirlwind, the 180 h.p. Hispano, or the 160 h.p. Curtiss C-6 engine. It can also be had with interchangeable float and wheel landing gears. It has an overall span of 30 ft. 7½ in., and overall length of 20 ft. 11½ in., and total supporting surface of 264.3 sq. ft. Equipped with the 200 h.p. Wright, it has a total weight of 2708 lbs. of which 680 lbs. is
Commercial outgrowth of world business. The Douglas Co.'s mail plane (Top) and interior six passenger transport.
pay-load. It attains a high speed at sea level of 117 m.p.h. and has a
service ceiling of 13,100 ft., climbing 6180 ft. in ten minutes.

The Douglas Company of Santa Monica, California has continued
to build military airplanes and has also produced a type of commercial
cargo carrier which has been adopted and purchased in considerable
quantities by the U. S. Air Mail Service. The Douglas Air Mail
Plane is a natural outgrowth of the Douglas planes built for the
Army by this company, including the "Round-the-World" Cruisers.
A conventional single bay tractor biplane, it has a span of 39 ft. 8 in.
both top and bottom, a length of 28 ft. 10 in. and is powered with a
Liberty engine. The pilot is located aft of the mail compartment in
such a position as to give best visibility. The pay-load is approxi-
mately 1000 lbs. and the total weight loaded is between 5100 and 5200
lbs. Sufficient gasoline is carried for an endurance of 3 1/2 hours at
cruising speed. A high speed of 135-140 m.p.h. is attained and a
climb of 750 ft. in the first minute with full load. Complete night
flying equipment is carried, including landing lights, running lights,
parachute flares, etc.

The Douglas transport is a single-bay tractor biplane, having a
wing span of 60 ft., length of 36 feet, and wing area of 800 square
feet. It is equipped to carry seven passengers in the roomy passenger
cabin or, with the removal of the passenger seats, 2500 pounds of
cargo. It is powered with the Liberty motor, and has a high speed
of 120 m.p.h., landing speed of 46 m.p.h., and service ceiling of
15,950 feet.

G. Elias & Bro., Inc. of Buffalo, N. Y. continued the development
of their mail plane, the M-1, built for night mail service in the
Elias Air Express (Type AJE). This machine has a rated speed
of 50 to 123 m.p.h., range of 510 miles; normal pay-load capacity
of 1200 pounds and service ceiling of 15,000 feet. It is a conven-
tional biplane type, with wing span of 42 feet and length overall of
29 ft. 2 inches. Cargo space is 65 cubic feet. Liberty twelve engine.
Weight empty 2890 lbs., and normal gross weight 4960 lbs.

The Ford Motor Co. of Detroit, Mich., Airplane Division—Stout
Metal Airplane Co. specializes in commercial machines, in addition
to building and operating their all-metal monoplanes of the Maiden
Dearborn type built a large three-engined monoplane. The latter
unfortunately was lost in a factory fire, but is being replaced by an
improved design which is now under construction.

The Maiden Dearborn which has operated for more than a year
regularly on the Detroit-Cleveland-Chicago lines is fairly well known.
It is an all-duralumin monoplane type, powered with a 400 h.p.
Liberty engine. Its span is 58 ft. 4 in. and its total supporting area
600 sq. ft. The cruising speed of 100 m.p.h. gives an endurance of approximately 500 miles. Its high speed is 115 m.p.h. Arrangements are such that passengers or cargo may be carried and the total useful load is given as 2000 lbs.

The Stout Trimotor Transport, which was destroyed by fire, was of all-metal construction and had a span of 68 ft. 10 in. It was powered with three Wright Whirlwind 200 h.p. air-cooled engines and had a gross weight of 7800 pounds.

Huff Daland Airplanes, Inc. of Bristol, Pennsylvania, has been active throughout the year in building military and commercial airplanes as in previous years. These have been principally large bombing and transport types and those adapted to agricultural uses.

The LB Bomber built for the Army Air Service, won the Detroit News Air Transport Trophy at the 1925 New York Air Races.

The Pegasus or LB type is equipped with a Packard 800 h.p. engine, has a span of 46 ft. 2 in. and weighs fully loaded 11,224 lbs. Its weight empty is 5323 lbs. giving a useful load of 5909 lbs. Plans have been completed for a new type of all-metal bomber to be known as the Cyclops.

Other Huff Daland models produced are the commercial Petrel, the TW-5, TA-5 and the Pelican, a five purpose Navy training plane. In the commercial types this company has made considerable progress in improvement of its machines designed for use in crop control, dusting, etc.

The Loening Aeronautical Engineering Corporation, of New York, has continued work throughout the year in the development of their Air Yacht and amphibian types of aircraft. The amphibian has an overall span of 45 ft., a length of 32 ft. 11 in. and weighs empty about 3400 pounds. The high speed at sea level is about 125 m.p.h. and the time of climb to 10,000 ft., 26.2 min. The endurance, including climb equipped for military purposes is approximately 3 1/2 hours. Its initial rate of climb fully loaded is 600 ft. per minute.

One of the interesting developments of this airplane is the power plant which is a 400 horse-power engine in an inverted position which not only allows of greatly increased visibility but many structural improvements.

In January, 1926, the National Aeronautic Association announced the winning of several Class C-2 seaplane records with the Loening COA-1.

Orders for numbers of the amphibian have been executed for both the Army and the Navy, in which services these machines have found a unique usefulness.

The Glenn L. Martin Company of Cleveland, Ohio, has con-
Huff-Daland *Pelican* (Top) with Wright engine, and *Pegasus*.
continued development of the CS—three purpose—type for the Navy and has been in production on substantial orders for its latest model the SC-2. This model is similar to the SC-1 with minor differences in arrangement of special equipment. They are fitted with twin floats, interchangeable with wheel gear for use from carriers or land bases. Maximum speed 97.5 m.p.h. Radius 950 m. Ceiling 4700 ft. Weight full load 9295 lbs. Span overall 56 ft. 6 in. Wing area 856 sq. ft. Length 42 ft., height 16½ ft. Wright T-3 motor 540 h.p.

Pitcairn Aviation, Inc. of Bryn Athyn, Philadelphia, Pa., has designed and built a commercial airplane called the Fleetingwing of the following characteristics. Its span is 38 ft. and overall length 25 ft. 11 in. The total weight fully loaded is 2879 lbs. and its wing loading is 8.24 lbs. per sq. ft. It is powered with a Curtiss C-6 engine and is capable of 106.2 m.p.h. fully loaded. A total useful load of 1077 lbs. is carried of which 800 lbs. is made up of pilot and passengers; 182 lbs. of gasoline are carried. The landing speed is about the same as that of the JN4. In accordance with present trend of design the fuselage is of welded steel tubing and the struts are of steel, spruce faired.

The Ryan Airlines, Inc. of San Diego, Cal., have produced the Ryan M-1, which was designed for commercial use and has been variously equipped with the Wright Whirlwind 200 h.p., Hispano Suiza 150 h.p. and the Curtiss OX5-90 h.p. engines. It is a monoplane with an all-steel fuselage, steel struts, etc., and with the Whirlwind engine makes 135 m.p.h. high speed. Its initial rate of climb is 1200 ft. per min., and it carries 600 lbs. of pay-load.

The Sikorsky Manufacturing Corporation of Westbury, Long Island, N. Y., during 1925 did considerable experimental work in addition to the construction of three new models. Plans were also completed and work started on a large 3-motored biplane.

The Sikorsky S-31 powered with a Wright Whirlwind 200 h.p. engine is a tractor biplane with a span of 45 ft. and a total area of 366 sq. ft. Its maximum speed is 126.5 m.p.h. and it carries a normal pay-load of 800 lbs.

The S-32 is a biplane with a span of 58 ft. 4 in., a total supporting area of 605 sq. ft. and is capable of a speed of 135 m.p.h. It weighs empty 3400 lbs. and carries 2200 lbs. of useful load. The power plant is a Liberty 400 h.p. engine with which it attains a rate of climb at the ground of 800 ft. per min., and a service ceiling of 15,000 ft. It may be equipped for four passengers or an equivalent cargo load.

The Sikorsky S-33 is a small two-seater commercial biplane equipped with Sikorsky high lift wings and powered with the Anzani
70 h.p. motor. It has a high speed of 112 m.p.h. and a cruising range of 400 miles.

The Thomas-Morse Aircraft Corporation of Ithaca, New York, has continued the development of metal aircraft having concentrated on a corps observation machine of this type for the Army Air Service designated as the X0-6. For this plane, two types of wings have been built and tested. Both wings are of metal structure but one is fabric covered, while the other is covered with duralumin on top and fabric on the bottom. Both have satisfactorily withstood the required tests.

The Chance Vought Corporation of Long Island City, N. Y. has continued its production and development work, for the Army and Navy for whom considerable numbers have been built. A feature of this development has been a concentrated study on the perfection of types for operating on board ships and carriers.

The U0-1 was refined and continued in production. Plans were completed for a new two-seater fighter, powered with the Pratt & Whitney Wasp engine, and for a single-seater fighter to be powered with the Wright J-5 engine.

The development of strictly commercial planes in quantity has been one of the important features of the year. The constructors specializing in this field include the following:

The Advance Aircraft Company of Troy, Ohio, produced the Waco Nine, a three-place commercial biplane powered with the 90 horse-power OX5 motor.

The Alexander Aircraft Company of Denver, Colo., likewise produced a three-place commercial biplane around the OX5 motor, and known as the Eaglerock.

G. M. Bellanca of Paterson, N. J., built a six-seater cabin monoplane, powered with the Wright Whirlwind 200 h.p. This machine won the Efficiency Race at the New York Air Races in October, scoring 53% higher efficiency than its nearest competitor. It has a speed of 133 m.p.h., carrying a pay-load of 850 pounds.

The Stinson Airplane Syndicate of Detroit, Mich., built the Stinson-Detroiter, a four-place cabin biplane powered with the 200 h.p. Wright Whirlwind and equipped with individual wheel brakes, electric starter, and Curtiss-Reed propeller.

The Swallow Airplane Company of Wichita, Kansas, produced the Swallow, a three or four-place biplane powered with the OX5 engine.

Travel Air Manufacturing Company of Wichita, Kansas, developed a three-place biplane, interchangeably equipped with the 90 h.p. OX5, the 160 h.p. Curtiss C-6 or the 200 h.p. Wright Whirlwind.
The Woodson Engineering Company of Bryan, Ohio, built the 2-A Express, another three-place biplane, equipped with the 260 h.p. Salmson engine.

Charles Ward Hall of New York has continued specialization in engineering development of all metal airplanes for the Army and Navy.

**Power Plants**

The motor department of the Curtiss Aeroplane and Motor Company of Buffalo, N. Y. has been very active during the year 1925. It produced the V-1400 engine, a new design which, while no larger than the D-12, develops 500 h.p. at 2100 r.p.m. This engine was used in the Curtiss racers, winning the 1925 Pulitzer Trophy and Schneider Cup Races. The first Curtiss R-1454 9-cylinder radial air-cooled engine has also been completed and is now undergoing tests. The famous D-12 motor, which has had such extensive use, has been further refined and continued in production and, in addition, preliminary designs of an entirely new type of air-cooled engine have been made, which will be produced in 1926.

The Detroit Aircraft Engine Works has produced an extremely interesting air-cooled engine, solely for commercial purposes. It is of the 5 cylinder radial type, developing 60 h.p. at 1800 r.p.m. Economy, simplicity and long life are said to be features of the engine.

The Fairchild Caminez Engine Co., Farmingdale, Long Island, N. Y., organized during the year, has produced and flown a new cam type 4 cylinder radial air-cooled motor, called the "Caminez Model 447-B." It is rated at 150 h.p. at 1200 r.p.m., has a bore and stroke of 5\(\frac{3}{8}\)\(\times\)4\(\frac{1}{2}\) in. and weighs 360 pounds complete with propeller hub and all accessories except starter. This engine, in process of development for some time, has many unique features and the production of the successful model is indicative of general activity in the aeronautical industry throughout the year in an attempt to improve aircraft power plants.

The Packard Motor Car Company of Detroit, Michigan, subjected their Models 1500 and 2500 to extensive flight testing. The direct drive type 1500 was installed and flown in various Army and Navy planes and in the inverted model used by the Navy in flight testing the Loening Amphibians. This engine was also flown considerably in the geared type. The Packard model 2500 geared type was also used in both Army and Navy machines. The 1A-1500 Packard, which is used either geared or direct, upright or inverted, although originally rated at 500 h.p. at 2100 r.p.m., has successfully passed a 50-hour
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test developing 600 h.p. at 2500 r.p.m. The 1A-2500 Model develops 800 h.p. at 2050 r.p.m. Both engines have been in quantity production for the Navy. The geared 1500 in the Navy's PN9 broke the world's record for duration and was used in Commander Rodgers' 2000 mile flight across the Pacific. The 2500 model was used in the Huff-Daland bomber, winning the bombing plane races at Mitchel Field.

The Pratt & Whitney Aircraft Company of Hartford, Connecticut, organized during the year, has produced its first engine called the Wasp. It is an air-cooled radial type, and following exhaustive Navy tests has been rated at 425 h.p. with a weight of 650 pounds. Since the maximum power of the engine is well in excess of the figure given, its weight per horsepower ratio of below 1.5 pounds per h.p. for an air-cooled type is of note. The Wasp is the first radial of large displacement, which has demonstrated ability to operate safely on high crankshaft speed, which permits of a favorable power-weight in comparison to water-cooled types on a dry weight basis and effects a considerable weight saving in the installed power plant.

The Wright Aeronautical Corporation of Paterson, N. J., has continued its policy of aircraft engine development and the Whirlwind model has passed from the "J4" to the "J4B" and the J5. During the year it has not only continued its military and naval use, but has been purchased in considerable quantities by builders of commercial craft. This 9-cylinder fixed radial air-cooled type develops 200 h.p. at 1900 r.p.m. and weighs dry 480 lbs. The Wright Cyclone 435 h.p. fixed 9-cylinder radial air-cooled has been continued and developed into the Model P-2. Their Simon Model R-1200, developing 325-350 h.p., which is another fixed radial air-cooled type, has successfully passed its 50-hour tests. The Tornado 12 cylinder 600-675 h.p. water-cooled type has been continued in production for the Navy Department. One of the new developments of the year is the manufacturing production of the "Wright-Morehouse" 25-30 h.p. 2 cylinder opposed air-cooled engine. The first models of these engines have had extensive flight tests which indicate that they will find a wide usefulness in the light airplane field.

The Allison Engineering Co. of Indianapolis, Ind., while not engaged in the production of complete new aircraft engines, has carried on general development work that is worthy of note. In addition to the design and construction of such items as reduction gears, air-cooled cylinders, etc., much successful experimental work has been accomplished for the Army Air Service, both in engines and accessories.
Plan of metal clad airship car by Aircraft Development Corp.
Airships

Lighter-than-air activity during 1925, in so far as it concerned airships progressed along two lines. The Army and Navy continued the development by experimenting with large and small military ships and training operating personnel. The manufacturers projected new ships and brought out new auxiliary apparatus. Special airship engines were produced; an all-metal airship was designed and a super-airship of the improved Zeppelin type was projected. The development of the all-metal airship and the Super-Zeppelin had reached such an advanced state by the end of the year that the Navy Department requested Congress to authorize construction of both types. Additional details regarding this entire development will be found in Chapter IX on Airships.

Government agencies have continued their efforts to increase facilities for the production of helium at less cost and in this have been successful. The results are such that this gas, of which the only large supply known is in the United States, will probably be available at reasonable cost both to the Government and to commercial operators.

The Aircraft Development Corporation of Detroit, Mich., has been responsible for the work on metal-clad airships, in addition to their other experimentation.

Airships Inc., of Hammondsport, N. Y., have carried on extensive experimentation and development work in the perfection of fabrics in connection with the execution of orders for gas cells for large airships for the Army and Navy.

The B. F. Goodrich Company, of Akron, Ohio, has devoted a great deal of time during the year to the development of materials and accessories for lighter-than-air craft such as its new 20 in. Gammeter automatic airship valve, which may function either automatically or manually. This valve has undergone both ground and flight tests by the Army and the Navy. Other activity includes the construction, under Curtiss patents, of rubber handhole covers for seaplane floats, a new type of shock absorber cord known as the "Ring Type Cord," and in connection with the rubber covering of metal propellers.

The Goodyear-Zeppelin Corporation of Akron, Ohio, constructed for the Army the largest semi-rigid thus far built in this country, known as the Super RS-1. This ship designed for the use of helium with a capacity volume of 720,000 cubic feet, gives a total lift of 41,250 pounds of which about 11,200 pounds constitutes useful load. This company has pursued its program in the perfection of plans and engineering data for large airships. The continuation of the latter,
by the most experienced engineers and operators of airships in the world, has enabled this branch of our aircraft development to continue under favorable conditions.

B. F. Goodrich Rubber Co.'s 20-inch airship valve

**Propellers**

Considerable activity and much real progress is evident in the propeller manufacturing field with an increasing trend toward the use of metal. Several propeller manufacturers have either definitely committed themselves to metal, or are seriously experimenting with it.

The Curtiss Aeroplane and Motor Company, Inc., continued the development of the Curtiss-Reed duralumin propellers, both in the familiar single piece twisted type and a new forged type which has been produced both as a one-piece and a two-piece propeller. The Collier trophy for 1925 was awarded to its inventor, Dr. Reed, for his work as the most valuable contribution to aviation during the year.

The Hamilton Aero Manufacturing Co., of Milwaukee, Wis., not only executed large production orders for their propellers but
also constructed a number of interesting experimental types, including the largest four-bladed propeller built in this country for a single engine. Included in their efforts was the building of several very wide blade metal propellers.

The Hartzell Walnut Propeller Company, of Piqua, Ohio, a pioneer in this field, has continued with success production and specialization of its standard types of propellers for the Services and the trade.

Paragon Engineers, Inc., of Baltimore, Md., have continued work on the development of controllable-pitch propellers in a wide range of sizes, up to those adapted to the 400 h.p. Liberty motor. These propellers are made with a variety of blades, including aluminum alloy, steel and plywood. They have also produced a number of very large integral blade propellers, using plywood. These are lighter than the conventional step-laminated wood propellers. In the very large sizes spruce or some other light wood is used for the inner plies. Such a propeller is under construction for the Army, to be used on 800 h.p. Packard engines.

The Standard Steel Propeller Co., of Pittsburgh, Pa., continued to develop and manufacture all-metal adjustable pitch airplane propellers which have been used by the Government in considerable quantities.

**INSTRUMENTS AND NAVIGATIONAL AIDS**

The American Gas Accumulator Company, continuing its work on flashing route beacons, has not only improved its regular products, but has brought out a new type known as the AGA 300 m/m Routing Beacon. It is equipped with a sun valve that automatically turns the light on and off at dusk and daylight, and operates for six months without attention. It has a clear weather range of about 12 miles. The special 300 m/m lens is designed to produce a "flat-ceiling light curve" and to eliminate weak indication areas. A new reflector globe has also been developed for its boundary marker beacon.

The B. B. T. Corporation, of Philadelphia, Pa., produced a complete line of aerodrome flood lights, aviation beacons, and night flying illuminating equipment.

The General Electric Company, in its airway lighting work during 1925, developed a number of new devices which have aided materially in the solution of night flying problems. For route work, the regular 24-inch beacon has been supplemented by a "cluster beacon," which is used where the contour of the land interferes with the visibility of the 24-inch beacon. Other developments include the adaptation of the 150 ampere high intensity arc lamp mechanism to the
(Top Left) Four way and vertical beacon. (Right) Revolving beacon, both by General Electric Co. (Bottom Left) 300 mm. routing beacon of American Gas Accumulator Co. (Right) 375 mm. flashing beacon of Interflash Signal Corp.
B. B. T. flood light, the production of a 120 degree landing field light, and the design of a new relay for emergency field boundary lights, insuring continued operation in the event of a lamp failure.

The Interflash Signal Corporation, of New York, has developed from the smaller light described in the last Year Book, the largest acetylene gas aviation light in the country. It is a 375 m/m light equipped with the large type of marine flashers. Among its features are great flexibility and a device for signalling from the ground.

The Pioneer Instrument Company, of New York, has continued the development and perfection of its earth inductor compass and has added to its line of standardized vertical type instruments an altimeter, a fuel quantity gauge, and an air distance gauge, making it now possible to assemble a complete instrument board, using only vertical type instruments. Other developments include a new climb indicator, registering to 5,000 feet per minute, a large hand fuel pump, and a hand-operated refuelling pump with a capacity of 1,000 gallons per hour. A notable development in navigational aids is the Pioneer Aircraft Octant, employing a Willson artificial horizon. This instrument is extremely light in weight and easy to handle in the air. It is manufactured by Brandis & Sons, and sold by the Pioneer Instrument Company.

The Radio Corporation of America, of New York, has specialized in the perfection of radio telephones, signalling and control, cooperating with the trade and the Army, Navy and Post Office Department in the perfection of this equipment.

The Sperry Gyroscope Company, of Brooklyn, continued the development and manufacture of high intensity and incandescent searchlights for airports and airways.

Accessories

As aeronautical activity in the United States extends itself into commercial fields we find more and more manufacturers going into the production of parts, materials and accessories designed especially for aeronautical use. It is interesting to note among these not only concerns newly organized, but also some of the long established manufacturers devoting part of their attention to developing products especially adapted to aircraft.

Airships Incorporated, of Hammondsport, N. Y., produced during the year an "Aircraft" for use as a portable tender or boat for a number of purposes, including aircraft. It is a small light balloon fabric, air-inflated raft, or boat, which will support a useful load of 750 pounds, and can be deflated and rolled into a small bundle for carrying.
(Top Left) Hess-Bright Deep Groove Ball Bearing. (Center) SKF Thrust Bearings. (Right) Skayef Cylindrical Roller Bearings. (Bottom) Aeromarine Starter for Airplane Engines.
The Dayton Wire Wheel Company, of Dayton, Ohio, manufactured U. S. Army and Navy standard airplane wheels, also special wire wheels for all types of airplanes.

The Eclipse Machine Company, of Hoboken, N. J., has continued its experimental and production work on aircraft engine starting devices. Their starters include both the electric and hand inertia types, numbering among their users the government and commercial concerns.

The Electric Storage Battery Company, of Philadelphia, Pa., has produced during the year a new line of Exide aircraft batteries in addition to those built to Army and Navy specifications, which are being used in some quantities by commercial concerns.

