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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

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ORGANIZATION AND EXPLOITATION OF REGULAR  
AERIAL TRANSPORTATION LINES.

By Albert Tete.

From "Premier Congrès International de la  
Navigation Aérienne,"  
Paris, November, 1921, Vol. I.

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I. - Organization.

The systematic and methodical organization of regular aerial transportation dates in France from September, 1918. The progress made during the war in the theory and practice of aviation led to the anticipation of its commercial utilization. Moreover, the allied governments realized at the time of the armistice the necessity of paralleling their military air service by a civil air service, capable of enabling aeronautic industries to keep up the vitality and enthusiasm acquired during the war.

From September, 1918, to June, 1919, there was a period of groping and experimenting. Aerial lines, almost exclusively postal, were organized by the "Administration des Postes et Télégraphes" (Antibes-Ajaccio, Paris-Saint Nazaire, Nice-Avignon, Paris-Lille, Paris-Brussels) by means placed at the disposal of this department by the army and navy, or by the Bureau of Civil Aeronautics, War Department, "13th Direction" (Paris-Bordeaux, Paris-Maubeuge-Valenciennes, Nancy-Briey-Longwy, Paris-London) with its squadrons, or directly by the G.H.Q. (Paris-Strassburg, Paris-Mulhouse.

These experiments made by the various departments, demon-

\* From "Premier Congrès International de la Navigation Aérienne," Paris, November, 1921, Vol. I, pp. 132-138.

strated the need of a single central department. The "Organe de Coordination Général de l'Aéronautique et des Transports Aériens" took over in June the various prerogatives hitherto appertaining to the different departments.

Finally, January 20, 1920, the "Sous-Secrétariat de l'Aéronautique et des Transports Aériens" was created. This included the three sections of which the O.C.G.A.T.A. had hitherto consisted: the Technical Section of Aeronautics, the Section of Aeronautical Construction and the Section of Aerial Navigation, in special charge of the organization of airways and the commercial exploitation of transportation lines.

For the regular functioning of aerial transportation lines, it was first necessary to lay out air routes, i. e. to establish airdromes and emergency landing fields, a suitable meteorological service and a system of communications.

The Government having, for economic and political reasons, taken charge of this organization, the Section of Aerial Navigation immediately laid out and established trunk lines adapted to the requirements of the grand commercial and industrial routes, or to colonial considerations. Furthermore, provisions were made for the utilization of government airdromes by aviators.

#### Ground Equipment.

Aviation fields.- After the air routes had been laid out, the necessary aviation fields were bought and equipped. These fields were divided into different classes or grades, according

to their importance. Their equipment depended on the part they were to play, but their general plan was such that, in the event of increased traffic, any field could be transformed to the next higher grade by the simple addition of new structures without necessitating any changes in the older structures.

These fields are classified as

Emergency fields, located at intervals of 50 to 100 km, according to the importance of the line. They comprise: a lodging place, a workshop and a gasoline cellar;

Fourth-grade stations, with an area of at least 1050 square meters;

Third-grade stations, with an area of 3900 sq.m.;

Second-grade stations, with an area of 4500 sq.m.;

First-grade stations, or "airports," with an area of 6300 square meters.

The last four grades have, moreover, in varying degrees, lodgings, hangars, workshops, gasoline cellars, infirmaries, offices, waiting rooms, etc.

The civil air service still has a few mixed fields, in common with the army.

Lines now operating have stations as follows--

Paris-London: Bourget (1st grade); Beauvais, Poix, Abbeville and Berck (emergency fields; Saint Inglevert (3rd grade).

Paris-Brussels-Amsterdam: Bourget (1st grade); Compeigne and Saint Quentin (emergency); Valenciennes (4th grade); Brussels.

Paris-Strassburg: Bourget (1st grade); Romilly (mixed field); Saint Dizier (emergency); Nancy (3rd grade); Sarrebourg (emergency); Strassburg (3rd grade).

Toulouse-Casablanca: Toulouse (3rd grade) Carcassonne and Perpignan (emergency); in Morocco, military fields at Kenitra, Rabat, Znika, Fildhala and Casablanca.

Bordeaux-Nimes: Bordeaux (4th grade); Agen (emergency); Toulouse (3rd grade); Carcassonne and Pézenas (emergency); Nimes (4th grade).

Radio.- Radio stations are being installed on all government airdromes for communicating between the airdromes themselves and between the airdromes and airplanes.

At present Bourget communicates directly with London, Groydon, Lympne, Brussels, Amsterdam, Saint Inglevert, Strassburg, Nancy, Maubeuge, Valenciennes, Romilly-sur-Seine, Dijon, Lyons and Le Havre (military); and, by relays, with Bordeaux, Toulouse, Marseilles, Montélimar, Perpignan, Nimes, Bayonne, Antibes; and will soon communicate with Ajaccio. All these stations communicate with one another, both in connection with the meteorologic service and air traffic.

Meteorologic stations.- France is divided into six regions or districts: Paris, Metz, Tours, Lyons, Bordeaux and Marseilles. These central stations gather information from their own districts and report it to Bourget, which also receives reports from from foreign countries and transmits them all to the French mete-

orological office. After studying these documents, the latter office transmits its forecasts to all the central stations. The system is completed by stations for storm warnings.

Aerial beacons.-- Lights of different ranges (25 or 50 km) function on some of the airdromes of the Aerial Navigation Section (eleven in operation November 1, 1921).