The Healey-Aeromarine Bus Company, Inc., of Keyport, N. J., has put into quantity production the "Aeromarine Inertia Starter," which includes among other users the Navy, where it has been successfully used with engines up to 800 h.p.

The Scintilla Magneto Company, Inc., of Sidney, N. Y., continues to produce its aircraft magnetos which are used in the equipment of a large number of the new engines. They have successfully developed a vertical double magneto, using a rotating magnet.

The Splitdorf Electrical Company, of Newark, N. J., is manufacturing a new aircraft magneto known as the VA Double Magneto.

The Stromberg Motor Devices Company, of Chicago, Ill., continued with the design and manufacture of carburetors and carburetor accessories for all types of aircraft engines.

The A. C. Spark Plug Company, of Flint, Mich., continued its experimental and production work on spark plugs for aircraft use.

The Eastman Kodak Company, of Rochester, N. Y., have further developed a model K-5 aerial camera and the super-sensitized anchromatic film which makes it possible to take pictures earlier and later in the day than when using the plain pane film.

The Fairchild Aerial Camera Corporation, New York, have further developed their camera used in high altitude mapping. This camera is used as standard equipment by both Army and Navy Air Services. For further particulars see Chapter VII on Aerial Photography.

The U. S. Cartridge Company of Lowell, Mass., continued development and production of extruded seamless copper tube types. This type of radiator has characteristics of strength, water flow capacity, ease of repair and high cooling efficiency.

The Moto-Meter Company, Inc., of Long Island City, N. Y., have specialized in the adaptation of their standard accessories to the peculiar and exacting needs of airplane motors and have maintained their pre-eminence in this field.
(Top Left) Stromberg carburetor used on Curtiss and Wright engines. (Right) Splitdorf magneto. (Bottom Left) Scintilla magneto. (Right) Stromberg carburetor used on Packard engines.
The number of manufacturers producing aeronautical materials and supplies is legion and there is room here for only a brief survey of their activities.

Steel products in various forms were furnished by The American Hammered Piston Ring Co., of Baltimore, manufacturers of piston rings for a large percentage of American aircraft engines. The Eberhart Aircraft Products Co., of Buffalo, N. Y., have increased their facilities and engineering development and have produced extensive armament equipment as well as parachute flares. National Steel Products Co., of Dayton, Ohio, have continued extensive manufacture of aircraft fittings and parts. Other important concerns are The Park Drop Forge Co., of Cleveland, Ohio, who built aviation crankshafts; S. K. F. Industries, Inc., of New York, manufacturers of ball and roller bearings; Steel Products Co., of Cleveland, Ohio, makers of engine parts; Wood & Spencer Co., of Cleveland, Ohio, makers of connecting rods and screw machine products; and the Wyman-Gordon Co., of Worcester, Mass., makers of crankshafts.

Plywoods especially adapted for aeronautical use were produced by the Haskelite Mfg. Co., of Chicago, Ill., and by the New Jersey Veneer Co., of Paterson, N. J.

Berry Brothers, Inc., of Detroit, Mich., specialized in aeronautical finishes, including "Berryloid," a pyroxylin enamel, and "Lionoil," a protective coating for metal parts. Others producing aeronautical dopes and finishes were E. I. DuPont de Nemours & Co., Inc., of Wilmington, Del., with a complete line of coatings, including "Duco," as well as pyralin sheeting and upholstery materials; Titanine, Inc., of Union, N. J., manufacturers of dopes and varnishes; the Valentine Co., of New York, manufactures of "Valspar," one of the best known and favorite brands; and the Perry-Austin Mfg. Co., of Grassmere, Staten Island, N. Y., a pioneer manufacturer in this field.

Streamline wire and tie-rods were manufactured by the Macwhyte Co., of Kenosha, Wis., as well as by the Stewart Hartshorn Co., of New York. John A. Roebling's Sons Co., of Trenton, N. J., produced aircraft wire and cable.

The Standard Oil Co., of Indiana, continued its development and production of aviation fuels and oils; and the Wolverine Lubricants Co. and The Vacuum Oil Co., of New York, have specialized in the production of airplane lubricants.

The Aero Supply Manufacturing Company, Inc., College Point, N. Y., developed and manufactured many special accessories, supplies
and equipment for the aircraft trade. Having moved to a new and larger factory, especially equipped for the more adequate handling of the increasing amount of business in this field.

Brewster & Company, of Long Island City, N. Y., produced during the year a large amount of special fuselages and fittings for the industry, sustaining their long established reputation for the production of work of the highest quality.

The Meisel Press Mfg. Company, of Boston, Mass., who, for a number of years have specialized in the development and production of special gears, through the perfection and excellence of their products have maintained a leading position in this field, in supplying the Services and the trade.

The Johnson Airplane & Supply Company, of Dayton, Ohio, one of the pioneers in supplying the needs of aircraft constructors and operators have enlarged and extended their business in this field. Their practical understanding of the requirements of the trade have made their facilities of increasing value and importance.

The Aluminum Company of America, of Pittsburgh, Pa., have extended their production and maintained their valuable research work in the perfection of duralumin to meet the special demands of all phases of aircraft construction. With the increasing tendency toward metal construction, the importance and significance of this work is constantly and increasingly recognized.

The Carpenter Steel Company of Reading, Pa., have enjoyed the advantage of large production due to their foresight in their extensive research work in developing special alloys, particularly adaptable for many purposes throughout the industry.

The production of fabrics suitable for airplanes, airships, and balloons has required special research work and the development of special processes of manufacture to meet the peculiar needs of the aeronautical industry.

The following are pioneer manufacturers and distributors of airplane fabrics and are recognized as leaders in this field.

AIRCRAFT AND ENGINE DESIGN
SECTION
AERIAL SERVICE CORPORATION
HAMMONDSPORT, N.Y.
"MERCURY JR" CW-1 3 PLACE COMMERCIAL PLANE
C6A ENGINE  160 H.P.  HIGH SPEED 124 MPH.
ABSOLUTE CEILING 14,300 FT.  LOW SPEED 52.8 MPH.
ATLANTIC AIRCRAFT CORP.
HASBROUCK HEIGHTS, N.J.
FOKKER UNIVERSAL COMMERCIAL MONOPLANE
ENGINE—WRIGHT WHIRLWIND 200 H.P.
DISPOSABLE LOAD—FUEL FOR 5 HOURS, PILOT AND 4-6 PASSENGERS,
OR 1000 LBS. OF CARGO. TOTAL 1500 LBS.
SPEED—120 MPH, LANDING SPEED—45 MPH.
ATLANTIC AIRCRAFT CORP
HASBROUCK HEIGHTS, N. J.,
FOKKER TRIMOTOR AIRLINER
3 WRIGHT "WHIRLWIND" 200 H.P. ENGINES.
DISPOSABLE LOAD: FUEL FOR 5 HOURS, 2 PILOTS, 8-10 PASSENGERS
AND BAGGAGE OR 2350 LBS. OF CARGO TOTAL 4000 LBS.
SPEED: 125 MPH. LANDING SPEED: 50 MPH.
221
BOEING AIRPLANE COMPANY
SEATTLE, WASH.
TYPE-TRAINING - ENGINE - J-4-A - 200 HP

222
BOEING AIRPLANE COMPANY
SEATTLE WASH
TYPE PATROL — MODEL — PB-1
TWO PACKARD IA-2500 ENGINES
BOEING AIRPLANE COMPANY
SEATTLE WASH.
TYPE - PURSUIT — MODEL - FB-4
ENGINE - P-1 - 450 H.P. AT 1800 R.P.M.
BOEING AIRPLANE COMPANY
SEATTLE WASH.
TYPE PURSUIT—MODEL PW-9A
ENGINE·D-12·375 H.P.
BOEING AIRPLANE COMPANY
SEATTLE WASH.
ENGINE-IA-1500 WITH SUPERCHARGER
520 H.P. AT 2100 R.P.M.
TYPE-PURSUIT-MODEL-XP-4
CONSOLIDATED AIRCRAFT
BUFFALO, N.Y.
PT-1 TRAINING AIRPLANE
ENGINE - WRIGHT MODEL I or E
THE "FALCON"

THE CURTISS AEROPLANE & MOTOR COMPANY INC.

BUFFALO, N.Y.

GARDEN CITY, N.Y.

229
THE "HAWK"

THE CURTISS AEROPLANE & MOTOR COMPANY INC.

BUFFALO, N.Y.

GARDEN CITY, N.Y.
THE R 3 C-1 RACER

THE CURTISS AEROPLANE & MOTOR COMPANY INC.

BUFFALO, N.Y.

GARDEN CITY, N.Y.
THE RSC-2 RACER

THE CURTISS AEROPLANE & MOTOR COMPANY INC.
BUFFALO, N.Y.

GARDEN CITY, N.Y.
THE DOUGLAS COMPANY
SANTA MONICA CALIFORNIA
COMMERCIAL TRANSPORT C-1
LIBERTY 12-420 H.P.  HIGH SPEED 120 MPH.
GROSS WEIGHT 7440*  USEFUL LOAD 3540*

236
THE DOUGLAS COMPANY
SANTA MONICA, CALIFORNIA
MAIL PLANE M-2
LIBERTY 12 - 420 H.P.
HIGH SPEED 145 M.P.H.

237
AIR EXPRESS - SPEED 50-123 M.P.H. - RANGE 510 MILES
CAPACITY 1200 LBS. - SERVICE CEILING 15,000 FT.

G. ELIAS & BRO., Inc.
AIRCRAFT DEPT.
BUFFALO NY
HUFF DALAND AIRPLANES, INC
BRISTOL ~ PENNSYLVANIA

HUFF DALAND "COMMERCIAL TRANSPORT"
BI-MOTORED MONOPLANE
(Wright J-4)
(Land or Water - Convertible)

239
HUFF DALAND AIRPLANES, INC
BRISTOL ~ PENNSYLVANIA

HUFF DALAND "PELICAN"
(U.S. NAVY HN-3)
TRAINING AIRPLANE.
(Wright J-5)
(Land or Water - Convertible)
PITCAIRN 'FLEETWING'
5-PLACE PASSENGER CARRIER
CURTISS C-6 MOTOR 160 HP AT 1750 RPM
SPEED 110-45 MPH  DURATION 3½ HR  CEILING 12500 FT.
PITCAIRN AVIATION

PHILADELPHIA  PENNSYLVANIA
SIKORSKY MANUFACTURING CORPORATION
N. Y.

OBSERVATION & TRANSPORT PLANE S-31
MOTOR: WRIGHT 200 HP  SPEED 124 MPH
USEFUL LOAD 1200 LBS  CEILING 16000 FT
LOAD FACTOR 8.5

243
SIKORSKY MANUFACTURING CORPORATION
N. Y.

TWO SEATER MESSENGER S-33
MOTOR: WRIGHT 60 HP
USEFUL LOAD 500 LBS.
SPEED 103 M.P.H.
LOAD FACTOR 8.5
Sikorsky Manufacturing Corporation
N.Y.
Transport & Mail Carrier Seaplane S-32
Motor: Liberty 400HP  Speed 133 M.P.H.
Useful Load 2200 Lbs. Ceiling 18000 Ft.
Load Factor 6.5
[Performance shown as a land plane]
245
THOMAS-MORSE AIRCRAFT CORP'N.
ITHACA, N.Y.

ALL METAL: CORPS OBS. U.S. ARMY XO-6
ENGINE: LIBERTY-12 400 H.P. W.C.

246
CHANCE VOUGHT CORPORATION
LONG ISLAND CITY, N.Y., U.S.A.
VOUGHT MODEL UF-1 SINGLE SEATER FIGHTER
SPEED - 158 M.P.H.
CLIMB IN 10 MIN. = 14,000 FT.
ENDURANCE - 3.25 HRS.
CEILING - SERVICE - 22,000 FT.
CHANCE VOUGHT CORPORATION
LONG ISLAND CITY, N.Y., U.S.A.
VOUGHT MODEL UO-I 2-PLACE NAVAL OBSERVATION PLANE
SPEED - SEA LEVEL 130 M.P.H.
CLIMB - 10 MIN. 8,600 FT.
CEILING - SERVICE 19,500 FT.
ENDURANCE - 4 HRS.
ENGINE - WRIGHT J-4A, 200 H.P.

248
CHANCE VOUGHT CORPORATION
LONG ISLAND CITY, N.Y., U.S.A.
VOUGHT MODEL UO-3 TRAINING PURSUIT
SPEED-AT 15,000 FT.-153 M.P.H.
ENDURANCE-3.75 HRS.
CEILING-31,000 FT. ABSOLUTE - 28,000 FT. SERVICE
CLIMB-TO 21,000 FT./20 MIN.

249
WRIGHT AERONAUTICAL CORPORATION
PATERSON, N.J.
WRIGHT-BELLANCA SIX SEATER COMMERCIAL

250
MC-2

DESIGN OF METAL CLAD AIRSHIP 200,000 CU. FT.
AIRCRAFT DEVELOPMENT CORPORATION
DETROIT, MICHIGAN
CURTISS AEROPLANE AND MOTOR COMPANY, INCORPORATED.
MODEL GV-1550. 12 CYLINDERS.

525 B.H.P. AT 2100 R.P.M.
600 B.H.P. AT 2400 R.P.M.

WATER COOLED.

WEIGHT 800 LBS DRY.
CURTISS AEROPLANE AND MOTOR COMPANY, INCORPORATED

MODEL V-1550. 12 CYLINDERS  WATER COOLED.

525 B.H.P. AT 2100 R.P.M.
600 B.H.P. AT 2400 R.P.M.

WEIGHT 700 LBS. DRY
FAIRCHILD CAMINEZ ENGINE CORPORATION
270 WEST 38 STREET NEW YORK N.Y.
MODEL 447-B 4 CYLINDER AIR COOLED CAM ENGINE
RATED 150 H.P AT 1200 R.P.M 360 LBS COMPLETE,
PACKARD MOTOR CAR COMPANY - DETROIT, MICH.
MODEL: 2A-1500 12 CYLINDERS  WATER COOLED
600 B.H.P. AT 2500 R.P.M.  730 LBS. DRY  30 LBS. WATER
PACKARD MOTOR CAR COMPANY - DETROIT, MICH.

MODEL: CA-1500  GEARED 2:1  12 CYLINDERS  WATER COOLED

600 B.H.P. AT 2500 ENGINE R.P.M.  850 LBS. DRY  30 LBS. WATER
PACKARD. MOTOR CAR COMPANY - DETROIT, MICH.

MODEL: 2-A-1500  12 CYLINDERS  WATER COOLED

600 B.H.P. AT 2500 R.P.M.  750 LBS. DRY  30 LBS. WATER
PACKARD MOTOR CAR COMPANY ~ DETROIT, MICH.

MODEL: 2A 2500
12 CYLINDERS
WATER COOLED

800 B.H.P. AT 2000 ENGINE R.P.M.
1146 LBS. DRY
39 LBS. WATER
PACKARD MOTOR CAR COMPANY - DETROIT, MICH.

MODEL: ZA-2500  GEARED 2:1  12 CYLINDERS  WATER COOLED
800 B.H.P. AT 2000 ENGINE R.P.M.  1300 LBS. DRY  39 LBS. WATER
WRIGHT AERONAUTICAL CORPORATION—PATERSON, N. J.

MODEL—TORNADO 12 CYLINDERS WATER COOLED.

STANDARD—600 B.H.P. AT 2000 R.P.M. WT. DRY 1154 LBS
WRIGHT AERONAUTICAL CORPORATION - PATERNON, N.J.
MODEL - WHIRLWIND  9 CYLINDERS  AIR COOLED.
STANDARD - 200 B.H.P. AT 1800 R.P.M. W.T. DRY 482 LBS.
WRIGHT AERONAUTICAL CORPORATION - PATERNON, N.J.
MODEL - WRIGHT-MOREHOUSE 2 CYLINDERS AIR COOLED.
STANDARD - 29 B.H.P. AT 2500 R.P.M. WT. DRY 89 LBS.
APPENDIX
AERONAUTICAL CHAMBER OF COMMERCE OF AMERICA, INC.
300 Madison Ave., New York, N. Y.

OBJECTS OF THE AERONAUTICAL CHAMBER OF COMMERCE OF AMERICA, AS SET FORTH IN THE ARTICLES OF INCORPORATION

To foster, advance, promulgate, and promote trade and commerce, throughout the United States, its territories, possessions, and in foreign countries, in the interests of those persons, firms or corporations engaged in the business of manufacturing, buying, selling and dealing in aircraft, aircraft motors, and aircraft parts and accessories of every kind and nature.

To reform any and all abuses which may arise relative thereto.

To secure for its members and those persons, firms or corporations dealing with them, freedom from unjust or unlawful exactions of whatever description.

To diffuse among its members accurate and reliable information as to the standing of its members and those persons, firms or corporations engaged in similar lines of business.

To procure uniformity and certainty in the customs and usages of trade and commerce among its members and those persons, firms or corporations having a common trade, business or professional interest in all matters pertaining to aeronautics.

To aid and assist in mapping out air roads and lanes, the location of landing fields, airdromes, hangars, or such other structures as may be necessary for the advancement of aeronautics.

To advocate and promote in every lawful way the enactment of just and equitable laws, both national and state, pertaining to aeronautics.

To settle, adjust and arbitrate any and all differences which may arise between its members, and persons, firms or corporations dealing with them.

To promote a more enlarged and friendly intercourse between its members and persons, firms or corporations engaged in the business of, or dealing in aircraft, motors and aircraft parts and accessories.

To acquire by grant, gift, purchase, devise, bequest, and to hold and dispose of, such property or assets as the purposes of the corporation shall require, subject to such restrictions as may be prescribed by law, and

Generally to do every act and thing which may be necessary and proper for the advancement of the aeronautical art and industry and the accomplishment of the objects and purposes hereinbefore set forth; provided, however, that nothing herein contained shall authorize this corporation to engage in any business for pecuniary profit.

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AIRCRAFT YEAR BOOK

GOVERNORS

Samuel S. Bradley.
Charles H. Colvin.
Edward K. Davis.
A. J. Elias.
Sherman M. Fairchild.

Lester D. Gardner.
C. M. Gallup.
Paul Henderson.
Thomas H. Huff.
Charles L. Lawrence.

C. T. Ludington.
Harold F. Pitcairn.
Frank H. Russell.
George P. Tidmarsh.
W. C. Young.

OFFICERS

President........................... Charles L. Lawrance.
First Vice-President................ Thomas H. Huff.
Second Vice-President.............. Paul Henderson.
Third Vice-President................. George P. Tidmarsh.
Treasurer.......................... Sherman M. Fairchild.
General Manager and Assistant Treas.................. Samuel S. Bradley.
Secretary......................... W. C. Young.
Assistant Secretary............... Owen Shannon.

COMMITTEES

Executive
Charles L. Lawrance, Chairman.

Airship
Charles H. Colvin.

W. C. Young, Chairman.

Henry Wacker.
Harry Vissering.
Ralph Upson.
Beckwith Havens.

Operators and Terminals
C. S. Jones, Chairman.

E. A. Johnson.
C. T. Ludington.
R. H. Depew, Jr.
W. E. Arthur.

Aircraft Standardization
Frank H. Russell, Chairman.

Ralph Upson.
Grover C. Loening.
Samuel S. Bradley.

Membership
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Charles H. Colvin.

Lester D. Gardner.

Patents
Stephen H. Philbin.
J. P. Tarbox.

Trade Practice
Grover C. Loening, Chairman.

Frank H. Russell.
J. L. Callan.

Charles H. Colvin.

State Committees
California—Donald Douglas, Los Angeles.
Connecticut—F. B. Bentschler, Hartford.
Delaware—E. R. Armstrong, Wilmington.
Florida—Glenn H. Curtiss, Hialeah.
Illinois—Allan Jackson, Chicago.
Indiana—N. H. Gilman, Indianapolis.
Maryland—Spencer Heath, Baltimore.
Michigan—J. G. Vincent, Detroit.
Minnesota—M. A. Northrop, Minneapolis.
Missouri—W. B. Robertson, St. Louis.
New Jersey—C. G. Peterson, Paterson.
Ohio—E. A. Johnson, Dayton.

Texas—J. H. McEvoy, Jr., Houston.
Washington (State)—P. G. Johnson, Seattle.
Wisconsin—Thomas Hamilton, Milwaukee.

MEMBERS AND SUBSCRIBERS

Pioneers
Orville Wright, Dayton, Ohio.
Glenn H. Curtiss, Garden City, N. Y.

Manufacturing and Engineering

Aerial Service Corp., Hammondsport, N. Y.
Aircraft Development Corp., Detroit, Mich.
Airships Incorporated, Hammondsport, N. Y.
Boeing Airplane Co., Seattle, Wash.
Buhl-Verville Aircraft Co., Detroit, Mich.
Consolidated Aircraft Corp., Buffalo, N. Y.
Curtiss Aeroplane & Motor Co., Inc., Garden City, N. Y.
The Douglas Co., Santa Monica, Calif.
Eberhart Aeroplane & Motor Co., Inc., Buffalo, N. Y.
G. Elias & Bro., Inc., Buffalo, N. Y.
Fairchild Aviation Corp., New York, N. Y.
MEMBERS AND SUBSCRIBERS

Manufacturing and Engineering (Cont.)

B. F. Goodrich Rubber Co., Akron, Ohio.
The Goodyear Tire & Rubber Co., Inc., Akron, Ohio.
Healey-Aeromarine Bus Co., Inc., Keypont, N. J.
Charles Ward Hall, Inc., New York, N. Y.
Manufacturers Aircraft Association, Inc., New York, N. Y.

Pratt & Whitney Aircraft Co., Hartford, Conn.
Remington-Burnelli Aircraft Corp., New York, N. Y.
Sikorsky Manufacturing Corp., New York, N. Y.
Thomas-Morse Aircraft Corp., Ithaca, N. Y.
Chance Vought Corp., Long Island City, N. Y.
Wright Aeronautical Corp., Paterson, N. J.

Operators and Distributors

Anton F. Brots, Sr., Kohler, Wis.
Curtiss Metropolitan Airplane Co., New York, N. Y.
Orton Hoover, (Curtiss Aeroplane Export Corp.), Rio de Janeiro, Brazil.
G. Sumner Ireland, Garden City, N. Y.

Lawrence Leon (Curtiss Aeroplane Export Corp.), Buenos Aires, Argentina.
R. B. C. Noorduyn, (Fokker), Hasbrouck Heights, N. J.
Marvin Northrup, Minneapolis, Minn.
National Air Transport, Inc., Chicago, Ill.
Robertson Aircraft Corp., Anguilla, Mo.
Sweeney Aviation School, Kansas City, Mo.
Walter T. Varney, San Francisco, Calif.
P. J. Williams (Williams Bros. Aircraft Corp.), San Francisco, Calif.

Accessories and Supplies

Aero Supply Mfg. Co., College Point, N. Y.
Allison Engineering Co., Indianapolis, Ind.
Aluminum Co. of America, Pittsburgh, Pa.
American Gas Accumulator Co., Elizabeth, N. J.
American Hammered Piston Ring Co., Baltimore, Md.
Armour & Co., Chicago, Ill.
Berry Bros., Inc., Detroit, Mich.
Breuer & Co., Long Island City, N. Y.
The Carpenter Steel Co., Reading, Pa.
Dayton Wire Wheel Co., Dayton, Ohio.
Eastman Kodak Co., Rochester, N. Y.
Eberlehan Aircraft Products Co., Inc., Buffalo, N. Y.
Ellipse Machine Co., Inc., Hoboken, N. J.
General Electric Co., Schenectady, N. Y.
Hartzell Walnut Propeller Co., Piqua, Ohio.
Stewart Hartshorn Co., New York, N. Y.
Interflash Signal Corp., New York, N. Y.
Macwryte Company, Kenosha, Wis.
Mosler Metal Products Co., Mt. Vernon, N. Y.
Moto-Meter Co., Inc., Long Island City, N. Y.

National Steel Products Co., Dayton, Ohio.
Navigator Instruments, Inc., San Francisco, Calif.
New Jersey Veneer Co., Paterson, N. J.
Park Drop Forge Co., Cleveland, Ohio.
Paragon Engineers, Inc., Baltimore, Md.
Perry Austen Mfg. Co., Grasmere, N. Y.
Pioneer Instrument Co., Brooklyn, N. Y.
Radio Corp. of America, New York, N. Y.
John A. Roebling's Sons Co., Trenton, N. J.
Scintilla Magneto Co., Inc., Sidney, N. Y.
SKF Industries, New York, N. Y.
A. G. Spalding & Bros., Inc. New York, N. Y.
Sperry Gyroscope Co., Brooklyn, N. Y.
Sptteldorf Electrical Co., Newark, N. J.
Standard Oil Co. (Indiana) Chicago, Ill.
Standard Oil Co. (Calif.), San Francisco, Calif.
Steel Products Co., Cleveland, Ohio.
Stromberg Motor Devices Co., Chicago, Ill.
W. Harris Thurston & Co., New York, N. Y.

Titanium, Inc., Union, N. J.
E. S. Twinning & Co., New York, N. Y.
Valentine & Co., New York, N. Y.
Wamsutta Allis, New Bedford, Mass.
Wellington, Sears & Co., New York, N. Y.
The Wood & Spence Co., Cleveland, Ohio.

Public Relations

Geo. S. Wheat, New York, N. Y.

Insurance

H. H. Salmon, Jr. (Johnson & Higgins), New York, N. Y.
Travelers Insurance Co., Hartford, Conn.
Duncan A. Woodman, New York, N. Y.

Publications

American Machinist (Fred H. Colvin), New York, N. Y.
Aviation (L. D. Gardner), New York.
U. S. Air Services Magazine (Earl N. Findley), Washington, D. C.
**AIRCRAFT YEAR BOOK**

**Executives, Engineers, Designers, Pilots**

<table>
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<th>Name</th>
<th>Position</th>
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<td>E. R. Armstrong</td>
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<td>Luther K. Bell</td>
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**MANUFACTURERS AIRCRAFT ASSOCIATION, Inc.**

300 Madison Ave., New York City

**Membership**

- Aeromarine Plane & Motor Company, Keyport, N. J.
- Boeing Airplane Company, Seattle, Wash.
- Curtiss Aeroplane & Motor Co., Inc., Garden City, N. Y.
- Curtiss Engineering Corp., Garden City, N. Y.
- Dayton-Wright Company, Dayton, Ohio
- Douglas Company, Santa Monica, Calif.
- G. Elias & Bro., Inc., Buffalo, N. Y.
- Fisher Body Corporation, Detroit, Mich.
- Gallaudet Aircraft Corp., East Greenwich, R. I.
- L. W. F. Engineering Co., College Point, L. I., N. Y.
- Glenn L. Martin Company, Cleveland, Ohio
- Packard Motor Car Company, Detroit, Mich.
- Sturtevant Aeroplane Company, Boston, Mass.
- Thomas-Morse Aircraft Corp., Ithaca, N. Y.
- Chance Vought Corporation, Long Island City, N. Y.
- Wright Aeronautical Corp., Paterson, N. J.
- Standard Aero Corp., Plainfield, N. J.

Three members have ceased the manufacture of aircraft and withdrawn from the Association.

**Directors**

- F. H. Russell
- Chas. L. Lawrance
- C. M. Vought
- Glenn L. Martin
- Donald Douglas
- Geo. P. Tidmarsh
- A. J. Elias

**Officers**

- President: F. H. Russell
- Vice-President: G. L. Martin
- Treasurer: C. L. Lawrance
- Secretary: C. M. Vought
- General Mgr. & Ass't Treasurer: S. S. Bradley

**NATIONAL AERONAUTIC ASSOCIATION OF THE U.S.A., Inc.**

1623 H Street N.W., Washington, D. C.

President, Godfrey L. Cabot, Boston; Vice-President, Carl H. Woffrey, St. Joseph, Mo.; Treasurer, Col. B. F. Castle, New York; Secretary, Donald W. Douglas, Santa Monica, Cal.; Governors by States—Maj. J. A. Meissner, Ala.; Felix J. Smart, Jr., Ark.; Donald W. Douglas, Cal.; Carl S. Milliken, Colo.; L. S. Horner, Conn.; Dr. C. W. Lewis,
APPENDIX

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D. of C.; Herbert E. Ross, Fla.; R. E. Lee Cone, Ga.; Dr. R. R. Ferguson, Ill.; Arthur
P. Hall, Ind.; Ralph W. Cram, La.; A. E. Merriam, Kan.; A. H. Bowman, Ky.; Frank
Carl B. Fritzshe, Mich.; Ed. T. Chapman, Jr., Minn.; Samuel Kaye, Jr., Miss.; Harry
Block, Mo.; Gould Dietz, Nebr.; R. S. Fegg, N. H.; C. G. Peterson, N. J.; Maj. E. B.
Lyon, N. M.; Emmer A. Sperry, N. Y.; G. L. Martin, O.; C. T. Ludington, Pa.; E. F.

GOVERNORS BY TERRITORIES—T. A. Marquam, Alaska; Walter F. Dillingham, Hawaii;
M. H. Oldfather, Porto Rico.

Cracken, Jr., Ill.; Howard F. Wehrle, Mo.; Moorhead Wright, Ark.

CHAIRMEN OF COMMITTEES—Executive, Porter H. Adams; Foreign Relations, Sidney
R. Veit; Contingent, Orville Wright; Program, H. E. Coffin; Legislative, Wm. P. Mac
Cracken, Jr.; Membership, Carl H. Woffley; Publicity, John W. Pattison; Civic Organiza
tion, C. H. Woffley; Honorary Membership, Porter H. Adams; Publications, F. B. Patterson;
Finance, Godfrey L. Cabot.

U. S. AIR SERVICE, WAR DEPARTMENT

Munitions Building, Washington, D. C.

ORGANIZATION

The functions of the Office of the Chief of Air Service are divided among the following
Divisions: Personnel, Supply, Engineering, Training and War Plans, Information, Indus
trial War Plans, and Finance. There is also a Medical Section. The Executive office,
which is the controlling office, is headed by the Chief of Air Service who is a Major
General. The Chief of Air Service has as assistants a Brigadier General who is the
Assistant Chief of Air Service; a Major, who is known as the Executive; and two Cap
tains—two Assistant Executives. The Chief of the Personnel and the Supply Divisions
are Lieutenant Colonels. The chief of the other divisions are Majors with the exception
of the Medical Section, the chief of which is a Lieutenant Colonel, with a Major as
Assistant.

OFFICERS ON DUTY IN WASHINGTON

Major General Mason M. Patrick, Chief of Air Service.
Brig. General James E. Pechet, Assistant Chief of Air Service.

L. Colonels—Wm. R. Davis, Ira F. Travel, Wm. E. Gilmore, Roy C. Kirkland, R. H.
Young.

Majors—Gerald C. Braut, Henry B. Clagett, Ralph P. Cousins, Herbert A. Dargue,
Shepler W. Fitzgerald, Wm. H. Garrison, Jr., Thomas J. Hanley, Jr., Robert R. Harmon,
William F. Harmon, Wm. N. Henley, Jr., Byron O. Jones, John J. Jenett, Walter G.
Kilner, Rush B. Lincoln, Lawrence W. McIntosh, Henry C. Pratt, John D. Reardon, Carl
Spatz, Roycroft Walsh, Wood S. Woolford.

Captains—Bruce V. Janecum, Morris Berman, Arthur W. Brock, Jr., Wm. H. Crom,
Ira C. Esber, Oliver P. Echols, Idwal H. Edwards, Ross G. Hoyt, Robert Oldys, Charles
T. Phillips, Orlo H. Quinn, Eugene G. Reinartz, Cleon H. Reynolds, Andrew W. Smith,
C. H. Schwarz Waelder, Otto G. Trunk, Robert L. Walsh, Donald Wilson, Ralph H.
Woodin, Frank W. Wright.

Lieutenants—Lucas V. Braut, Jr., Chas. C. Channey, Burnie R. Dallas, Harry A.
Dinger, Alonzo M. Drake, Donald G. Duke, Harold L. George, John S. Gullett, Ernest
Jones, A. K. Ladd, R. H. Lawter, M. S. Lawton, C. F. McFarlane, J. M. McDonnell,
Harry G. Montgomery, Bob E. Nowland, L. D. Schulze, W. I. Scott, S. C. Skeepp,
John E. Upson.

ENGINEERING DIVISION

McCook Field, Dayton, O.

Major J. F. Curry, Commanding Officer.

Majors—Paul T. Rock, R. A. Hale, F. M. Kennedy, Leslie MacDill, H. S. Martin,
T. DeW. Melting, D. W. Morey, J. H. Rudolph.

Captains—G. E. Brower, O. S. Ferson, R. A. Greer, M. G. Healy, J. H. Houghton,

Lieutenants—E. E. Batten, L. R. Brumley, R. G. Breeze, D. L. Bruner, D. S.
Burns, F. O. Carroll, F. E. Cotran, O. E. Coufard, R. C. Coupland, C. E. Cruinne,
AIR FORCE


F I F T H C O R P S A R E A—Includes Ohio, West Virginia, Indiana and Kentucky; headquarters, Ft. Hayes, Columbus, Ohio. Air Service Officer, Lieut. Col. Seth W. Cook.

S I X T H C O R P S A R E A—Includes Illinois, Michigan, Wisconsin, the post of Jefferson Barracks, Mo., and Arcadia Target Range, Arcadia, Mo.; headquarters, 1839 W. Pershing Road, Chicago, Ill. Air Officer, Major J. H. Preman.

S E V E N T H C O R P S A R E A—Includes Missouri, Kansas, Arkansas, Iowa, Nebraska, Minnesota, North Dakota and South Dakota; headquarters, Army Building, Omaha, Neb. Air Service Officer, Capt. R. G. Ervin.

E I G H T H C O R P S A R E A—Includes States of Texas, Oklahoma, Colorado, New Mexico, and Arizona, except that portion thereof west of western longitude 114° and south of north latitude 33°, which is attached to the Ninth Corps Area for purposes of administration, training, and tactical control in connection with Border Patrol and field operations incident thereto; headquarters, Ft. Sam Houston, San Antonio, Texas. Air Service Officer, Capt. Thos. W. Hasty.

N I N T H C O R P S A R E A—Includes States of Washington, Oregon, Idaho, Montana, Wyoming, Utah, Nevada, and California, and that portion of Arizona which is attached for certain specific purposes only; headquarters, Presidio of San Francisco, Calif. The Territory of Alaska is attached to the Ninth Corps Area. Air Service Officer, Lt. Col. Frank F. Lahn.

H A W A I I A N D E P A R T M E N T—Includes all islands belonging to the United States within area between 150° west longitude and 166° east longitude and between 15° south latitude and 30° north latitude; headquarters, Honolulu, Hawaii. Air Service Officer, Major Robert E. M. Gooldrick.

P H I L I P P I N E D E P A R T M E N T—Includes all islands of Philippine Archipelago; headquarters, Manila, P. I. Air Service Officer, Major Charles J. Browne.

U. S. FORCES IN CHINA—American Barracks, Tientsin, China.

P A N A M A C A N A L D E P A R T M E N T—Includes entire Canal Zone; headquarters, Quarry Heights, Balboa Heights, Canal Zone. Air Service Officer, Maj. Follett Bradley.

J A N U A R Y 1, 1926.


<table>
<thead>
<tr>
<th>Station</th>
<th>P. O. Address</th>
<th>Troops and activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akron, Ohio</td>
<td>Goodyear Tire &amp; Rubber Co., Akron, Ohio</td>
<td>District Office, Balloon Production &amp; Inspection Procurement Section.</td>
</tr>
<tr>
<td>Brooks Field</td>
<td>San Antonio, Tex.</td>
<td>11th School Group Hq., 46th, 47th School Sq., 62nd Service Sq., Primary Flying School, Flying Cadet Det.</td>
</tr>
<tr>
<td>Buffalo, N. Y.</td>
<td>398 Ellicott Square, Buffalo, N. Y.</td>
<td>Procurement Planning Representative</td>
</tr>
<tr>
<td>*Chanute Field</td>
<td>Rantoul, Ill.</td>
<td>Technical School, School Troops.</td>
</tr>
<tr>
<td>Chicago, Ill.</td>
<td>1839 W. Pershing Road, Chicago, Ill.</td>
<td>Procurement Planning Representative</td>
</tr>
<tr>
<td>Detroit, Mich.</td>
<td>802 Farwell Building, Detroit, Mich.</td>
<td>Procurement Planning Representative</td>
</tr>
<tr>
<td>*Fairfield Air Intermediate Depot (and Wright Field)</td>
<td>Fairfield, Ohio</td>
<td>Supply &amp; Repair Depot, Field Service Section.</td>
</tr>
</tbody>
</table>

*See stations under Corps Area, Dept., Dist. or Post Commanders.
### APPENDIX

<table>
<thead>
<tr>
<th>Station</th>
<th>P. O. Address</th>
<th>Troops and Activities</th>
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</thead>
<tbody>
<tr>
<td>Langley Field</td>
<td>Hampton, Va.</td>
<td>2d Wing Ho. 50th Obs. Sq. 19th Airship Co. 2d Bomb. Group Hq. 51st, 20th, 59th Bomb Sq. 58th, 59th Service Sq. less Det. at Aberdeen, 2d, 20th Photo Sec. Tactical School. Flying Field.</td>
</tr>
<tr>
<td>Little Rock Air Inter-</td>
<td>Little Rock, Ark.</td>
<td>Supply Depot.</td>
</tr>
<tr>
<td>Middletown Air Inter-</td>
<td>Middletown, Pa.</td>
<td>Supply Depot, Industrial War Plans Section.</td>
</tr>
<tr>
<td>Rockwell Air Inter-</td>
<td>Rockwell Field, Coronado, California</td>
<td>Supply &amp; Repair Depot, Flying Field.</td>
</tr>
<tr>
<td>intermediate Depot</td>
<td>San Antonio, Texas</td>
<td>Supply &amp; Repair Depot.</td>
</tr>
<tr>
<td>San Francisco, Calif.</td>
<td>Room 624 Exchange Block, 300 Pine St.</td>
<td>Procurement Planning Representative.</td>
</tr>
<tr>
<td>Scott Field</td>
<td>Scott Field, Ill.</td>
<td>8th, 9th, 12th Airship Co. 21st Airship Grp. Hq. 21st Photo Sec. 24th Airship Service Co. Balloon &amp; Airship School. Air Intermediate Depot.</td>
</tr>
<tr>
<td>Stinson Field</td>
<td>San Antonio, Texas</td>
<td>Intermediate Landing Field.</td>
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### STATIONS AND ORGANIZATIONS UNDER JURISDICTION OF CORPS AREA, DEPT., DIST. OR POST COMMANDERS

<table>
<thead>
<tr>
<th>Station</th>
<th>P. O. Address</th>
<th>Troops and Activities</th>
</tr>
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<tbody>
<tr>
<td>Armstrong, Ft.</td>
<td>Honolulu, Hawaii</td>
<td>Air Depot.</td>
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<tr>
<td>Bliss, Ft.</td>
<td>Ft. Bliss, Texas</td>
<td>1st Photo Sec. 1st Obs. Squ. (less Det. at Ft. Sam Houston) Border Patrol.</td>
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<tr>
<td><strong>Bolling Field</strong></td>
<td>Anacostia, D. C.</td>
<td>18th Hq. Sq. 3rd Photo Sec. 9th Obs. Sq. 56th Service Sq. Flying Field.</td>
</tr>
<tr>
<td>Bowman Field</td>
<td>Louisville, Ky.</td>
<td>Intermediate Landing Field.</td>
</tr>
<tr>
<td>+Chanute Field</td>
<td>Rantoul, Ill.</td>
<td>5th Photo Sec. 15th Obs. Sq.</td>
</tr>
<tr>
<td>Clark Field</td>
<td>Camp Statusburg, P. I.</td>
<td>3rd Pursuit Sq.</td>
</tr>
<tr>
<td>Clover Field</td>
<td>Santa Monica, Calif.</td>
<td>Airframe.</td>
</tr>
<tr>
<td>Croissy Field</td>
<td>Presidio of San Francisco, Calif.</td>
<td>Aerial Coast Defense, Forest Patrol.</td>
</tr>
</tbody>
</table>

* See Stations under Corps Area, Dept., Dist. or Post Commander.  
** Correspondence thru C.G. District of Washington.
<table>
<thead>
<tr>
<th>Station</th>
<th>P. O. Address</th>
<th>Troops and Activities</th>
</tr>
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<tbody>
<tr>
<td>Fairfield Air Interme-</td>
<td>Fairfield, Ohio</td>
<td>88th Obs. Sq., 7th Photo Sec.</td>
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<tr>
<td>ditate Depot (and</td>
<td></td>
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<tr>
<td>Wright Field)</td>
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<tr>
<td></td>
<td>Canal Zone,</td>
<td></td>
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<tr>
<td>Houston, Ft. Sam</td>
<td>Ft. Sam Houston</td>
<td>44th Photo Sec. Det. 12th Obs. Sq.</td>
</tr>
<tr>
<td></td>
<td>Tex.</td>
<td></td>
</tr>
<tr>
<td>Kindley Field</td>
<td>Fort Myles,</td>
<td>Intermediate Landing Field.</td>
</tr>
<tr>
<td></td>
<td>Corregidor, P.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L. I.</td>
<td></td>
</tr>
<tr>
<td>Langin Field</td>
<td>Alexandriaville,</td>
<td>Intermediate Landing Field.</td>
</tr>
<tr>
<td></td>
<td>W. Va.</td>
<td></td>
</tr>
<tr>
<td>Laredo Airdrome</td>
<td>Laredo, Texas</td>
<td>Det. 12th Obs. Sq. (from Ft. Sam</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Houston)</td>
</tr>
<tr>
<td>Leavenworth, Ft. (The</td>
<td>Ft. Leavenworth,</td>
<td>Air Service Det.</td>
</tr>
<tr>
<td></td>
<td>Kan.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Command and General Staff School</td>
</tr>
<tr>
<td>Logan Field</td>
<td>Dundalk, Md.</td>
<td>Intermediate Landing Field.</td>
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<tr>
<td>Lunar Airports</td>
<td>Cincinnati, Ohio</td>
<td>(Station Airdrome.</td>
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<td></td>
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<tr>
<td>Lake Field</td>
<td>Honolulu, Hawaii</td>
<td>5th Comp. Grp. Hqrs. 6th Pursuit Sq. 65th Service Sq. 11th Photo Sec. 23rd Bomb Sq. Aerial Coast Defense. 72nd Bomb Sq. 19th Pursuit Sq.</td>
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<tr>
<td>Marshall Field</td>
<td>Ft. Riley, Kan.</td>
<td>9th Obs. Sq. 9th Photo Sec.</td>
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<tr>
<td>Maxwell Field</td>
<td>Montgomery, Ala.</td>
<td>22nd Obs. Sq. less Det. at Ft. Bragg.</td>
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<tr>
<td></td>
<td></td>
<td>4th Photo Sec.</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Mitchel Field</td>
<td>Mitchell Field,</td>
<td>9th Obs. Grp. Hqrs. 8th, 14th Photo Sec. 1st Obs. Sq. 5th Obs. 61st Service Sq.</td>
</tr>
<tr>
<td></td>
<td>L. I., New York</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Luzon, P. l.</td>
<td></td>
</tr>
<tr>
<td>Norton Field</td>
<td>Columbus, Ohio</td>
<td>Corps Area Hqrs. Flight.</td>
</tr>
<tr>
<td></td>
<td>Ground, Md.</td>
<td></td>
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<tr>
<td>Pope Field</td>
<td>Fayetteville, N.</td>
<td>Det. 22nd Obs. Sq. Artillery Firing Center.</td>
</tr>
<tr>
<td></td>
<td>C.</td>
<td></td>
</tr>
<tr>
<td>Post Field</td>
<td>Ft. Sill, Oklahoma</td>
<td>44th Obs. Sq. 23rd Photo Sec. Flying Field.</td>
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<td>Richards Field</td>
<td>Kansas City, Mo.</td>
<td>Intermediate Landing Field.</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>***Ross Field</td>
<td>Arcadia, Calif.</td>
<td>Det. 91st Obs. Sq. (See Crissy Field).</td>
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<tr>
<td>Selfridge Field</td>
<td>Mt. Clemens, Mich.</td>
<td>57th Pursuit Grp. Hqrs. 37th Service Sq. 17th, 27th, 94th, 95th Field.</td>
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<tr>
<td>Woodward Field</td>
<td>Salt Lake City,</td>
<td>Intermediate Landing Field, Airdrome.</td>
</tr>
<tr>
<td></td>
<td>Utah.</td>
<td></td>
</tr>
</tbody>
</table>

† See Stations under Chief of Air Service.

*** Inactive.

†† Under jurisdiction of Post Commander.
## APPENDIX

### AIRWAYS SECTION

**MODEL AIRWAY CONSOLIDATED STATISTICAL RECORD**

**CHART—FISCAL YEAR**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Flights Started</td>
<td>117</td>
<td>134</td>
<td>145</td>
<td>167</td>
<td>21</td>
<td>20</td>
<td>20</td>
<td>21</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Flights Completed</td>
<td>130</td>
<td>135</td>
<td>145</td>
<td>167</td>
<td>21</td>
<td>20</td>
<td>20</td>
<td>21</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Hours Flown</td>
<td>2,086</td>
<td>3,187</td>
<td>4,337</td>
<td>5,286</td>
<td>5,038</td>
<td>6,147</td>
<td>6,246</td>
<td>5,326</td>
<td>5,638</td>
<td>4,583</td>
</tr>
<tr>
<td>Passengers</td>
<td>1,886</td>
<td>4,337</td>
<td>4,524</td>
<td>5,538</td>
<td>669</td>
<td>763</td>
<td>793</td>
<td>614</td>
<td>873</td>
<td>732</td>
</tr>
<tr>
<td>Express (lbs.)</td>
<td>117</td>
<td>134</td>
<td>145</td>
<td>167</td>
<td>21</td>
<td>20</td>
<td>20</td>
<td>21</td>
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<td>Wages</td>
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<td>Accidents</td>
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<td>0</td>
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<tr>
<td>Fatalities</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Flights Abandoned. (Excluding crashes)</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Iowa (State)</td>
<td>73,730</td>
<td>67,989</td>
<td>58,892</td>
<td>9,235</td>
<td>10,884</td>
<td>10,870</td>
<td>8,534</td>
<td>9,041</td>
<td>6,209</td>
<td>9,019</td>
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<tr>
<td>Oil Consumed, (Qu.)</td>
<td>18,206</td>
<td>14,727</td>
<td>20,206</td>
<td>1,889%</td>
<td>3,023</td>
<td>3,061</td>
<td>2,159</td>
<td>2,195</td>
<td>1,612</td>
<td>2,677</td>
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<tr>
<td>Flights Cancelled.</td>
<td>0</td>
<td>5</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Father Ludgers</td>
<td>157,180</td>
<td>240,980</td>
<td>255,750</td>
<td>23,315</td>
<td>35,820</td>
<td>29,250</td>
<td>21,525</td>
<td>28,328</td>
<td>11,145</td>
<td>31,816</td>
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<td>Delaware</td>
<td>107</td>
<td>117</td>
<td>117</td>
<td>21</td>
<td>35</td>
<td>30</td>
<td>34</td>
<td>46</td>
<td>78</td>
<td>60</td>
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<tr>
<td>Expenses</td>
<td>3,137,816</td>
<td>101,141</td>
<td>5,889,356</td>
<td>126,10</td>
<td>127,345</td>
<td>418,851</td>
<td>186,467</td>
<td>494,15</td>
<td>321,78</td>
<td>739,35</td>
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### LANDING FIELDS IN UNITED STATES

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# AIRCRAFT YEAR BOOK

## LIST OF MUNICIPAL LANDING FIELDS

### ALABAMA
- Mobile
- Montgomery
- Arkansas
- Little Rock
- Pine Bluff (2)

### ARIZONA
- Apache Pass
- Benson
- Casa Grande
- Cochise
- Flagstaff
- Gila Bend
- Hallbrook
- Kingman (2)
- Marana
- Maricopa
- Phoenix (2)
- San Simon
- Seigman
- Sentinel
- Showa
- Tucson
- Vail
- Wellton (2)
- Williams
- Winslow (2)
- Yuma

### CALIFORNIA
- Amboy (2)
- Angels Camp
- Auburn
- Bakersfield
- Barstow
- Bridgeport
- Calexico
- Campo
- Chico
- Chowchilla
- Concord
- Corning (2)
- El Centro
- Fresno
- Glendale
- Grays Well
- Jacumba (Hot Springs)
- Long Beach
- Los Angeles (2)
- Modesto
- Needles
- Oakland
- Palm Springs
- Pasadena
- Redding
- Redlands
- Sacramento
- Santa Cruz
- Seeley
- Stockton
- Torrance
- Venice
- Woodland
- Yreka

### COLORADO
- Colorado Springs
- Grand Junction (2)
- Leadville
- Pueblo

### CONNECTICUT
- Bridgeport
- Hartford

### DISTRICT OF COLUMBIA

### FLORIDA
- Bartow
- Daytona Beach (Seaplane)
- Fort Myers
- Kissimmee
- Lakeland
- Miami
- Ocala
- Sarasota
- Sebring
- Tallahassee
- Tampa
- Titusville

### GEORGIA
- Ashburn
- Atlanta
- Augusta
- Columbus
- Dawson
- Fitzgerald
- Hawkinsville
- Mccou
- Marshallville
- McRae
- Savannah (2)
- Thomaston
- Valdosta
- Washington
- Waycross

### IDAHO
- Boise
- Coeur D'Alene (2)
- Pocatello

### ILLINOIS
- Bloomington
- Chicago
- Monmouth
- Rushville

### INDIANA
- Ft. Wayne
- Muncie
- Terre Haute
- Vincennes

### IOWA
- Red Oak
- Waterloo

### KANSAS
- Caney
- Dodge City
- Emporia
- Goodland
- Kansas City
- Liberal
- Topeka
- Wichita
- Winfield

### KENTUCKY
- Covington

### LOUISIANA
- Baton Rouge
- Delta
- Houma
- Lake Charles
- New Orleans

### MAINE
- Brunswick

### MARYLAND
- Frostburg
- Martinsburg

### MASSACHUSETTS
- Boston
- Westfield

### MICHIGAN
- Battle Field
- Jackson
- Lansing
- Standish
- Traverse City

### MINNESOTA
- Crookston
- Hibbing

### MISSISSIPPI
- Pascagoula

### MISSOURI
- St. Joseph
- Springfield

### MONTANA
- Butte
- Columbia
- Helena
- Kalispell
- Manhattan

### NEBRASKA
- Alliance
- Ogallala
- Omaha
- Sidney
- Valentine
- Wahoo

### NEVADA
- Battle Mountain
- Caliente
- Las Vegas
- Montello
- Reno
- Winnemucca

### NEW HAMPSHIRE
- Lancaster

### NEW JERSEY
- Asbury Park
- Atlantic City

### NEW MEXICO
- Albuqeurque
- Corrales
- Deming
- Gage
- Gallup
- Lordsburg
- Santa Rosa
- Stein
- Taiban
- Taiban
- Texico

### NEW YORK
- Albany
- Brooklyn
- Buffalo
- Corning
- Glens Falls
- Lake Placid
- New York City
- Niagara Falls
- Oneida
- Rochester
- Syracuse
- Utica
APPENDIX

List of Municipal Landing Fields (Cont.)

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BUREAU OF AERONAUTICS, NAVY DEPARTMENT

Organization

The Bureau of Aeronautics of the Navy Department was established August 10, 1921. The following organization carries on the duties of the bureau: the Chief of the Bureau; the Assistant Chief of the Bureau, and the six following divisions: (a) Plans, (b) Administrative, (c) Material, (d) Flight, (e) Carriers, (f) Information. Duties have been distributed as follows: the Planning Section deals with the planning of the work of the Bureau, the formulation of plans of war in conjunction with the Planning Sections of the Office of Naval Operation; recommendations concerning types of aircraft which are necessary for Naval Aviation. The Administration Division handles all civilian personnel, employees under the jurisdiction of the Bureau, and keeps a record of and approves the expenditure of funds allotted to the Bureau. The Material Division has under its jurisdiction all matters pertaining to the design of aircraft. The Flight Division has under its cognizance all matters pertaining to the operation of naval aircraft, training of personnel, aviation photography and aerology. The Carrier Division has under its jurisdiction the development of carriers for aircraft. The Information Division collects all data pertaining to Aeronautics and supplies information as desired to the press, and to commercial organizations and individuals.


Officers on Duty in the Bureau of Aeronautics, Navy Department

Rear Adm. W. A. Moffet, O............................Chief of Bureau.
Comdr. John Rodgers, N.A............................Asst. Chief of Bureau Administration—Comdr. N. H. White, Jr., N.A. Aide to Chief of Bureau; Lt. L. W. Curtiss, N.A.
NAVAL AIR STATIONS

San Diego, Calif., Base—Commanding Officer, Capt. S. H. Doyle, Naval Observer; Exec. Officer, Lieut. Comdr. W. Capheart, NA; Hampton Roads, Va., Fleet Base—Commanding Officer, Capt. H. C. Cocke, FO; Ex. Officer, Lieut. Commander Geo. S. Gillespie, NA.

AIRCRAFT SQUADRONS

Aircraft Squadrons, Scouting Fleet—Commander, Capt. H. E. Yarnell, FO; Senior Aide, Lieut. Commander V. D. Herbst, NA.
Scouting Plane Squadron One—Squad. Commander, Lieut. Commander, G. A. Smith (NA); Ex. Officer, Lieut. J. Schlossbach.
Torpedo and Bombing Plane Squadron One—Squad. Commander, Lieut. Commander DeVine C. Ramsey, NA; Ex. Officer, Lieut. G. R. Fairbanks, NA.
Observation Plane Squadron Three (Light Cruisers)—Squad. Commander, Lieut. W. D. Thomas, NA; Ex. Officer, Lieut. R. Irvine, NA.
Observation Plane Squadron Six (Battle-ships)—Squad. Commander, Lieut. J. D. Small, NA; Ex. Officer, Lieut. C. M. Huntington, NA.
U. S. S. Wright (tender) (Flagship)—Commanding Officer, Capt. J. V. Babcock; Ex. Officer, Lieut. Commander Marshall Collins.
U. S. S. Snailpiper (tender)—Commanding Officer, Lieut. H. A. Clough.
U. S. S. Tucal (tender)—Commanding Officer, Ch. Bosn. P. J. Kelly; Ex. Officer, Bosn. W. J. Smith.
Aircraft Squadrons Battle Fleet—Commander, Capt. J. H. Reeves, Naval Observer; Senior Aide, Commander Karl F. Smith, FO.
Observation Plane Squadron One—Commanding Officer, Commander A. C. Read, NA.
Observation Plane Squadron Two—Commanding Officer, Lieut. W. K. Harrill, NA.
Observation Plane Squadron Four—Commanding Officer, Lieut. D. C. Watson, NA.
Flying Plane Squadron One—Commanding Officer, Lieut. Commander R. F. Wood, NA.
Fighting Plane Squadron Two—Commanding Officer, Lieut. F. W. Wead, NA.
Utility Squadron One (formerly Scouting Plane Squadron Two)—Commanding Officer, Commander W. G. Child, NA.
U. S. S. Langley (aircraft carrier) (Flagship)—Commanding Officer, Capt. E. S. Jackson; Ex. Officer, J. H. Towers, NA.
U. S. S. Aroostook (tender)—Commanding Officer, Commander W. R. Van Auker.
Ex. Officer, Lieut. Commander M. T. Tisdale.
U. S. S. Gannet (tender)—Commanding Officer, Lieut. W. R. Spear.
Aircraft Squadrons, Asiatic Fleet—Commander, Comdr. Ernest Friedrich, FO.
Torpedo and Bombing Plane Squadron Twenty—Commanding Officer, Lieut. J. G. Farley; Ex. Officer, Lieut. R. H. Norris, NA.
U. S. S. Jason (tender)—Commanding Officer, Comdr. Ernest Friedrich, FO.
APPENDIX

AIRSHIPS

U. S. S. Los Angeles—Commanding Officer, Capt. G. W. Steele, Jr., NA; Ex. Officer, Commander J. H. Klein, Jr., NA (LTA).

AVIATION DUTY OTHER THAN DEPARTMENT, STATIONS AND SQUADRONS

Naval Aircraft Factory, U. S. Navy Yard, Philadelphia, Pa.—Manager, Capt. G. C. Westervelt (CC), USN;

Naval Air Detachment, Dahlgren, Virginia.—Officer in Charge, Lieut. V. H. Schaeffer, USN, NA.

Aviation Mechanics' School, Naval Training Station, Great Lakes, Ill.—Officer in Charge, Chief Carpenter W. E. Redfern, USN, NA.

AIRCRAFT CARRIERS

The two Aircraft Carriers, the U. S. S. Lexington and the U. S. S. Saratoga, which are being built were launched as follows: The U. S. S. Saratoga on April 7, 1925, and the U. S. S. Lexington on October 3, 1925.

The Lexington will accommodate the following planes: Two squadrons of VT—VS—32 operating planes. Six VO operating observation planes. The Saratoga will be equipped with the same number of planes except that there will be twelve VO operating planes. The above does not include planes in reserve or seaplanes. Details of flight deck, equipment for launching, arresting, fueling and servicing of planes are confidential and cannot be published herein.

Propulsion of the above carriers will be by steam furnished by sixteen oil burning boilers. Four 35,000 kw. turbine generators will supply current direct to eight propulsion motors which are directly connected in pairs to the four propeller shafts. The flight deck is approximately 880' long, with an average width of 90'. Two elevators will be installed between the flight deck and hangar deck. Landing area and arresting gear are aft; take-off area is forward. Displacement, 32,000 standard tons. Speed, 32½ knots. Armament, four 8-inch twin mounts: twelve 5-inch anti-aircraft guns; complement, 1962 men.

MARINE CORPS, NAVY DEPARTMENT

ORGANIZATION

Marine aviation is an integral part of the Marine Corps, and its mission is to furnish the air forces necessary to Marine Expeditionary duty. Marine advanced base operations, and the defense of Naval bases outside the continental United States which are defended on shore by Marines. In peace time, in addition to training and preparation for these duties, the Marine Corps aviation carries on air operations similar to those of the Army Air Service. Its officers are detailed to aviation duty from permanent line officers of the Corps, and its enlisted men are Marines enlisted especially for aviation duty. The administration, training and operations of Marine aviation are directed by the Chief of Aviation, Headquarters United States Marine Corps, whose office constitutes a section of the division of Operations and Training of the Major General Commandant's Office. A new table for the aeronautical organization of the Marine Corps was approved by the Major General Commandant on July 30th and by the Chief of Naval Operations on August 3, 1922, and accordingly the aviation force of the Corps has been redesignated and organized into the First Aviation Group, at Quantico, Va., consisting of one observation plane squadron, one fighting plane squadron, one service squadron, and one kite balloon squadron; Observation Squadron No. 1 at San Diego, Cal.; Observation Squadron No. 2 at Port au Prince, Haiti; and Scouting Squadron No. 1 at Sunray, Guam. On July 1, 1925, two new units, to be known as "Observation Plane Squadron Four" and "Fighting Plane Squadron Two" were added to the organization of the First Aviation Group, Quantico, Va. On September 1, 1926, the Marine Aviation unit at San Diego, Calif., became known as the "Second Aviation Group", consisting of "Observation Plane Squadron One" and "Fighting Plane Squadron Three."

OFFICERS

Lieut. Col. Thomas C. Turner
Major Charles A. Lutz
Major Ross E. Rowell
Major Edwin H. Brainard
Major Francis T. Evans
Major Roy S. Geiger
Capt. Louis M. Bourne
Capt. Ralph T. Mitchell
Capt. James E. Davis
Capt. James T. Moore
Capt. James F. Moriarty
Capt. Robert E. Williams
Capt. Francis P. Muleashy
Capt. Louis E. Woods
Capt. Charles M. Jones
Capt. Francis E. Pierce
Capt. Walter E. McCaughey
Capt. Russell A. Presley
Capt. Robert F. Archbold
Capt. Clyde W. Matteson
Capt. Thomas R. Shearer
Capt. Harold D. Campbell
Capt. William T. Evans
Capt. Henry S. Hausmann

AVIATION STATIONS

First Aviation Group, Marine Barracks, Quantico, Va.

Observation Squadron No. 1, U. S. Marine Corps, San Diego, Cal.

Observation Squadron No. 2, U. S. Marine Corps, Port au Prince, Haiti.

Scouting Squadron, No. 1, U. S. Marine Corps, Sunray, Guam, M. I.
STRENGTH OF THE U. S. AIR FORCES

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<tr>
<th></th>
<th>Officers</th>
<th>Aviators</th>
<th>Students</th>
<th>Enlisted Men</th>
<th>Civilians</th>
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<td>Army*</td>
<td>9,44</td>
<td>833</td>
<td>198</td>
<td>8,972</td>
<td>2,259</td>
<td>12,472</td>
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<tr>
<td>Marine</td>
<td>760</td>
<td>59</td>
<td>12</td>
<td>879</td>
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AIR EQUIPMENT, UNITED STATES

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<th>Standard</th>
<th>Substitute</th>
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<td>0</td>
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<td>Bombardment</td>
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<td>4</td>
<td>34</td>
</tr>
<tr>
<td>Observation</td>
<td>132</td>
<td>107</td>
<td>339</td>
</tr>
<tr>
<td>Pursuit</td>
<td>14</td>
<td>45</td>
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<td>Training</td>
<td>52</td>
<td>183</td>
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<tr>
<td></td>
<td>228</td>
<td>429</td>
<td>657</td>
</tr>
</tbody>
</table>

DIPLOMATIC SERVICE OF THE UNITED STATES

Army


Navy

London .......... Comdr. R. A. Burg, U.S.N.
               (Also accredited to Paris, The Hague and Berlin.)
In addition the following naval aviation officers are assigned to the U. S. Naval Mission in Peru and Brazil, but their states is not diplomatic:
Brazil ........ L. T. Hundt, U.S.N.

DIPLOMATIC SERVICE TO THE UNITED STATES

France .......... Maj. Georges Thenault, Assistant Military Attaché for Aviation.
               Great Britain ........ Wing Commander, T. G. Hetherington, Air Attaché.
               Italy .......... Commander Silvio Scaroni, Air Attaché.
               Japan .......... Lt. Chikao Yamamoto, Assistant Naval Attaché for Aviation.

THE AERONAUTICAL BOARD

On June 17, 1924, the Aeronautical Board, which had existed for some eight years prior thereto under various precepts, was reorganized. For the first time a definite precept was assigned and its jurisdiction and mission made clear. The purpose of the Aeronautical Board, as set forth in the joint order signed by the Secretary of War and the Secretary of the Navy, is to prevent duplication of effort and to secure a more complete measure of cooperation and coordination in the development and employment of the Army Air Service and Naval Aviation. The Board is required to investigate, study and report upon all questions affecting jointly the development and employment of the Army Air Service and Naval Aviation.

Specific questions requiring the action of the Aeronautical Board are the following: Policies and plans for the tactical and strategical employment of aircraft. The location of air stations. Preparation of annual joint Army and Navy aircraft programs. Coordination of the activities of the Army Air Service and Naval Aviation with aeronautical activities of other branches of the Government and with civilian aeronautical associations.

* As of Dec. 31, 1925.
** Officers as of Dec. 31, 1925; civilians as of April 29, 1926; enlisted men as July 1, 1925.
† As of Dec. 31, 1925.
‡ As reported by Chief of Bureau to Aircraft Year Book on April 10, 1926.
APPENDIX

Assignment of the development of new types of aircraft, motors, accessories and weapons to the Army or the Navy. Rendering available to either service, whenever possible, training, repair, and other aviation facilities. Plans to prevent competition in procurement, and provide for use of surplus material. Consideration and recommendation in regard to all estimates for appropriations for the aeronautical programs of the Army and Navy. Cognizance of invitations of foreign governments and domestic civilian organizations for participation in aviation activities abroad and in the United States. The issuance of licenses to civilians to operate aircraft in time of war.

The membership of The Aeronautical Board is as follows:

**Army**

Chief of Air Service, Maj. Gen. M. M. Patrick; Chief of Training and War Plans Division, Air Service, Major H. L. Pratt; Member of War Plans Division, General Staff, Col. E. R. Stone, U. S. A.

**Navy**

Chief of the Bureau of Aeronautics, Rear Admiral William A. Moffett; Chief of Planning Division, Bureau of Aeronautics, Lieutenant Commander Marc A. Mitscher; Member of War Plans Division, Naval Operations, Commander J. H. Newton; Secretary, Mr. Jarvis Butler.

**HELIUM BOARD**

Capt. E. S. Land, (CC), U. S. N.
Lt. Col. Ira F. Fravel, AS, U. S. A.

**Alternates**

Com. Garland Fulton, (CC), U. S. N.
Major J. H. Jonett, AS, U. S. A.

Progress during calendar year 1925: 10,389,682 cubic feet of helium of average purity of 94.6% was produced during the year. Helium Production Plant No. 2 practically completed. Helium tank car completed and accepted by Army, February 11, 1926, capacity 208,000 cubic feet at 2000 lbs. pressure, and construction of Army Helium Purification Unit mounted on a railway car will be completed about May 1, 1926. This plant will have a capacity of 5000 cubic feet per hour and may be run continuously.

On June 30, 1925, the production of helium at the Plant at Fort Worth, Texas, was transferred to the jurisdiction of the Bureau of Mines, Department of Commerce, in accordance with an Act of Congress approved March 3, 1925. Under the provisions of the aforementioned Act, the Army and Navy were authorized to designate an officer to cooperate with the Department of Commerce in carrying out the purposes of the Act. Each Department designated the officer who was then serving as its representative on the Helium Board, and the two Departments agreed that the Helium Board should continue with the functions previously exercised by it which had not under the law been transferred to the Bureau of Mines.

**AIR MAIL SERVICE**

**AND**

**CONTRACT AIR MAIL SERVICE**

**POST OFFICE DEPARTMENT**

Department Headquarters, Washington, D. C.

Second Assistant Postmaster General ........... Hon. W. Irving Glover.
Deputy Sec. Assistant Postmaster General .......... Hon. Chase C. Cove.

**CONTRACT AIR MAIL SERVICE**

Earl B. Wadsworth .............................. Superintendent.
Alvin E. Peterson .............................. Assistant Superintendent.
Ernest L. Loving ................................ Chief Clerk.

**GOVERNMENT OPERATED AIR MAIL SERVICE**

Operating Headquarters—Omaha, Nebraska (Washington, D. C., After July 1, 1926)

Stephen A. Cider .............................. General Superintendent.
Duard B. Colyer .............................. Assistant General Superintendent.

As Assistant Traffic Managers, there have been temporarily assigned to the Air Mail Service, from the Railway Mail Service, Edgar C. Garaabrant, New York, and Benjamin F. Myers, Chicago.

**SUPERVISORY OFFICIALS**

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Designation</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. F. Egge</td>
<td>Cleveland, Ohio</td>
<td>Supt., Eastern Div.</td>
<td>New York—Chicago</td>
</tr>
<tr>
<td>H. W. Huking</td>
<td>Cheyenne, Wyo.</td>
<td>Supt., Central Div.</td>
<td>Chicago—Cheyenne</td>
</tr>
<tr>
<td>W. E. LePellette</td>
<td>Salt Lake City, Utah</td>
<td>Supt., Mountain Div.</td>
<td>Cheyenne—Salt Lake City</td>
</tr>
<tr>
<td>H. G. Smith</td>
<td>Maywood, Ill.</td>
<td>Supt., Air Mail Repair</td>
<td>Salt Lake City—San Francisco</td>
</tr>
<tr>
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<td>Depot and Warehouse</td>
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### Fields, Equipment and Ownership, Postal Airway

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<th>Field</th>
<th>Character</th>
<th>Ground and Field Equipment</th>
<th>Owner</th>
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<td>*New Brunswick, N. J.</td>
<td>Terminal</td>
<td>Hangars, 24&quot; beacon, flood and boundary lights</td>
<td>Private</td>
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<td>Stewartsville, N. J.</td>
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<tr>
<td>Northampton, Pa.</td>
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<td>Hartford, Ind.</td>
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</tr>
<tr>
<td>Des Moines, Ia.</td>
<td>Semi-terminal</td>
<td>Hangars, 24&quot; beacon, flood and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Earlham, Ia.</td>
<td>Emergency</td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Casey, Ia.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Atlantic, Ia.</td>
<td></td>
<td>Hangars, 24&quot; beacon, flood and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Oakland, Ia.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
</tbody>
</table>

*Radio Station.*
## Field Character Ground and Field Equipment Owner

<table>
<thead>
<tr>
<th>Field</th>
<th>Character</th>
<th>Ground and Field Equipment</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Omaha, Neb.</em></td>
<td>Terminal</td>
<td>Hangars, 24&quot; beacon, flood and boundary lights</td>
<td>Government</td>
</tr>
<tr>
<td>Waukon, Neb.</td>
<td>Emergency</td>
<td>24&quot; beacon and boundary lights</td>
<td>Private</td>
</tr>
<tr>
<td>Valparaiso, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Ulysses, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Benedict, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Marquette, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Grand Island, Neb.</td>
<td>Semi-terminal</td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Shelton, Neb.</td>
<td>Emergency</td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Kearney, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Elm Creek, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Lexington, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Gothenburg, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td><em>North Platte, Neb.</em></td>
<td>Terminal</td>
<td>Hangars, 24&quot; beacon, flood and boundary lights</td>
<td>Government</td>
</tr>
<tr>
<td>Paxton, Neb.</td>
<td>Emergency</td>
<td>24&quot; beacon and boundary lights</td>
<td>Private</td>
</tr>
<tr>
<td>Ogallala, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Big Springs, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Chappell, Neb.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Sidney, Neb.</td>
<td>Semi-terminal</td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Dix, Nebraska</td>
<td>Emergency</td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Pine Bluffs, Wyo.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Butte, Wyo.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Cheyenne, Wyo.</td>
<td>Terminal</td>
<td>Hangars, 24&quot; beacon, flood and boundary lights</td>
<td>Government</td>
</tr>
<tr>
<td>Federal, Wyo.</td>
<td>Emergency</td>
<td>24&quot; beacon and boundary lights</td>
<td>Private</td>
</tr>
<tr>
<td>Laramie, Wyo.</td>
<td>Semi-terminal</td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Bosler, Wyo.</td>
<td>Emergency</td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Rock River, Wyo.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Medicine Lake, Wyo.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Wallowa, Wyo.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Rawlins, Wyo.</td>
<td>Terminal</td>
<td>Hangars, 24&quot; beacon, flood and boundary lights</td>
<td>Government</td>
</tr>
<tr>
<td>Cherokee, Wyo.</td>
<td>Emergency</td>
<td>24&quot; beacon and boundary lights</td>
<td>Private</td>
</tr>
<tr>
<td>Red Desert, Wyo.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Bitter Creek, Wyo.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td><em>Rock Springs, Wyo.</em></td>
<td>Terminal</td>
<td>Hangars, 24&quot; beacon, flood and boundary lights</td>
<td>Government</td>
</tr>
<tr>
<td>Granger, Wyo.</td>
<td>Emergency</td>
<td>24&quot; beacon and boundary lights</td>
<td>Private</td>
</tr>
<tr>
<td>Lefroy, Wyo.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Knight, Wyo.</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td>Coralville, Utah</td>
<td></td>
<td>24&quot; beacon and boundary lights</td>
<td></td>
</tr>
<tr>
<td><em>Salt Lake City, Utah</em></td>
<td>Terminal</td>
<td>Hangars, 24&quot; beacon, flood and boundary lights</td>
<td>Government</td>
</tr>
<tr>
<td><em>Elko, Nevada</em></td>
<td></td>
<td>Hangars</td>
<td></td>
</tr>
<tr>
<td><em>Reno, Nevada</em></td>
<td></td>
<td>Hangars</td>
<td>Government</td>
</tr>
<tr>
<td><em>Sacramento, Calif.</em></td>
<td></td>
<td>Hangars</td>
<td>Private</td>
</tr>
<tr>
<td><em>Concord, Calif.</em></td>
<td></td>
<td>Hangars</td>
<td></td>
</tr>
<tr>
<td><em>San Francisco, Calif.</em></td>
<td></td>
<td>Hangars</td>
<td></td>
</tr>
</tbody>
</table>

### Recapitulation, Mileage and Fields

<table>
<thead>
<tr>
<th>Transcontinental Mileage</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York-Cleveland</td>
<td>409</td>
</tr>
<tr>
<td>Cleveland-Chicago</td>
<td>327</td>
</tr>
<tr>
<td>Chicago-Omaha</td>
<td>246</td>
</tr>
<tr>
<td>Omaha-Cheyenne</td>
<td>476</td>
</tr>
<tr>
<td>Cheyenne-Salt Lake</td>
<td>417</td>
</tr>
<tr>
<td>Salt Lake-Elko</td>
<td>205</td>
</tr>
<tr>
<td>Elko-Reno</td>
<td>235</td>
</tr>
<tr>
<td>Reno-San Francisco</td>
<td>184</td>
</tr>
</tbody>
</table>

Total: 1,669

The transcontinental airway is lighted from New York to Salt Lake City, inclusive, a distance of.

No. Terminal Fields: 17

No. Semi-Terminal and Emergency Fields: New York-Chicago 42 Chicago-Cheyenne 36 Cheyenne-Salt Lake 13 Salt Lake-San Francisco 0

Total No. of Fields: 105

*Of these, 76 have radio stations. A seventeenth radio station is at Department Headquarters in Washington, D.C.*

*Radio Station.*
### Number of Employees

(As of Feb. 1, 1926)

<table>
<thead>
<tr>
<th>Department</th>
<th>Total Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington and Omaha Headquarters</td>
<td>19</td>
</tr>
<tr>
<td>Pilots</td>
<td>45</td>
</tr>
<tr>
<td>Radio Operators</td>
<td>43</td>
</tr>
<tr>
<td>Supervisors</td>
<td>119</td>
</tr>
<tr>
<td>Mechanics, Helpers, etc., at Repair Depot and Fields</td>
<td>373</td>
</tr>
</tbody>
</table>

**Total** | **630**

### Service Record of Air Mail Pilots

(As of Dec. 31, 1925)

<table>
<thead>
<tr>
<th>Pilot</th>
<th>Hours: Min.</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen, E. T.</td>
<td>309:34</td>
<td>27,479</td>
</tr>
<tr>
<td>Allison, E. M.</td>
<td>302:14</td>
<td>284,390</td>
</tr>
<tr>
<td>Barker, Hugh</td>
<td>954:12</td>
<td>88,970</td>
</tr>
<tr>
<td>Barnes, J. M.</td>
<td>601:36</td>
<td>56,688</td>
</tr>
<tr>
<td>Bertaud, L. W.</td>
<td>570:34</td>
<td>52,888</td>
</tr>
<tr>
<td>Biddle, I. O.</td>
<td>1,413:49</td>
<td>110,927</td>
</tr>
<tr>
<td>Bishop, L. F.</td>
<td>1,817:38</td>
<td>176,081</td>
</tr>
<tr>
<td>Boonstra, H. G.</td>
<td>540:09</td>
<td>52,497</td>
</tr>
<tr>
<td>Bow, L. L.</td>
<td>227:16</td>
<td>19,449</td>
</tr>
<tr>
<td>Brown, H. J.</td>
<td>350:53</td>
<td>36,166</td>
</tr>
<tr>
<td>Burns, F. H.</td>
<td>592:12</td>
<td>57,211</td>
</tr>
<tr>
<td>Chandler, H. A.</td>
<td>1,978:31</td>
<td>27,908</td>
</tr>
<tr>
<td>Colby, I. F.</td>
<td>1,407:28</td>
<td>13,914</td>
</tr>
<tr>
<td>Collision, H. A.</td>
<td>2,672:08</td>
<td>188,016</td>
</tr>
<tr>
<td>Collins, R. H.</td>
<td>2,490:43</td>
<td>258,320</td>
</tr>
<tr>
<td>Cline, J. B.</td>
<td>900:42</td>
<td>92,359</td>
</tr>
<tr>
<td>Hopson, W. C.</td>
<td>3,175:44</td>
<td>317,158</td>
</tr>
<tr>
<td>Johnson, C. E.</td>
<td>1,060:42</td>
<td>166,471</td>
</tr>
<tr>
<td>Johnson, R. J.</td>
<td>664:59</td>
<td>60,635</td>
</tr>
<tr>
<td>Kaufman, S. T.</td>
<td>350:01</td>
<td>30,140</td>
</tr>
<tr>
<td>Knight, J. H.</td>
<td>3,370:00</td>
<td>319,099</td>
</tr>
<tr>
<td>Lange, C. E.</td>
<td>2,745:43</td>
<td>236,802</td>
</tr>
<tr>
<td>Lee, E. H.</td>
<td>3,386:36</td>
<td>299,735</td>
</tr>
<tr>
<td>Levis, R. B.</td>
<td>2,420:42</td>
<td>230,751</td>
</tr>
<tr>
<td>Lewis, H. T.</td>
<td>2,917:30</td>
<td>297,427</td>
</tr>
<tr>
<td>Marshall, Tex.</td>
<td>2,849:12</td>
<td>273,730</td>
</tr>
<tr>
<td>Milatzo, J. F.</td>
<td>509:05</td>
<td>45,115</td>
</tr>
<tr>
<td>Mouton, E. E.</td>
<td>3,015:45</td>
<td>285,128</td>
</tr>
<tr>
<td>Murray, J. P.</td>
<td>3,400:08</td>
<td>304,997</td>
</tr>
<tr>
<td>Myers, O. L.</td>
<td>1,570:40</td>
<td>153,934</td>
</tr>
<tr>
<td>Pag, R. G.</td>
<td>2,052:04</td>
<td>182,046</td>
</tr>
<tr>
<td>Pomeroy, O. C.</td>
<td>2,735:09</td>
<td>285,853</td>
</tr>
<tr>
<td>Scott, F. D.</td>
<td>2,629:45</td>
<td>245,887</td>
</tr>
<tr>
<td>Sharpnack, J. W.</td>
<td>1,431:42</td>
<td>133,571</td>
</tr>
<tr>
<td>Short, S. J.</td>
<td>1,665:08</td>
<td>163,029</td>
</tr>
<tr>
<td>Smith, A. E.</td>
<td>1,694:29</td>
<td>165,666</td>
</tr>
<tr>
<td>Smith, D. C.</td>
<td>2,798:29</td>
<td>264,495</td>
</tr>
<tr>
<td>Smith, W. L.</td>
<td>3,054:15</td>
<td>291,349</td>
</tr>
<tr>
<td>Vance, C. K.</td>
<td>2,061:34</td>
<td>200,517</td>
</tr>
<tr>
<td>Wagner, R. L.</td>
<td>1,478:58</td>
<td>145,702</td>
</tr>
<tr>
<td>Ward, E. E.</td>
<td>1,048:00</td>
<td>108,074</td>
</tr>
<tr>
<td>Webster, J. O.</td>
<td>684:15</td>
<td>59,775</td>
</tr>
<tr>
<td>Williams, W. D.</td>
<td>3,210:15</td>
<td>304,041</td>
</tr>
<tr>
<td>Winslow, B. H.</td>
<td>2,074:34</td>
<td>186,342</td>
</tr>
<tr>
<td>Yager, F. R.</td>
<td>3,149:26</td>
<td>300,584</td>
</tr>
</tbody>
</table>

### Air Mail Service Inventory

(As of June 30, 1925)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair Depot and Warehouse (1)</td>
<td>$200,000</td>
<td>$495,930</td>
</tr>
<tr>
<td>Hangars (14)</td>
<td>276,700</td>
<td></td>
</tr>
<tr>
<td>Shops (6)</td>
<td>4,550</td>
<td></td>
</tr>
<tr>
<td>Offices (12)</td>
<td>14,880</td>
<td></td>
</tr>
<tr>
<td>Field Improvements (runways, tile, drains, etc.)</td>
<td>140,000</td>
<td></td>
</tr>
<tr>
<td>Field Equipment (machinery, tools, etc.)</td>
<td>93,200</td>
<td></td>
</tr>
<tr>
<td>Airplanes (96 @ $10,000—84 flying and 12 not assembled)</td>
<td>960,000</td>
<td></td>
</tr>
<tr>
<td>Aircraft Motors (428 @ $2,000)</td>
<td>856,890</td>
<td></td>
</tr>
<tr>
<td>Supplies and Material in Stockrooms</td>
<td>351,517</td>
<td></td>
</tr>
</tbody>
</table>
### APPENDIX

Night Flying Equipment (lamps, generators, towers, etc.) .......................... 474,000
Motor vehicles (115 @ $350) ........................................................................ 40,600
Gasoline on hand July 1st—(35,637 gals. @ 25¢) ....................................... 8,990
Oil on hand July 1st—(3,300 gals. @ 60¢) .................................................. 1,980
Mileage scrip on hand July 1st ................................................................. 1,500
Office Equipment (furniture, typewriters, file cases, etc.) ................. 7,465

Radio Office Buildings (8) ................................................................. $ 2,173
Radio Office Equipment ................................................................. 1,610
Radio Equipment ........................................................................ 66,650

Total .......................................................................................................... $3,506,534

---

### INVENTORY OF FLYING EQUIPMENT

(As of Dec. 31, 1925)

<table>
<thead>
<tr>
<th>Number of planes in service</th>
<th>Number of planes in reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>79</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>Type of planes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>De Haviland</td>
</tr>
<tr>
<td></td>
<td>Curtiss</td>
</tr>
<tr>
<td></td>
<td>Aerial Service</td>
</tr>
<tr>
<td></td>
<td>Stout</td>
</tr>
</tbody>
</table>

Number of planes undergoing repair: 10

<table>
<thead>
<tr>
<th>Liberty Motors in service</th>
<th>Unused Liberty Motors in stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>104</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unserviceable Liberty Motors in stock</th>
<th>Total number of Liberty Motors</th>
<th>Liberty Motors used 100 to 300 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>238</td>
<td>422</td>
<td>73</td>
</tr>
</tbody>
</table>

### REPORT OF REVENUE AND EXPENDITURES FOR 12 MONTHS

#### JANUARY 1—DECEMBER 31, 1925

<table>
<thead>
<tr>
<th>Revenue (Excess Postage)</th>
<th>$716,994.28</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>EXPENSE</th>
<th>Maintenance of Way</th>
<th>Maintenance of Equipment</th>
<th>Transportation</th>
<th>Executive Overhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields</td>
<td>$ 39,157.74</td>
<td>$ 701,838.53</td>
<td>$ 711,366.85</td>
<td>$ 524,125.77</td>
</tr>
<tr>
<td>Lights</td>
<td>226,102.59</td>
<td>1,683,472.70</td>
<td>41,779.21</td>
<td>68,515.25</td>
</tr>
<tr>
<td>Communications</td>
<td>$159,971.66</td>
<td>143,768.26</td>
<td>6,504.48</td>
<td>68,515.25</td>
</tr>
<tr>
<td>Motor Vehicle</td>
<td>$ 79,346.54</td>
<td>13,344.68</td>
<td>2,270.75</td>
<td>36,950.48</td>
</tr>
</tbody>
</table>

| | | | | |
| | | | | Per centage
| | | | | 26.06
| | | | | 25.71
| | | | | 26.06
| | | | | 19.13
| | | | | 6.92

---
### Expense

#### Maintenance of Way

<table>
<thead>
<tr>
<th>Item</th>
<th>Per</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital</td>
<td></td>
</tr>
<tr>
<td>New Buildings</td>
<td>$258,639.03</td>
</tr>
<tr>
<td>New Lighting Equipment</td>
<td>$218,421.72</td>
</tr>
<tr>
<td>Ground Improvements</td>
<td>$52,070.97</td>
</tr>
<tr>
<td>New Flying Equipment</td>
<td>$88,841.46</td>
</tr>
<tr>
<td>New Miscellaneous Equipment</td>
<td>$20,210.55</td>
</tr>
<tr>
<td><strong>Total Capital Expense</strong></td>
<td><strong>$638,183.43</strong></td>
</tr>
</tbody>
</table>

#### Grand Total

<table>
<thead>
<tr>
<th>Item</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>$1,729,683.91</strong></td>
</tr>
</tbody>
</table>

The above figures include all expenditures, New York-Chicago night route as well as regular transcontinental route. No segregation of expense for New York-Chicago night route is available.

### Statement of Monthly Performance and Revenue, Transcontinental Route

(Calendar Year, 1925)

<table>
<thead>
<tr>
<th>Month</th>
<th>Miles Mail Trips Scheduled</th>
<th>Miles Mail Trips Traveled with Mail</th>
<th>Per Cent of Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>$45,110.84</td>
<td>220,983</td>
<td>88.22</td>
</tr>
<tr>
<td>February</td>
<td>$49,044.48</td>
<td>175,687</td>
<td>87.81</td>
</tr>
<tr>
<td>March</td>
<td>$48,319.37</td>
<td>180,961</td>
<td>92.18</td>
</tr>
<tr>
<td>April</td>
<td>$47,394.42</td>
<td>174,645</td>
<td>91.74</td>
</tr>
<tr>
<td>May</td>
<td>$51,201.24</td>
<td>166,865</td>
<td>99.28</td>
</tr>
<tr>
<td>June</td>
<td>$50,117.46</td>
<td>161,079</td>
<td>96.65</td>
</tr>
<tr>
<td>July</td>
<td>$69,433.63</td>
<td>173,882</td>
<td>97.60</td>
</tr>
<tr>
<td>August</td>
<td>$59,815.97</td>
<td>165,586</td>
<td>99.82</td>
</tr>
<tr>
<td>September</td>
<td>$59,692.62</td>
<td>160,085</td>
<td>99.49</td>
</tr>
<tr>
<td>October</td>
<td>$60,264.38</td>
<td>172,552</td>
<td>94.79</td>
</tr>
<tr>
<td>November</td>
<td>$52,916.86</td>
<td>161,386</td>
<td>96.81</td>
</tr>
<tr>
<td>December</td>
<td>$61,304.79</td>
<td>178,872</td>
<td>81.21</td>
</tr>
</tbody>
</table>

**Total for Year:**

<table>
<thead>
<tr>
<th>Miles Mail Trips Scheduled</th>
<th>2,102,848</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miles Mail Trips Traveled with Mail</td>
<td>1,972,598</td>
</tr>
<tr>
<td>Per Cent of Performance</td>
<td>93.81</td>
</tr>
</tbody>
</table>
## STATEMENT OF MONTHLY PERFORMANCE AND REVENUE, NEW YORK—CHICAGO OVERNIGHT ROUTE

(July 1 to December 31, 1925)

<table>
<thead>
<tr>
<th>Month</th>
<th>Excess Postage</th>
<th>Mail Carried Letters</th>
<th>Miles Scheduled</th>
<th>Miles Flown</th>
<th>Per Cent of Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>$15,330.86</td>
<td>East: 193,950</td>
<td>270,500</td>
<td>31,848</td>
<td>99.58</td>
</tr>
<tr>
<td>August</td>
<td>14,157.71</td>
<td>West: 32,500</td>
<td></td>
<td>34,703</td>
<td>109.69</td>
</tr>
<tr>
<td>September</td>
<td>12,265.61</td>
<td></td>
<td></td>
<td>30,492</td>
<td>106.94</td>
</tr>
<tr>
<td>October</td>
<td>13,195.24</td>
<td></td>
<td></td>
<td>30,492</td>
<td>106.94</td>
</tr>
<tr>
<td>November</td>
<td>13,619.83</td>
<td></td>
<td></td>
<td>31,914</td>
<td>108.61</td>
</tr>
<tr>
<td>December</td>
<td>10,491.63</td>
<td></td>
<td></td>
<td>34,703</td>
<td>109.69</td>
</tr>
<tr>
<td>Totals</td>
<td>$80,169.30</td>
<td>1,074,449 East</td>
<td>1,404,560</td>
<td>2,115,000</td>
<td>177,991</td>
</tr>
</tbody>
</table>

## MILES FLOWN, MAIL CARRIED AND TOTAL REVENUE EARNED

(From Start of Day and Night Through Transcontinental Service, July 1, 1924, to Dec. 31, 1924)

<table>
<thead>
<tr>
<th></th>
<th>Miles Flown</th>
<th>Night</th>
<th>Total</th>
<th></th>
<th></th>
<th>Excess Postage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>954,146</td>
<td>329,525</td>
<td>1,283,671</td>
<td>1,407,280</td>
<td>177,991</td>
<td>$329,520.73</td>
</tr>
</tbody>
</table>

## SUMMARY OF AIR MAIL PERFORMANCE FROM START OF EXPERIMENTAL DAY TIME SERVICE, MAY 15, 1918, TO JUNE 30, 1924, WHEN THROUGH TRANSCONTINENTAL DAY AND NIGHT SERVICE WAS BEGUN

<table>
<thead>
<tr>
<th>Year</th>
<th>Trips Possible</th>
<th>Trips Attempted</th>
<th>Trips Defeated</th>
<th>Trips Uncompleted</th>
<th>Weather Encountered</th>
<th>Mileage Possible</th>
<th>Miles Ferry and Test</th>
<th>Total Miles Travelled</th>
<th>Percent of Service</th>
<th>Mail Carried</th>
<th>Cost of Service</th>
<th>Forced Landings Due to</th>
</tr>
</thead>
<tbody>
<tr>
<td>1918</td>
<td>373</td>
<td>761</td>
<td>17</td>
<td>32</td>
<td>258</td>
<td>535</td>
<td>87,028</td>
<td>81,160</td>
<td>94.00</td>
<td>4,520,240</td>
<td>$76,616.59</td>
<td>2.7%</td>
</tr>
<tr>
<td>1919</td>
<td>1,761</td>
<td>1,074</td>
<td>57</td>
<td>98</td>
<td>603</td>
<td>1,060</td>
<td>409,275</td>
<td>393,066</td>
<td>95.10</td>
<td>6,180,397</td>
<td>320,647.70</td>
<td>6.9%</td>
</tr>
<tr>
<td>1920</td>
<td>4,941</td>
<td>3,032</td>
<td>1,009</td>
<td>328</td>
<td>1,614</td>
<td>2,318</td>
<td>1,107,266</td>
<td>864,128</td>
<td>97.64</td>
<td>30,075,000</td>
<td>979,007.25</td>
<td>4.4%</td>
</tr>
<tr>
<td>1921</td>
<td>9,202</td>
<td>6,970</td>
<td>512</td>
<td>400</td>
<td>2,903</td>
<td>5,277</td>
<td>1,846,072</td>
<td>1,713,034</td>
<td>94.64</td>
<td>46,620,260</td>
<td>1,499,584.00</td>
<td>6.2%</td>
</tr>
<tr>
<td>1922</td>
<td>2,891</td>
<td>7,999</td>
<td>292</td>
<td>145</td>
<td>2,935</td>
<td>5,064</td>
<td>1,643,057</td>
<td>1,579,080</td>
<td>94.64</td>
<td>64,872,880</td>
<td>1,417,374.82</td>
<td>5.0%</td>
</tr>
<tr>
<td>1923</td>
<td>6,072</td>
<td>7,827</td>
<td>225</td>
<td>111</td>
<td>3,745</td>
<td>4,102</td>
<td>1,603,110</td>
<td>1,545,480</td>
<td>95.52</td>
<td>85,295,920</td>
<td>1,910,422.54</td>
<td>5.2%</td>
</tr>
<tr>
<td>1924</td>
<td>4,071</td>
<td>3,887</td>
<td>184</td>
<td>59</td>
<td>1,866</td>
<td>2,621</td>
<td>807,395</td>
<td>763,236</td>
<td>94.53</td>
<td>29,317,080</td>
<td>323,844.00</td>
<td>1.6%</td>
</tr>
<tr>
<td>Total</td>
<td>37,131</td>
<td>34,760</td>
<td>2,341</td>
<td>1,643</td>
<td>14,984</td>
<td>20,827</td>
<td>7,524,817</td>
<td>6,931,681</td>
<td>95.82</td>
<td>255,686,600</td>
<td>$6,837,487.09</td>
<td>1.6%</td>
</tr>
</tbody>
</table>
MILES FLOWN, MAIL CARRIED AND TOTAL REVENUE EarnED, AIR MAIL SERVICE, CALENDAR YEAR 1925
(From July 1, to Dec. 31. All Figures Include New York-Chicago Night Service)

<table>
<thead>
<tr>
<th>Month</th>
<th>Miles Flown</th>
<th>Mail Carried Letters</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>157,185</td>
<td>76,031</td>
<td>233,216</td>
</tr>
<tr>
<td>February</td>
<td>118,816</td>
<td>55,327</td>
<td>174,143</td>
</tr>
<tr>
<td>March</td>
<td>135,374</td>
<td>60,427</td>
<td>195,801</td>
</tr>
<tr>
<td>April</td>
<td>140,728</td>
<td>58,533</td>
<td>199,263</td>
</tr>
<tr>
<td>May</td>
<td>139,825</td>
<td>49,277</td>
<td>189,102</td>
</tr>
<tr>
<td>June</td>
<td>154,663</td>
<td>73,642</td>
<td>228,305</td>
</tr>
<tr>
<td>July</td>
<td>158,121</td>
<td>74,739</td>
<td>232,860</td>
</tr>
<tr>
<td>August</td>
<td>157,739</td>
<td>78,154</td>
<td>235,893</td>
</tr>
<tr>
<td>September</td>
<td>120,562</td>
<td>70,188</td>
<td>190,750</td>
</tr>
<tr>
<td>October</td>
<td>156,062</td>
<td>77,098</td>
<td>233,160</td>
</tr>
<tr>
<td>November</td>
<td>116,859</td>
<td>83,285</td>
<td>199,144</td>
</tr>
<tr>
<td>December</td>
<td>117,206</td>
<td>78,638</td>
<td>195,844</td>
</tr>
<tr>
<td>Totals</td>
<td>1,682,521</td>
<td>839,237</td>
<td>2,521,758</td>
</tr>
</tbody>
</table>

RECAPITULATION, MILES FLOWN, MAIL CARRIED AND TOTAL REVENUE EarnED
(From Start of Service for Which Extra Postage Was Charged for Extra Speed, July 1, 1924, to Dec. 31, 1925)

<table>
<thead>
<tr>
<th>Day</th>
<th>Miles Flown</th>
<th>Number of Letters</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Night</td>
<td>West</td>
<td>East</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Excess Postage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$45,110.84</td>
</tr>
<tr>
<td>40,044.48</td>
</tr>
<tr>
<td>46,319.37</td>
</tr>
<tr>
<td>47,394.32</td>
</tr>
<tr>
<td>51,201.24</td>
</tr>
<tr>
<td>56,117.49</td>
</tr>
<tr>
<td>75,784.51</td>
</tr>
<tr>
<td>73,973.68</td>
</tr>
<tr>
<td>70,727.63</td>
</tr>
<tr>
<td>73,382.52</td>
</tr>
<tr>
<td>63,771.69</td>
</tr>
<tr>
<td>71,796.44</td>
</tr>
</tbody>
</table>

| $716,994.28 |

<table>
<thead>
<tr>
<th>Excess Postage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,037,524.01</td>
</tr>
</tbody>
</table>
APPENDIX

FLIGHT SCHEDULE—GOVERNMENT OPERATED ROUTES

New York, N. Y., to San Francisco, Calif., Including New York—Chicago Overnight

<table>
<thead>
<tr>
<th>Overnight Daily</th>
<th>Transcontinental Daily</th>
<th>Effective May 15, 1926</th>
<th>Transcontinental Daily</th>
<th>Overnight Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 pm Eastern Time</td>
<td>8:10 am</td>
<td>Lx. New York, N. Y. ... Ar. (P. R. R. Sta.)</td>
<td>6:00 pm</td>
<td>6:10 am</td>
</tr>
<tr>
<td>9:30 pm</td>
<td>9:40 am</td>
<td>... New Brunswick, N. J. (Hadley Field)</td>
<td>5:00 pm</td>
<td>4:45 am</td>
</tr>
<tr>
<td>.....</td>
<td>11:30 am</td>
<td>... Bellefonte, Pa.</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>.....</td>
<td>11:50 am</td>
<td>... Cleveland, Ohio</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>1:10 am</td>
<td>1:30 am</td>
<td>Transcontinental Daily</td>
<td>1:30 am</td>
<td>1:45 am</td>
</tr>
<tr>
<td>.....</td>
<td>3:00 pm</td>
<td>... Bryan, Ohio</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>.....</td>
<td>3:20 pm</td>
<td>... Chicago, Ill</td>
<td>3:25 pm</td>
<td>3:40 pm</td>
</tr>
<tr>
<td>4:15 am</td>
<td>5:40 pm</td>
<td>... Iowa City, Iowa</td>
<td>4:45 pm</td>
<td>5:00 pm</td>
</tr>
<tr>
<td>6:00 pm</td>
<td>8:00 pm</td>
<td>... Des Moines, Iowa</td>
<td>6:00 pm</td>
<td>6:45 am</td>
</tr>
<tr>
<td>8:10 pm</td>
<td>11:00 pm</td>
<td>... Omaha, Neb</td>
<td>8:25 pm</td>
<td>9:05 pm</td>
</tr>
<tr>
<td>11:15 pm</td>
<td>2:00 am</td>
<td>Transcontinental Daily</td>
<td>11:15 pm</td>
<td>11:30 pm</td>
</tr>
<tr>
<td>.....</td>
<td>North Platte, Neb</td>
<td>.....</td>
<td>.....</td>
<td>10:30 am</td>
</tr>
<tr>
<td>1:20 am</td>
<td>4:10 am</td>
<td>8:55 pm</td>
<td>8:25 pm</td>
<td>8:40 pm</td>
</tr>
<tr>
<td>4:25 pm</td>
<td>7:40 am</td>
<td>... Cheyenne, Wyo</td>
<td>6:15 pm</td>
<td>7:45 am</td>
</tr>
<tr>
<td>7:55 am</td>
<td>9:55 am</td>
<td>... Rock Springs, Wyo</td>
<td>6:00 pm</td>
<td>9:25 am</td>
</tr>
<tr>
<td>9:10 am</td>
<td>11:15 am</td>
<td>... Elko, Nevada</td>
<td>4:10 pm</td>
<td>11:45 am</td>
</tr>
<tr>
<td>11:30 am</td>
<td>2:00 pm</td>
<td>... Reno, Nevada</td>
<td>10:50 am</td>
<td>2:25 pm</td>
</tr>
<tr>
<td>2:15 pm</td>
<td>3:35 pm</td>
<td>... Sacramento, Cal</td>
<td>10:25 am</td>
<td>3:55 pm</td>
</tr>
<tr>
<td>5:00 pm</td>
<td>5:00 pm</td>
<td>... Concord Field</td>
<td>8:45 am</td>
<td>5:00 pm</td>
</tr>
</tbody>
</table>

RATES OF POSTAGE ON TRANSCONTINENTAL AND NEW YORK-CHICAGO GOVERNMENT OPERATED ROUTES

TRANSCONTINENTAL

The Transcontinental line is divided into three zones: New York-Chicago, Chicago-Cheyenne, Cheyenne-San Francisco. The charge for domestic mail is 8 cents an ounce or fraction thereof for each air zone or part of zone, fully prepaid; such charge includes transportation to or from the Air Mail route, as well as transportation by air. The rates for foreign air mail are the same as those for domestic air mail for those countries having 2-cent postal conventions with the United States (Great Britain, Spain, the Central and South American countries); for all other countries, 3 cents in addition to Air Mail rate.

NEW YORK—CHICAGO OVERNIGHT

This is one zone. The charge is to cents an ounce or fraction thereof, fully prepaid, this charge including transportation to or from the Air Mail route, as well as the transportation by air.

RATES OF POSTAGE ON CONTRACT AIR MAIL ROUTES

(Excerpt from P. M. G. Order 3817, Jan. 19, 1926)

"The rates of postage on mail carried by airplane on contract air mail routes shall be 10 cents for each ounce or fraction thereof on each route or part thereof not exceeding 1,000 miles in length; 15 cents for each ounce or fraction thereof on each route or part thereof exceeding 1,000 miles and not exceeding 1,500 miles in length; and 20 cents for each ounce or fraction thereof on each route or part thereof over 1,500 miles in length, direct air mileage to control in each case, with 5 cents for each ounce or fraction of an ounce additional for each air mail zone or part of such zone the mail is carried over Government-operated air mail routes. Such postage includes any necessary transportation to and from the contract air mail routes except by air mail."
CONTRACT AIR MAIL SERVICE

At the time of publication, the Post Office Department, under authority of the Kelly law, the text of which is appended, had contracted for the private operation of twelve air mail routes:

A BILL.

To encourage commercial aviation and to authorize the Postmaster General to contract for Air Mail service.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that this Act may be cited as the Air Mail Act.

Sec. 2. That when used in this Act the term "air mail" means first class mail prepaid at the rates of postage herein described.

Sec. 3. That the rates of postage on air mail shall not be less than 10 cents for each ounce or fraction thereof.

Sec. 4. That the Postmaster General is authorized to contract with any individual, firm, or corporation for the transportation of air mail by aircraft between such points as he may designate at a rate not to exceed four-fifths of the revenues derived from such air mail, and to further contract for the transportation by aircraft of first-class mail other than air mail at a rate not to exceed four-fifths of the revenues derived from such first-class mail.

Sec. 5. That the Postmaster General may make such rules, regulations and orders as may be necessary to carry out the provisions of this Act: Provided, That nothing in this Act shall be construed to interfere with the postage charged or to be charged on Government operated air-mail routes.

Compensation: 80 per cent of the revenue.
Equipment: 10 American Biplanes, 6 Curtiss Larks of 200 and 4 of 300 h.p., with Liberty motors.

Tentative Schedule:
Leave Boston .......... 7:00 p. m. Leave New York .......... 6:00 a. m.

Service to commence about July 1, 1926.

No. C.A.M. 2. Chicago to Peoria and Springfield, Ill., to St. Louis Mo., 278 miles.
Contractor: Robertson Aircraft Corporation, Angham, Mo.
Compensation: 67 1/2 per cent of the revenue.
Equipment: 9 American Planes; 4 Curtiss Orioles, 180 h.p.; 5 D.H.-4's, 450 h.p.

Schedule:
Leave Chicago daily except Sunday and Monday on arrival of overnight plane from New York.
Leave Peoria .......... 7:25 a.m. Leave St. Louis daily except Saturday and Sunday .......... 4:00 p.m.
Leave Springfield ...... 8:15 a.m. Arrive St. Louis ........ 9:15 a.m. Leave Peoria .......... 5:55 p.m.
Arrive St. Louis ........ 9:15 a.m. (To connect overnight plane for New York.)

Service began April 15, 1926.

Compensation: 80 per cent of the revenue.
Equipment: 10 American Curtiss Carrier Pigeons planes, 440 h.p.

Schedule:
Leave Chicago daily ..... 5:45 a.m. Leave Dallas daily except Sunday ........ 7:30 a.m.
Leave Moline .......... 7:35 a.m. Leave Fort Worth ........ 8:00 a.m.
Leave St. Joseph ...... 10:33 a.m. Leave Kansas City 10:16 a.m.
Leave Kansas City .... 11:18 a.m. Leave Oklahoma City 11:17 a.m.
Leave Wichita .......... 11:18 p.m. Leave Wichita .......... 11:57 a.m.
Leave Oklahoma City ... 3:05 p.m. Leave Kansas City .......... 1:57 p.m.
Leave Fort Worth ...... 5:15 p.m. Leave St. Joseph .......... 2:40 p.m.
Leave Moline .......... 5:35 p.m. Leave Chicago ........ 7:20 p.m.

Service began May 12, 1926.

Contractor: Western Air Express, Inc., 801 W. M. Garland Bldg., Los Angeles, Calif.
Compensation: 80 per cent of the revenue.

Schedule:
Leave Salt Lake City daily .......... 9:30 a.m. Leave Los Angeles daily .......... 7:35 a.m.
Leave Las Vegas ........ 10:25 p.m. Leave Las Vegas ........ 10:40 a.m.
Leave Los Angeles .... 1:25 p.m. Leave Angeles .......... 5:25 p.m.
Arrive Los Angeles .......... 2:25 p.m.
Arrive Salt Lake City. 3:20 p.m.

Service began April 17, 1926.
APPENDIX

Contractor: Walter T. Varney, 1540 Pine St., San Francisco, Calif.
Compensation: 80 per cent of the revenue.
Equipment: 4 American Securite Planes, 150 h.p.
Schedule: Leave Elko daily except Monday, 11:30 a.m. Leave Pasco daily except Monday, 6:00 a.m.
No. C.A.M. 6. Detroit, Mich., to Cleveland, Ohio, 91 miles.
Compensation: 64} cents per ounce of mail carried.
Equipment: 3 American Stout All-metal Monoplanes, 400 h.p.
Schedule: Leave Detroit, 11:40 a.m. Arrive Cleveland, 12:15 p.m.
Contractor: Charles Dickinson, Room 132, Auditorium Hotel, Chicago, Ill.
Compensation: 48 per cent of the revenue.
Equipment: 5 American Laird Commercial 90 to 200 h.p.; 1 American Partridge, 180 h.p.; 1 American Keller Commercial 180 h.p.; and 1 American B.B.W. 400 h.p. Planes.
Schedule: Leave Chicago, 5:45 a.m. Arrive Minneapolis, 5:50 p.m.
Contractor: Vern C. Gorst, North Bend, Ore.
Compensation: 75 per cent of the revenue.
Schedule: Leave Seattle, 6:00 a.m. Arrive San Francisco, 6:20 p.m.
No. C.A.M. 9. Cleveland, Ohio, to Pittsburgh, Pa., 120 miles.
Contractor: Clifford Ball, 503 Standard Life Bldg., Pittsburgh, Pa.
Compensation: 80 per cent of the revenue.
Equipment: 3 American Swallow Planes, 120 h.p.
Schedule: Leave Cheyenne, 8:30 a.m. Arrive Pueblo, 4:45 p.m.
No. C.A.M. 10. Atlanta, Ga., by Jacksonville, Tampa and Fort Myers, to Miami, Fla., 664 miles.
Contractor: Florida Airways Corp., 50 East 42nd St., New York, N. Y.
Compensation: 80 per cent of the revenue.
Equipment: 14 American Planes; Stout all metal 400 h.p., Curtis J-4 Lark, 200 h.p., and Ford 3 Wright motored metal Monoplane, 600 h.p.
Schedule: Leave Jacksonville daily except Sunday, 6:00 a.m. Leave Tampa 12:00 p.m. Leave Fort Myers 6:15 a.m. Arrive Miami, 6:15 p.m.
Service began April 6, 1926.
No. C.A.M. 11. Cleveland, Ohio, to Pittsburgh, Pa., 120 miles.
Contractor: Clifford Ball, 503 Standard Life Bldg., Pittsburgh, Pa.
Compensation: 80 per cent of the revenue.
Equipment: 3 American Swallow Planes, 120 h.p.
Schedule: Leave Cheyenne, 8:30 a.m. Arrive Pueblo, 4:45 p.m.
Service to start May 31.
Investigation of performance of model air propellers in a free air stream and in autorotation.
Investigation of water-pressure distribution on seaplane hulls.
Investigation of performance characteristics of DT and CS seaplanes.
Investigation in the variable-density wind tunnel of standard propeller sections with various camber ratios.
Investigation of performance of four propellers in flight.
Investigation of performance characteristics of aeronautical engine.
Investigation of pressure distribution and accelerations on a pursuit type airplane.
Investigation of spoiler aileron control for a VE-7 airplane.
Investigation of the behavior of an airplane in landing and in taking off.
Investigation of pressure distribution over the wing section of a VE-7 airplane.
Investigation of performance characteristics of aeromarine variable-thickness and variable-camber wing.
Investigation of heat distribution, between wings of seaplanes.
Investigation of distribution of loading between wings of biplanes and triplanes.
Investigation of landing speed of TS airplane.
Investigation of aerodynamic loads on the U. S. S. Los Angeles.
Investigation of performance characteristics of DT and CS seaplanes.
Investigation in the variable-density wind tunnel of standard propeller sections with various camber ratios.
Investigation of performance of four propellers in flight.
Investigation of water-pressure distribution on seaplane hulls.
Investigation of autorotation.
Investigation of performance of model air propellers in a free air stream and in front of a VE-7 model.
Propeller tests on SC-1 airplane.
A work of great importance was begun through the appointment of a subcommittee on accidents. Says the report: "In order to determine, if possible, the exact causes of aircraft accidents, the greater number of which are due to failure of some part of the power-plants of aircraft, a subcommittee on accidents has been organized as a subcommittee of the committee on power-plants for aircraft. The functions of this subcommittee are to assemble and analyze data on accidents in the Army, Navy, and Postal Air Services with a view to determining the types of material failures which most commonly occur in aircraft. The organization of the subcommittee on accidents is as follows: G. W. Lewis, National Advisory Committee for Aeronautics, chairman; Lieut. R. R. Dallas, United States Army; Lieut. W. H. Dillon, United States Navy; C. F. Egge, Air Mail Service."

LIST OF TECHNICAL NOTES ISSUED IN 1925

(For Previous List, See Aircraft Year Book, 1925)

No.

206. Structural Weight of Aircraft as Affected by the System of Design. By Charles Ward Hall.
212. Simplified Propeller Design for Low-Powered Airplanes. By Fred E. Weick.


216. The Velocity Distribution Caused by an Airplane at the Points of a Vertical Plane Containing the Span. By Max M. Munk.

217. Note on the Air Forces on a Wing Caused by Pitching. By Max M. Munk.


**List of Technical Memorandums Issued During the Past Year**


82. Results of Experiments with Slotted Wings. By G. Lachmann. Translated from "Zeitschrift für Flugtechnik und Motorluftschifffahrt," May 26, 1924.


89. Two-Seat Light Airplanes Which Participated in Contest Held at Lympne, England, Week of September 20 to October 4, 1924. Taken from "Flight," September 25, October 2 and 9, and from "Aeroplane," September 24, October 1, 8 and 15, 1924. Compiled by N. A. C. A.


98. Results of Recent Experiments with Slotted Wings. By G. Lachman. Translated from "Zeitschrift für Flugtechnik und Motorluftschifffahrt," August 26 and September 26, 1924.


APPENDIX


Part V of the Committee’s report has the following to say on “Progress in Commercial Aviation”:

“The past year was notable as witnessing what may prove to be a real, substantial beginning of commercial aviation in America. The most encouraging factors were the initiative shown by private companies in establishing air lines and the relatively large numbers of responsible bidders for the carrying of air mail by contract with the Post Office Department. When it is realized that commercial aviation exists in European countries at this time only by virtue of the support of the various governments given through various plans of direct and indirect subsidies, it should be especially gratifying to all concerned with the advancement of aeronautics in this country to feel that the era of commercial aviation on a sound basis is about to dawn in America.

“Although the National Advisory Committee for Aeronautics has long been of the opinion that commercial aviation must largely make its own way in America, it believes at the same time that the Government should aid commercial aviation in certain respects where Government aid is practicable and necessary. If, in recognition of this principle, commercial aviation can be successfully developed in America on a firm basis, its development will not be limited, whereas the development of European commercial aviation on a direct subsidy basis is necessarily limited by the nature and extent of the subsidies given. The committee believes that the American policy is sound and in the long run will be more effective in stimulating the substantial development of commercial aviation than will the European policy of direct subsidy.

“In spite of this optimistic note, the facts of the situation that must be faced show a number and variety of problems requiring study and solution before commercial aviation can take its proper place in America. The most pressing needs requiring attention at this time are, first, legislation establishing the fundamental right of flight, creating a bureau of air navigation in the Department of Commerce for the regulation and licensing of air craft, airports, and aviators, and for the establishment of airmail, maintenance, and lighting of adequate national airways, and providing for the necessary meteorological information; and, second, the improvement of airplane design and structure with a view primarily to making airplanes safer, more reliable, more controllable at low speeds incident to taking off and landing, and less expensive in initial cost, as well as in the cost of maintenance and operation. There should also be assistance from the other governmental agencies concerned, such as the Hydrographic Office, the Coast and Geodetic Survey, the Weather Bureau, the Lighthouse Service, and the Army and Navy Air Services.

“To accomplish the first purpose, legislation is necessary. This has been repeatedly recommended by the National Advisory Committee for Aeronautics and has been endorsed in principle by all agencies of the Government concerned. This question is discussed at length in the report of the committee on civil aviation of the Department of Commerce and American Engineering Council. To accomplish the second purpose requires continuous prosecution of scientific research on the more fundamental problems of flight. This is the definite prescribed function of the National Advisory Committee for Aeronautics, and in the last analysis is necessarily the most fundamental activity in the whole field of aeronautics.”

And the following on “The Problem of the Aircraft Industry”:

“In its tenth annual report [See Aircraft Year Book, 1925], the committee outlined the relation of the aircraft industry to national defense, and emphasized the need of maintaining a satisfactory nucleus of an industry. This was defined as a number of aircraft manufacturers distributed over the country, operating on a sound financial basis, and capable of rapid expansion to meet the Government’s needs in an emergency. The committee presented certain definite suggestions of steps to be taken by the Government and by the industry to meet the situation that existed at that time. There has been substantial progress during the past year along the lines outlined by the committee, and it believes that the condition of the industry and the relations of the Government to the industry have been much improved. The greatest single factor in bringing about this improved condition has been the increased volume of Government orders for aircraft, made possible by increased appropriations and contract authorizations for the purchase of aircraft. The present situation, on the whole, may be regarded as more satisfactory at this time, and as offering promise of further improvement.”

The Committee summarizes the situation, nationally, in the following words:

“There has been continued gratifying progress in the technical development of aircraft. Performance and reliability have increased. The committee’s program of research for the coming year promises to add substantially to the store of technical knowledge. There is nothing in sight at this time to indicate the probability of the occurrence of a revolutionary principle contributing any great or sudden improvement in aircraft. While progress must be gradual, there is every reason to believe that there will be steady improvement in the performance, efficiency, reliability, and safety of aircraft.

“Aviation has become more generally recognized as a weapon indispensable to war.
operations and as an instrument that gives promise of taking its place in the immediate future in the commercial life of the Nation.

"During the past year alone there were three investigations of the aircraft situation. A special committee of the House of Representatives known as the "Lampert Committee," and a special board appointed by President Coolidge known as "The President's Aircraft Board," inquired into all details of the aircraft situation and the aeronautical organization of the Government. A third investigation, limited to civil and commercial aviation, was made by a special committee on civil aviation of the Department of Commerce and American Engineering Council. The recommendations of these bodies should serve to clarify the public mind and to focus attention on the major problems requiring immediate solution. Measures to meet the situation should be formulated and carried into effect without delay. In this connection the National Advisory Committee for Aeronautics reiterates its recommendations of previous years for the creation of a bureau of air navigation in the Department of Commerce to regulate and encourage commercial aviation.

"The state of the aircraft industry is gradually improving. The most substantial factors in improving the situation during the past year were the increase in appropriations and contract authorizations for the purchase of aircraft by the War and Navy Departments and the increasingly close liaison between the industry and the Government engineers. With sustained Government patronage on a continuous production basis and with the prospect of a growing commercial demand for aircraft, the condition of the aircraft industry will steadily improve.

"Air mail service is no longer a novelty. It is passing out of the experimental stage and becoming a necessity in the daily business life of the Nation. It has reached the point where it has become practical for private firms to carry air mail under contracts with the Post Office Department. Air transportation of the mails should therefore be extended gradually to meet the requirements of the people in all parts of the country."

**AIRCRAFT EXPORTS**

**U.S.—1925**

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<th>Month</th>
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* Other aircraft, such as dirigible and non-dirigible lighter than aircraft, not separated during 1925; only two "other aircraft" valued at $900 and three valued at $1,280 were exported during 1923 and 1924, respectively.
### Aircraft and Aircraft Engine Exports by Countries 1916-1925

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| Totals                   | $2,156,395| $1,081,542| $206,120| $215,300| $598,274| $314,940| $157,800| $374,609| $796,273| $682,075| $6,504,808 |
| Part of Airplanes (lbs)  | 4,843,619| 3,133,793| 8,879,797| 3,429,226| 554,375| 157,608| 165,427| 69,630|        |        | 21,399,580 |
| Complete Airplanes       | 269      | 115      | 20       | 44       | 65      | 48      | 40       | 46       | 59       | 376      |                  |
| Complete Engines         | 15       |          |          |          |         |         |          |          |          |          |                  |

*Not available prior to 1924.*
AIRCRAFT APPROPRIATIONS, UNITED STATES
1898-1924

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<th>Year</th>
<th>Army</th>
<th>Navy</th>
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* Increase.
† Decrease.
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* Increase.  
† Decrease.  
** Plus $2,150,000 "contract authorizations" for additional purchases of aircraft.  
†† For the contract Air Mail Service $500,000 was appropriated for 1926 and $2,000,000 was allowed for 1927.  
*** Plus $4,400,000 "contract authorizations" for additional purchases of aircraft.  
††† Plus $6,250,000 "contract authorizations" for additional purchases of aircraft.
**AIRCRAFT APPROPRIATIONS, FOREIGN**—(Also See Previous Aircraft Year Books)

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<th>Country</th>
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<th>1924-1925</th>
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<td>Total</td>
<td>Part Devoted to Civil and Subsidy</td>
<td>Total</td>
<td>Part Devoted to Civil and Subsidy</td>
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<tr>
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<td>£90,541,233</td>
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<td>£26,666—three years</td>
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<td>£34,000</td>
<td>£57,915,000</td>
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<td>461,708,566 lire</td>
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<td>1923-1924</td>
<td>1924-1925</td>
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<td>Jugo-Slavia</td>
<td>Air credits extended by French</td>
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<td>485,000 glds.</td>
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<td>285,000 Ztoly</td>
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<td>Poland</td>
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<td>30,000,000 leis</td>
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## AIRCRAFT YEAR BOOK

### OFFICIAL WORLD AND AMERICAN AIR RECORDS

Established under Rules and Regulations of the FEDERATION AERONAUTIQUE INTERNATIONALE

**JANUARY 1, 1926**

**WORLD RECORDS**

Confirmed by the Federation Aeronautique Internationale

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### CLASS A—BALLOONS

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<th>Duration</th>
<th>Distance</th>
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<tr>
<td>1st Category (600 Cubic Meters)</td>
<td>(France) G. Cormier, Aug. 10-13, 1924. 22h. 54m. 804.173 km. 499.69 miles.</td>
</tr>
<tr>
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<td>(France) Georges Cormier, July 1, 1922. 23h. 8m. 804.173 km. 499.69 miles.</td>
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<table>
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<tbody>
<tr>
<td>2nd Category (601-900 Cubic Meters)</td>
<td>(France) Jules Dubois, May 14-15, 1922. 24h. 34m. 804.173 km. 499.69 miles.</td>
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<td>(France) Georges Cormier, July 1, 1922. 23h. 8m. 804.173 km. 499.69 miles.</td>
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<td>3rd Category (901-1,200 Cubic Meters)</td>
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### CLASS B—AIRSHIPS

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<td>Returning to Point of Departure</td>
<td>(Italy) Castracane and Castruccio, P-5, June 25, 1913. 13 hours. 810 km. 503.3 miles.</td>
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<tr>
<td></td>
<td>(Italy) Castracane and Castruccio, P-5, July 30, 1913. 16 hours. 1012 feet. 3080 meters.</td>
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### CLASS C—AIRPLANES

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<tr>
<td>Returning to Point of Departure Without Refueling</td>
<td>(France) Drouhin and Landry, Farman biplane, Farman 450 h.p., at Etampes-Chartes, Aug. 7-8-9, 1925. 24h. 11m. 476 km. 295.6 miles.</td>
</tr>
<tr>
<td></td>
<td>(France) Drouhin and Landry, Farman biplane, Farman 450 h.p., at Etampes-Chartes, Aug. 7-8-9, 1925. 24h. 11m. 476 km. 295.6 miles.</td>
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<table>
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<td>(Airline)</td>
<td>Captain Arrachart and Lemaître, Breguet 19 B-2, Renault, 480 h.p., Farman to Cannes, Feb. 3-4, 1925. 2734 miles. 4366.30 km. 1987.26 miles.</td>
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<table>
<thead>
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<th>Distance</th>
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<tbody>
<tr>
<td>Maximum Speed</td>
<td>(France) Warrant Officer Bonnett, Ferbois monoplane, Hispano Suiza, 350 h.p., at Istres, France, December 11, 1924. 44 minutes. 448.171 k.p.h. 278.480 m.p.h.</td>
</tr>
</tbody>
</table>

**SPEED FOR SPECIFIED DISTANCES**

| Speed for 100 Kilometers | (United States) Lt. Cyrus Bettis, U.S.A.S., Curtiss R3C-1, Curtiss V 1400 600 h.p., Mitchel Field, N. Y., Oct. 12, 1925. 401.279 k.p.h. 248.847 m.p.h. |
| Speed for 200 Kilometers | Lt. Cyrus Bettis, U.S.A.S., Curtiss R3C-1, Curtiss V 1400, 600 h.p., Mitchel Field, N. Y., Oct. 12, 1925. 400.687 k.p.h. 248.975 m.p.h. |
| Speed for 500 Kilometers | (France) Sadi-Lecointe, Nieuport-Delage, Hispano-Suiza, 500 h.p., at Istres, June 23, 1924. 306.969 k.p.h. 190.567 m.p.h. |
APPENDIX

SPEED FOR 1000 KILOMETERS (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villessauvage-La Marmargne, Aug. 29, 1925, 248.296 k.p.h., 154.823 m.p.h.

SPEED FOR 1500 KILOMETERS (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villessauvage-La Marmargne, Sept. 12, 1925, 218.827 k.p.h., 135.599 m.p.h.

SPEED FOR 2000 KILOMETERS (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villessauvage-La Marmargne, Sept. 12, 1925, 218.750 k.p.h., 135.930 m.p.h.

SPEED FOR 2500 KILOMETERS (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villessauvage-La Marmargne, Sept. 12, 1925, 218.659 k.p.h., 135.630 m.p.h.

SPEED FOR 3000 KILOMETERS (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villessauvage-La Marmargne, Sept. 12, 1925, 218.593 k.p.h., 135.420 m.p.h.

SPEED FOR 3500 KILOMETERS (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villessauvage-La Marmargne, Sept. 12, 1925, 218.486 k.p.h., 134.870 m.p.h.

SPEED FOR 4000 KILOMETERS (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villessauvage-La Marmargne, Sept. 12, 1925, 218.369 k.p.h., 134.330 m.p.h.

CLASS C—WITH USEFUL LOAD OF 250 KILOGRAMS (551.15 lbs.)

RETURNING TO POINT OF DEPARTURE

Duration (United States) Lt. Harold R. Harris, U.S.A.S., Douglas DT-2, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924, 9h. 11m. 53.48.

Distance (United States) Lt. Harold R. Harris, U.S.A.S., Douglas DT-2, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924, 590.3 km. 366.8 miles.

Altitude (United States) Lt. H. R. Harris, U.S.A.S., TP-1, Liberty 400 h.p., (supercharged) at McCook Field, Dayton, Ohio, March 27, 1924, 8980 meters, 29,462 ft.

Speed for 100 Kilometers (France) Fernand Lasne, Nieuport-Delage, Hispano-Suiza, 500 h.p., at Villessauvage-La Marmargne, Oct. 7, 1925, 281.030 k.p.h., 174.622 m.p.h.

Speed for 200 Kilometers (France) Fernand Lasne, Nieuport-Delage, Hispano-Suiza, 500 h.p., at Villessauvage-La Marmargne, Oct. 7, 1925, 279.700 k.p.h., 173.809 m.p.h.

Speed for 500 Kilometers (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villessauvage-La Marmargne, Oct. 7, 1925, 249.618 k.p.h., 155.105 m.p.h.

CLASS C—WITH USEFUL LOAD OF 500 KILOGRAMS (1102.31 lbs.)

RETURNING TO POINT OF DEPARTURE

Duration (United States) Lt. H. R. Harris, U.S.A.S., Douglas DT-2, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924, 9h. 11m. 53.48.

Distance (United States) Lt. H. R. Harris, U.S.A.S., Douglas DT-2, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924, 590.3 km. 366.8 miles.

Altitude (United States) Lt. H. R. Harris, U.S.A.S., U.S. Army TP-1, Liberty 400 h.p., at McCook Field, Dayton, Ohio, May 21, 1924, 8578 meters, 28,143 ft.

Speed for 100 Kilometers (France) Fernand Lasne, Nieuport-Delage, Hispano-Suiza, 500 h.p., at Villessauvage-La Marmargne, Oct. 7, 1925, 281.030 k.p.h., 174.622 m.p.h.

Speed for 200 Kilometers (France) Fernand Lasne, Nieuport-Delage, Hispano-Suiza, 500 h.p., at Villessauvage-La Marmargne, Oct. 7, 1925, 279.700 k.p.h., 173.809 m.p.h.

Speed for 500 Kilometers (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villessauvage-La Marmargne, Oct. 7, 1925, 249.618 k.p.h., 155.105 m.p.h.

CLASS C—WITH USEFUL LOAD OF 1000 KILOGRAMS (2204.62 lbs.)

RETURNING TO POINT OF DEPARTURE

Duration (United States) Lt. J. A. Macready, U.S.A.S., Curtiss (Martin) Bomber, N18-1, 2 Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Oct. 4, 1924, 2h. 13m. 49.66.

Distance (France) Fernand Lasne, Nieuport-Delage, Hispano-Suiza, 500 h.p., at Villessauvage-La Marmargne, Oct. 16, 1925, 174.618 m.p.h., 124.27 miles, 206 kilometers.
<table>
<thead>
<tr>
<th>Altitude</th>
<th>Aircraft Details</th>
<th>Duration</th>
<th>Speed for 100 Kilometers</th>
<th>Speed for 200 Kilometers</th>
</tr>
</thead>
<tbody>
<tr>
<td>(France) Lucien Coupé, Farman Goliath, Farman 600 h.p., at Toussus, May 6, 1924.</td>
<td>(France) Fernand Lasne, Nieuport-Delage, Hispano-Suiza 500 h.p., at Villesaurage-La Marmogne, Oct. 16, 1925.</td>
<td>3h. 3m. 39s.</td>
<td>142.53 k.p.h.</td>
<td>142.36 k.p.h.</td>
</tr>
<tr>
<td>CLASS C—WITH USEFUL LOAD OF 1500 KILOGRAMS (3306.93 lbs.)</td>
<td>Returning to Point of Departure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLASS C—WITH USEFUL LOAD OF 2000 KILOGRAMS (4409.24 lbs.)</td>
<td>Returning to Point of Departure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration (United States) Lts. Smith and Richter, U.S.A.S., and Mechanician Doug. Culver, Barling Bomber, 6 Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Oct. 3, 1924.</td>
<td>Speed for 3000 Kilometers Liberty 400 h.p., at Rockwell Field, San Diego, Calif., Aug. 27-28, 1923.</td>
<td>1h. 47m. 10.5s.</td>
<td>142.78 k.p.h.</td>
<td>142.00 k.p.h.</td>
</tr>
<tr>
<td>CLASS C—WITH USEFUL LOAD OF 3000 KILOGRAMS (6613.86 lbs.)</td>
<td>Returning to Point of Departure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLASS C—WITH USEFUL LOAD OF 4000 KILOGRAMS (8818.48 lbs.)</td>
<td>Returning to Point of Departure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration (United States) Lts. Smith and Richter, U.S.A.S., and Mechanician Doug. Culver, Barling Bomber, 6 Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Oct. 3, 1924.</td>
<td>Speed for 1000 Kilometers Liberty 400 h.p., at Rockwell Field, San Diego, Calif., Aug. 27-28, 1923.</td>
<td>1h. 47m. 10.5s.</td>
<td>142.53 k.p.h.</td>
<td>142.84 k.p.h.</td>
</tr>
</tbody>
</table>

CLASS C—REFUELED IN FLIGHT

| Duration (United States) Lts. Smith and Richter, U.S.A.S., and Mechanician Doug. Culver, Barling Bomber, 6 Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Oct. 3, 1924. | Speed for 500 Kilometers Liberty 400 h.p., at Rockwell Field, San Diego, Calif., Aug. 27-28, 1923. | 1h. 47m. 10.5s.       | 142.53 k.p.h.            | 142.36 k.p.h.            |
APPENDIX

CLASS C-2—SEAPLANES

RETURNING TO POINT OF DEPARTURE WITHOUT REFUELING

Distance (United States) Lt. F. W. Wend and J. D. Price, Navy C S-2 seaplane, Wright, 585 h.p., at Washington, D. C., July 11-12, 1924. 1600 km.
Altitude (France) Sudie Leconte, Nieuport Delage, Hispano, 380 h.p., at Meulan, March 11, 1924. 894.19 miles.

SPED FOR SPECIFIED DISTANCES

Speed for 1000 Kilometers (United States) Lieuts. Victor E. Bertrand and George C. McDonald, Loening air yacht, Liberty 500 h.p., at Hampton Roads, Va., Nov. 7, 1924. 163.778 k.p.h. 101.642 m.p.h.
Speed for 1500 Kilometers (United States) Lieuts. F. W. Wend and J. D. Price, Navy C S-2 seaplane, Wright 585 h.p., at Washington, D. C., June 22-23, 1924. 119.36 k.p.h. 74.17 m.p.h.

CLASS C-2—WITH USEFUL LOAD OF 250 KILOGRAMS (551.15 lbs.)

RETURNING TO POINT OF DEPARTURE

Duration (United States) Lt. H. T. Stanley, U.S.N., F-5-L flying boat, 2 Liberty 400 h.p., at San Diego, Calif., June 6, 1923. 10 h. 23 m. 58.3 km.
Distance (Italy) St. Adriano Bacula, Savoia Marchetti S-58, Hispano Suiza 300 h.p., at Seibo, Calabria, Aug. 25, 1924. 684.64 miles.
Altitude (Italy) Guido Guidi, Dornier-Wal "Idaor," 2 Rolls-Royce 360 h.p., at Pisa, Oct. 26, 1925. 5.831 meters. 19,131 feet.
Speed for 100 Kilometers (Italy) Guido Guidi, Dornier-Wal "Idaor," 2 Rolls-Royce 360 h.p., at Pisa, Feb. 4, 1925. 94.736 m.p.h.
Speed for 200 Kilometers (Italy) Guido Guidi, Dornier-Wal "Idaor," 2 Rolls-Royce 360 h.p., at Pisa, Feb. 4, 1925. 152.335 k.p.h. 94.736 m.p.h.
Speed for 500 Kilometers (Denmark) Karl Leesch, Rohrbach metal seaplane, 2 Rolls-Royce 360 h.p., at Pisa, Oct. 24, 1924. 94.736 m.p.h.

CLASS C-2—WITH USEFUL LOAD OF 500 KILOGRAMS (1102.31 lbs.)

RETURNING TO POINT OF DEPARTURE

Duration (United States) Lt. H. E. Halland, U.S.N., F-5-L flying boat, 2 Liberty 400 h.p., at San Diego, Calif., June 6, 1923. 7 h. 35 m. 548.0 km.
Distance (United States) Lt. H. E. Halland, U.S.N., F-5-L flying boat, 2 Liberty 400 h.p., at San Diego, Calif., June 6, 1923. 466 miles.
Altitude (France) J. F. Laporte, Shreck seaplane, F. b. A. Hispano 300 h.p., at Argentine, Aug. 27, 1924. 4,735 meters.
Speed for 100 Kilometers (Italy) Guido Guidi, Dornier-Wal "Idaor," 2 Rolls-Royce 260 h.p., at Pisa, Feb. 4, 1925. 168.523 k.p.h. 104.715 m.p.h.
## AIRCRAFT YEAR BOOK

**CLASS C-2—WITH USEFUL LOAD OF 1000 KILOGRAMS (2204.62 lbs.)**

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>Altitude</th>
<th>Speed for 100 Kilometers</th>
<th>Speed for 200 Kilometers</th>
<th>Speed for 500 Kilometers</th>
</tr>
</thead>
</table>

**RETURNING TO POINT OF DEPARTURE**

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>Altitude</th>
<th>Speed for 100 Kilometers</th>
<th>Speed for 200 Kilometers</th>
<th>Speed for 500 Kilometers</th>
</tr>
</thead>
</table>

## CLASS C-2—WITH USEFUL LOAD OF 1500 KILOGRAMS (3309.03 lbs.)

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>Altitude</th>
<th>Speed for 100 Kilometers</th>
<th>Speed for 200 Kilometers</th>
<th>Speed for 500 Kilometers</th>
</tr>
</thead>
</table>

**RETURNING TO POINT OF DEPARTURE**

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>Altitude</th>
<th>Speed for 100 Kilometers</th>
<th>Speed for 200 Kilometers</th>
<th>Speed for 500 Kilometers</th>
</tr>
</thead>
</table>

## CLASS C-2—WITH USEFUL LOAD OF 2000 KILOGRAMS (4409.24 lbs.)

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>Altitude</th>
<th>Speed for 100 Kilometers</th>
<th>Speed for 200 Kilometers</th>
<th>Speed for 500 Kilometers</th>
</tr>
</thead>
</table>

## CLASS D—GLIDERS

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>Altitude</th>
<th>Speed for 100 Kilometers</th>
<th>Speed for 200 Kilometers</th>
<th>Speed for 500 Kilometers</th>
</tr>
</thead>
<tbody>
<tr>
<td>(France) Comm'dt. Massaux, Poncelet Vivette Glider, at Vauville, July 26, 1925.</td>
<td>(France) Lt. Thorot, Bardin Glider, at Vauville, France, August 26, 1925.</td>
<td>(France) E. Descamps, DeWoitine Glider, at Biskra, Feb. 7, 1923.</td>
<td>10.08 m.p.h.</td>
<td>10.08 miles.</td>
<td>9682 feet.</td>
</tr>
</tbody>
</table>

## CLASS G—HELICOPTERS

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>Altitude</th>
<th>Speed for 100 Kilometers</th>
<th>Speed for 200 Kilometers</th>
<th>Speed for 500 Kilometers</th>
</tr>
</thead>
<tbody>
<tr>
<td>(France) Oehmichen, Oehmichen Helicopter, Le Rhone, 180 h.p., at Arbouans, Sept. 14, 1924.</td>
<td>3682 meters.</td>
<td>18.1283 miles.</td>
<td>31.28 feet.</td>
<td>1788 feet.</td>
<td></td>
</tr>
</tbody>
</table>

## CLASS G—WITH USEFUL LOAD OF 100 KILOGRAMS (220.46 lb.)

**Altitude—** (France) Oehmichen, Oehmichen Helicopter, Le Rhone, 180 h.p., at Arbouans, Sept. 14, 1924. 1 meter. 3.28 feet.

## CLASS G—WITH USEFUL LOAD OF 200 KILOGRAMS (440.92 lbs.)

**Altitude—** (France) Oehmichen, Oehmichen Helicopter, Le Rhone, 180 h.p., at Arbouans, Sept. 14, 1924. 1 meter. 3.28 feet.
## APPENDIX

### AMERICAN RECORDS

Confirmed by the
Contest Committee
National Aeronautic Association of U.S.A.

### CLASS A—BALLOONS

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>1st Category (600 Cubic Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(No Record)</td>
<td>(No Record)</td>
<td>(No Record)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>3rd Category (900-1,200 Cubic Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(No Record)</td>
<td>(No Record)</td>
<td>(No Record)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>4th to 8th Categories, Inclusive</th>
</tr>
</thead>
<tbody>
<tr>
<td>H. V. Thaden and W. A. Morton, &quot;Detroit,&quot; Washington C. H., Ohio, to Gondola, Va., Sept. 30-31, 1924.</td>
<td>400.68</td>
<td>13h. 40' 20&quot;</td>
</tr>
</tbody>
</table>

### CLASS B—AIRSHIPS

Returning to Point of Departure

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>Altitude</th>
<th>Maximum Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ens. Maytham, Navy A-236 at Miami, Fla., Dec. 24-26.</td>
<td>40h. 26m.</td>
<td>(No Record)</td>
<td>(No Record)</td>
</tr>
</tbody>
</table>

### CLASS C—AIRPLANES

Returning to Point of Departure Without Refueling

<table>
<thead>
<tr>
<th>Duration</th>
<th>Distance</th>
<th>Altitude</th>
<th>Maximum Speed</th>
</tr>
</thead>
</table>

### SPEED FOR SPECIFIED DISTANCES

<table>
<thead>
<tr>
<th>Speed for 100 Kilometers</th>
<th>183.83 k.p.h.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed for 200 Kilometers</td>
<td>228.00 k.p.h.</td>
</tr>
<tr>
<td>Speed for 400 Kilometers</td>
<td>249.342 m.p.h.</td>
</tr>
<tr>
<td>Speed for 600 Kilometers</td>
<td>2516.55 miles.</td>
</tr>
<tr>
<td>Speed for 1000 Kilometers</td>
<td>4050 km.</td>
</tr>
</tbody>
</table>

### SPEED FOR SPECIFIED DISTANCES

<table>
<thead>
<tr>
<th>Speed for 100 Kilometers</th>
<th>183.83 k.p.h.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed for 200 Kilometers</td>
<td>228.00 k.p.h.</td>
</tr>
<tr>
<td>Speed for 400 Kilometers</td>
<td>249.342 m.p.h.</td>
</tr>
<tr>
<td>Speed for 600 Kilometers</td>
<td>2516.55 miles.</td>
</tr>
<tr>
<td>Speed for 1000 Kilometers</td>
<td>4050 km.</td>
</tr>
</tbody>
</table>

### ALTITUDE

<table>
<thead>
<tr>
<th>Speed for 100 Kilometers</th>
<th>183.83 k.p.h.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed for 200 Kilometers</td>
<td>228.00 k.p.h.</td>
</tr>
<tr>
<td>Speed for 400 Kilometers</td>
<td>249.342 m.p.h.</td>
</tr>
<tr>
<td>Speed for 600 Kilometers</td>
<td>2516.55 miles.</td>
</tr>
<tr>
<td>Speed for 1000 Kilometers</td>
<td>4050 km.</td>
</tr>
</tbody>
</table>
AIRCRAFT YEAR BOOK

CLASS C—WITH USEFUL LOAD OF 250 KILOGRAMS (551.15 lbs.)

Returning to Point of Departure

Duration

Lieut. Harold R. Harris, U.S.A.S., Douglas DT-2, Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

Distance

Lieut. Harold R. Harris, U.S.A.S., Douglas DT-2, Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

Altitude

Lieut. H. R. Harris, U.S.A.S., TP-1, Liberty, 400 h.p., (supercharged), at McCook Field, Dayton, Ohio, March 27, 1924.

Speed for 100 Kilometers

R. Lockwood, Army CO-5, Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

Speed for 200 Kilometers

R. Lockwood, Army CO-5, Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

Speed for 500 Kilometers

Louis G. Meister, Martin Bomber, M-2, 2 Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

CLASS C—WITH USEFUL LOAD OF 500 KILOGRAMS (1102.31 lbs.)

Returning to Point of Departure

Duration

Lieut. H. R. Harris, U.S.A.S., Douglas DT-2, Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

Distance

Lieut. H. R. Harris, U.S.A.S., Douglas DT-2, Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

Altitude

Lieut. H. R. Harris, U.S.A.S., U. S. Army TP-1, Liberty, 400 h.p., at McCook Field, Dayton, Ohio, May 21, 1924.

Speed for 100 Kilometers

R. Lockwood, Army CO-5, Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

Speed for 200 Kilometers

R. Lockwood, Army CO-5, Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

Speed for 500 Kilometers

Louis G. Meister, Martin Bomber, M-2, 2 Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, June 28, 1924.

CLASS C—WITH USEFUL LOAD OF 1000 KILOGRAMS (2204.62 lbs.)

Returning to Point of Departure

Duration


Distance

(No Record.)

Altitude

Lieut. H. R. Harris, U.S.A.S., U. S. Army TP-1, Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, May 22, 1924.

Speed for 100 Kilometers

(No Record.)

Speed for 200 Kilometers

(No Record.)

CLASS C—WITH USEFUL LOAD OF 1500 KILOGRAMS (3306.93 lbs.)

Returning to Point of Departure

Duration


Altitude

## APPENDIX

### CLASS C—WITH USEFUL LOAD OF 2000 KILOGRAMS (4,409.24 lbs.)

**Returning to Point of Departure**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude</td>
<td>Lt. H. R. Harris, U.S.A.S., Harling Bomber, 6 Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Oct. 25, 1923.</td>
</tr>
<tr>
<td>Distance</td>
<td>2,049 meters.</td>
</tr>
<tr>
<td>Speed</td>
<td>6,722 feet.</td>
</tr>
</tbody>
</table>

### CLASS C—WITH USEFUL LOAD OF 3000 KILOGRAMS (6,613.86 lbs.)

**Returning to Point of Departure**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude</td>
<td>Lt. H. R. Harris, U.S.A.S., Harling Bomber, 6 Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Oct. 27, 1923.</td>
</tr>
<tr>
<td>Distance</td>
<td>1,630 meters.</td>
</tr>
<tr>
<td>Speed</td>
<td>5,344 feet.</td>
</tr>
</tbody>
</table>

### CLASS C—WITH USEFUL LOAD OF 4000 KILOGRAMS (8,818.48 lbs.)

**Returning to Point of Departure**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude</td>
<td>Lt. H. R. Harris, U.S.A.S., Harling Bomber, 6 Liberty, 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Oct. 3, 1924.</td>
</tr>
<tr>
<td>Distance</td>
<td>1,630 meters.</td>
</tr>
<tr>
<td>Speed</td>
<td>4,472 feet.</td>
</tr>
</tbody>
</table>

### CLASS C—REFUELED IN FLIGHT

**Returning to Point of Departure**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>37h. 13m. 14.8s.</td>
</tr>
</tbody>
</table>

### CLASS C-2—SEAPLANES

**Returning to Point of Departure Without Refueling**

|----------|----------------------------------------------------------------------------------------------------------------------------------|

| Distance | 3,206 km. |
| Speed | 1,730 nautical miles. |
| Distance | 1,092 statute miles. |
| Speed | 4,318 meters. |
| Distance | 13,983 feet. |
| Speed | 325.713 m.p.h. |
### CLASS C-2—WITH USEFUL LOAD OF 250 KILOGRAMS (551.15 lbs.)

**Returning to Point of Departure**

| Speed for 500 Kilometers | (No Record.) |

### CLASS C-2—WITH USEFUL LOAD OF 500 KILOGRAMS (1102.31 lbs.)

**Returning to Point of Departure**

| Distance | Lt. H. E. Halland, U.S.N., F-5-L, flying boat, 2 Liberty, 400 h.p., at San Diego, Calif., June 6, 1923. |
| Speed for 500 Kilometers | (No Record.) |

### CLASS C-2—WITH USEFUL LOAD OF 1000 KILOGRAMS (2204.62 lbs.)

**Returning to Point of Departure**

| Speed for 500 Kilometers | (No Record.) |
APPENDIX

CLASS C-2—WITH USEFUL LOAD OF 1500 KILOGRAMS (3306.93 lbs.)

Returning to Point of Departure

          2h. 18m.
Distance Lieut. O. B. Hardison, U.S.N., PN-7-2, flying boat, z Wright T-2, 535 h.p., at Bay Shore, Baltimore, Md., 100 km.
          Oct. 25, 1924.
          62.137 miles.
          Oct. 25, 1924.
Speed for 100 Kilometers Lieut. O. B. Hardison, U.S.N., PN-7-2, flying boat, z Wright T-2, 535 h.p., at Bay Shore, Baltimore, Md., 110.98 k.p.h.
          Oct. 25, 1924.
Speed for 200 Kilometers (No Record.)
Speed for 500 Kilometers (No Record.)

CLASS C-2—WITH USEFUL LOAD OF 2000 KILOGRAMS (4409.24 lbs.)

Returning to Point of Departure

          1h. 49m. 11.95s.
Distance Lieut. O. B. Hardison, U.S.N., PN-7-2, flying boat, z Wright T-2, 535 h.p., at Bay Shore, Baltimore, Md., 100 km.
          Oct. 25, 1924.
          4,885 feet.
          Oct. 25, 1924.
Speed for 100 Kilometers Lieut. O. B. Hardison, U.S.N., PN-7-2, flying boat, z Wright T-2, 535 h.p., at Bay Shore, Baltimore, Md., 110.98 k.p.h.
          Oct. 25, 1924.
          68.4 m.p.h.

CLASS D—GLIDERS

Duration (No Record.)
Distance (No Record.)
Altitude (No Record.)

CLASS G—HELICOPTERS

Distance— Air Line 736 meters.
          2,414 feet.

CLASS G—WITH USEFUL LOAD OF 100 KILOGRAMS (220.46 lbs.)

Altitude— (No Record.)
Above Starting Point

CLASS G—WITH USEFUL LOAD OF 200 KILOGRAMS (440.92 lbs.)

Altitude— (No Record.)
Above Starting Point
REPLY OF THE INDUSTRY TO THE INQUIRY ADDRESSED TO THE AERONAUTICAL CHAMBER OF COMMERCE OF AMERICA, BY THE PRESIDENT'S AIRCRAFT BOARD

The following letter addressed to the President's Aircraft Board, was presented by Charles L. Lawrance, President of the Aeronautical Chamber of Commerce of America, at a special meeting of the Board, in Washington, on October 15, 1925. (See Chapter I, Recommendations of the President's Aircraft Board.)

AERONAUTICAL CHAMBER OF COMMERCE OF AMERICA, INC.

300 Madison Avenue, New York

October 9, 1925.

President's Aircraft Board,
Room 226, House Office Bldg.,
Washington, D. C.

Sir:

Replying to your letter of September 28th, signed by Dr. W. F. Durand, Secretary of the Board, we beg to say that representatives of the aircraft industry have agreed upon certain points which can be presented to your Board as coming from the industry, and as representing views of all of the members of the industry whose names are signed to this letter.

Replying specifically to some of the questions in your letter of September 28th, we beg to answer as follows:

First. The present condition of the industry as to types of planes, number of planes, number and classes of men employed and suitability of men from other industries for this type of work was covered very completely and in great detail in a survey made by the Industrial War Plans Division of the United States Army, after a conference with the Navy, in the spring of 1925. The data for this survey was furnished by the individual companies and was compiled very carefully. We believe that it will answer fully your questions, and since it is not more than six months old, we do not believe that anything will be gained by our repeating this work in the short time available in which to do it.

Major J. A. Mars of the Army Air Service, who carried out this survey and who displayed great skill in doing this work, has recently been transferred from the Industrial War Plans Division. We believe, however, that you will be able to obtain all the data necessary from that source.

Second. The question as to what would be necessary in order to convert the present industry from a peace time basis to a war basis, in the event of a national emergency, was, we believe, covered by the Industrial War Plans Division in this same survey. In fact, the survey was made for the express purpose of furnishing a satisfactory answer to that question.

Third. In response to your request for suggestions of means to put the industry on an adequate peace time basis, so that it would be readily available for the Government's need in the event of a national emergency, the suggestions which the undersigned members of the industry unanimously desire to offer, are the following:

(a) **Secure continuity of production:**

That a policy of procurement be adopted by all the departments of the United States Government who use aircraft, to the end that there may be a certain amount of continuity in the placing of orders for such material, with such plans and organization as have maintained or created good and adequate facilities for design and engineering development and the construction of types required.

This policy of continuity, if carefully worked out and constantly applied, would, we believe, go far toward correcting the conditions that have at times worked great hardships to most of the members of the industry and have limited the growth of the plants and the engineering facilities of the country.

(b) **Stop direct competition of Government owned plants with the industry:**

Throughout the whole period since the war there have been many occasions when members of the industry have met sharp competition from plants owned and operated by the Army, the Navy and the Post Office. While recently there have been praiseworthy efforts on the part of the Government to reduce this competition, no definite assurance that this will be a permanent continuing future policy has been as yet afforded the industry.

(c) **Eliminate destructive price policy in buying of equipment:**

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Due, no doubt, in large part to the unwillingness of the contracting officers of the Government to expose themselves to recurrent unjust criticism and investigation and due in part also to the fact that the entire procurement business in aircraft has been carried on under inflexible rules and regulations of long standing, a great many of the orders placed with the industry during the period from July 1919 to the present time, have been placed at prices which did not yield a fair profit commensurate with the risk and in many instances imposed heavy losses and, therefore, tended to destroy rather than to build up a strong, capable, well-equipped industry in the United States.

Several other important factors have contributed to this result. One has been competitive bidding. Another, as above indicated, has been the tendency, under the conditions which the contracting officers feel that they labor, to be over-exacting in negotiating contracts. Still another factor, as stated, has been the use of the Government owned plants and facilities as a threat to drive down prices below a fair level.

(d) Recognize and honor proprietary rights to design as tangible property:

Throughout a large part of the period under review the contracting officers have frequently required the designer to sell the design rights of new equipment to the Government as part of the contract for building experimental models. The possession of these design rights, so acquired, became in many instances a commanding reason why procurement orders built from the design had to be thrown open to competitive bidding. This has hampered the increase in procurement of adequate equipment. It has also worked a hardship to the producers and has undoubtedly tended to restrict and to hamper the growth of the design departments in the industry and has thereby defeated one of the main purposes for which Congress has been urged to appropriate money for aviation, namely, the maintenance of the industry of strong, vigorous engineering staffs within the industry.

We are pleased to reply to your further request for specific suggestions as follows:


Regarding Governmental procurement, we do not feel that we can properly make effective suggestions regarding methods of Government procurement excepting to point out, as has been done above, the reasons why, in our opinion, Government procurements to date have not resulted in establishing the industry on a healthy and well-equipped basis. Any form or method of Government procurement that will accomplish the results above outlined will be acceptable to the industry.

2. Legislation.

We do not feel that the industry is justified in recommending specific legislation. If legislation should be necessary in order to accomplish the aims outlined this letter expresses the opinion of the undersigned, replies adequately to your request (3) for a sketch of the developments in this field, by the industry.

Conclusion.

On December 1, 1924, at a general meeting of the entire aeronautical industry, a resolution was adopted as follows:

"WHEREAS, The President of the United States, in his Message to the Congress, transmitting the Budget, has said:

'Aside from the important factor of training personnel, our National Defense is largely an industrial problem. Today the outstanding weakness in the industrial situation which affects National Defense, is the inadequacy of the facilities to supply air service needs. The airplane industry in this country at the present time is dependent almost entirely upon Government business. To strengthen this industry is to strengthen our National Defense'; and

"WHEREAS, The Aircraft Industry, sensing its duty in this regard, purposes fullest cooperation to that end,

"NOW, THEREFORE, BE IT RESOLVED, That we, the undersigned, representing the Aircraft Industry in the United States of America, proceed immediately to the consideration of what should be done to enable us to ascertain and develop a sounder policy within the Aeronautical Industry, so that closer cooperation between the Government and the Industry may obtain through such relations of such character and on such a sound basis as will permit the safe and economical expansion of the Industry and the development of military and commercial aeronautics, and thus provide the essential nuclei for production of Service types for the National Defense and emergencies."

This resolution was approved and formally signed by the following manufacturers:

Wright Aeronautical Corporation, Charles L. Lawrance, Vice Pres.
Huff Daland & Company, Thomas H. Huff, President.
Johnson Airplane & Supply Co., J. M. Johnson.
The Glenn L. Martin Co., Glenn L. Martin, President.
Chance Vought Corporation, Chance M. Vought, Asst. Treas.
Aeromarine Plane & Motor Co., Inc., I. M. Upperey, President.
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Atlantic Aircraft Corp., Lorillard Spencer, President.
Consolidated Aircraft Corp., R. H. Fleet, President.
Boeing Airplane Company, E. N. Gott, President.
Airships Incorporated, J. L. Callan, President.
The Douglas Company, Donald W. Douglas.
Cox-Zeppelin Corp., L. Charles Cox, President.
Remington-Burnelli Corp., Vincent J. Burnelli.
Lawrence Sperry Aircraft Co., Inc., Robert Simon, Secretary.

Pursuant to the above resolution, conferences were held between the representatives of the War and Navy Departments and the industry. Out of these conferences, an agreement was reached with the Army and Navy Air Services, which was finally approved and endorsed by the Acting Secretary of War, the Acting Secretary of the Navy, and the industry, as the accepted policy to control the Government and the industry, in the procurement of aeronautical equipment, as follows:

1. The Government shall encourage and promote the design and manufacture, by other than Government agencies, of aircraft, aircraft engines and equipment. The Government shall not engage in such work in competition with the aeronautical industry.
2. The Government shall recognize and sustain the principle of proprietary design rights applied to all aeronautical material.
3. The Government will not purchase or acquire the design rights for aircraft, aircraft engines or accessories when these are the products of established manufacturers.
4. The Government will not purchase aircraft, aircraft engines or accessories of new design until after the actual articles have been presented for test, nor until said articles have demonstrated their superiority over existing and accepted standard types, unless the design project is of such magnitude as to demand Government assistance in its development.
5. The Government shall avail itself as much as practicable of the facilities of the industry for all major overhauling and reconstruction.
6. The Government shall co-operate with the industry toward the continuance of successful operation of its units and wherever necessary recognize the principle of sub-contracting within the industry itself.
7. The Government will continue the policy of conferring from time to time with the accredited representatives of the industry in the consideration of their mutual problems.
8. The Government shall, as far as possible, standardize aeronautical accessories, materials and hardware and otherwise assist in the procurement of non-standard materials and supplies.

The above summarizes and adequately expresses the principles which the members of the industry have signed and approved. These principles, as above noted, have also been approved and accepted by the Army and Navy. If they are now made the permanent continuing policy of the Government in the procurement of aircraft equipment, the desired result will be accomplished.

The above represents the combined unanimous views of the undersigned, who constitute the major part of the industry, and it covers most of the important questions. We, therefore, trust that it will not be necessary further to enlarge the record of your hearings by the appearance before your Board of spokesmen for the industry. Individuals may desire to appear before your Board, but they will represent merely their own companies or themselves, and are not authorized to speak for the industry.

All of which is respectfully submitted for your consideration by the following:

Curtiss Aeroplane & Motor Co., Inc., C. M. Keys, Pres., Garden City, L. I.
Boeing Airplane Company, P. G. Johnson, V. P., Georgetown Station, Seattle, Wash.
Airships Incorporated, J. L. Callan, Pres., Hammondsport, N. Y.
Consolidated Aircraft Corp., by R. H. Fleet, Pres., Buffalo, N. Y.
The Packard & Whitney Aircraft Co., E. B. Rentchler, Pres., Hartford, Conn.
Thomas-Morse Aircraft Corp., Raymond Ware, Secretary, Ithaca, N. Y.
Fokker Aircraft Corp., A. H. S. Fokker, Pres., Kansas City, Mo.
Atlantic Aircraft Corp., Halbert E. Payne, Vice Pres., Hasbrouck Heights, N. J.
Wright Aeronautical Corp., Charles L. Lawrence, Pres., Paterson, N. J.
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Chance Vought Corporation, Chance M. Vought, Pres., Long Island City.
The Glenn L. Martin Co., Glenn L. Martin, Pres., Cleveland, Ohio.
The Douglas Company, Donald Douglas, Pres., Santa Monica, Cal.
Cox-Klemin Aircraft Corp., L. C. Cox, Pres., Baldwin, N.Y.
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