Improvement of night marking will cause noticeable progress in commercial aviation, by enabling night flights and thus doubling the efficiency of the service.

#### Regulations.

Government installations are placed at the disposal of the aerial navigation companies, under the terms of a law called: "Provisional regulation of the conditions for the use of government airdromes."

This document enumerates the taxes of all kinds levied on an airplane which alights on an organized field. It contains regulations for landing and departing, as well as for the inspection of aircraft on arrival or departure. It also gives general instructions regarding flight above and in the vicinity of airdromes.

Moreover, an agreement made February 26, 1920, between the War Department and the Aerial Navigation Section states the conditions under which military aviators are to aid civil pilots alighting on their fields.

## II. Exploitation.

The regular exploitation of transportation lines did not really begin till 1919. The trials, made at the end of 1918 and the beginning of 1919 by the Bureau of Civil Aviation, the Post Office Department and General Headquarters, served as a basis for the first aerial navigation companies, which courageously undertook this exploitation, still full of uncertainties.

At the end of 1919, four French companies were engaged in the regular transportation of passengers and freight on the lines: Paris-Lille-Brussels, Paris-London and Toulouse-Rabat. Other lines (Paris-Cabourg, Paris-Deauville and Bayonne-Saint Sebastian) only operated during a certain season.

From the beginning, it has been impossible for the companies to live on their own resources. The exploitation of aerial lines is unprofitable for a number of reasons.

The airplanes employed were military airplanes, whose operation was very difficult and whose commercial utilization did not correspond at all to the principles which presided at its creation.

The appurtenances necessary for the flight of airplanes are very expensive.

For offsetting these heavy expenses, the receipts were practically nil at first, the public not having yet acquired confidence in this new mode of locomotion.

This is why the government has given financial aid to the aer-

ial transportation companies since their inauguration.

The manner of this support was the subject of discussions, which we will not take up here. In fact, since 1919, subsidies have been granted by the government to companies carrying on regular traffic. The amount of these subsidies depended on the speed and carrying capacity of the airplane and the length of the route.

319000 km (200000 miles) were flown in 1919 and 527 passengers, 7000 kg (15400 lbs) merchandise and 397 kg (875 lbs) mail were carried. The air fleet consisted of 43 airplanes with 27 pilots.

The year 1920 witnessed the opening of new lines encouraged by government aid.

The Toulouse-Rabat line was extended to Casablanca.

The lines, Bayonne-Bilbas, Paris-Geneva, Paris-Strassburg-Prague, Bordeaux-Toulouse-Montpellier, Nimes-Nice and Saint Laurent-Cayenne in French Guiana, operated regularly.

Many requests for the establishment of lines were received by the Aerial Navigation Section.

More people were on the airdromes and the freight increased considerably.

Subsidies granted in 1920 were by the hour and kilometer, as in 1919, the rates however being about 50% higher.

The airplanes were improved in small details, but without the appearance of any new machine worthy of the name of commer-



cial airplane. Military airplanes were transformed into limousines by the addition of suitable hoods and the interior comfort was increased by the installation of a few chairs.

Nevertheless, the expenses of the companies continued to increase, gasoline and oil reached prohibitive prices, airplanes deteriorated too rapidly and wages were high. Receipts, though increasing, were still small. The vast majority had not yet been impressed with the advantages of aerial travel and was afraid of accidents. There was not sufficient regularity.

In spite of everything, the figures show appreciable progress 850000 km (528000 miles) were flown. 982 passengers, 49000 kg (108000 lbs) merchandise and 4000 kg (8800 lbs) mail were carried. The commercial fleet comprised 169 airplanes and 71 pilots.

In 1921, after a few months' lull during the winter, intensive traffic was renewed and the frequency of the trips was increased on most lines. The Paris-Prague line was extended to Warsaw and the Paris-Brussels line to Amsterdam. The Paris-Le Havre line was inaugurated and served as a connecting link between Paris and the large transatlantic steamships. The Antibes-Ajaccio line connected Paris with Corsica.

Many international and colonial lines are being planned. The problem of long flights has been solved and the Marseilles-Algiers line will soon be running.

The Mediterranean circuit and lines penetrating our African colonies are no longer simply ideas on paper, but maturely considered projects.

Transportation service has become more regular. Improvements in marking the lines and in methods of communication, have enabled departures during weather which was formerly considered prohibitive.

Larger government subsidies have made it possible to reduce fares. The fare between Paris and London by airplane is not much more than by rail and water.

In 1921, the government granted two new subsidies to commercial aviation:

1. A purchase subsidy, designed to encourage the constructor;
2. A subsidy for commercial efficiency, designed to stimulate transportation companies to endeavor to increase the amount of their traffic in carrying both merchandise and passengers.

Traffic airplanes are all more or less modified forms of military airplanes, both with respect to their cells and their engines, and we are beginning to feel the need of some purely commercial aircraft built on economical lines.

Statistics for the month of September, 1921, give the following data: 1556151 km flown and 6387 paying passengers, 102272 kg merchandise and 5398 kg mail carried. The air fleet comprised 263 airplanes and 100 pilots in service on regular lines.

The accompanying graphics (Figs. 1 and 2) indicate the ascending curve of commercial traffic and the increasing importance of this new method of transportation.

To sum up, the development of aerial lines in France is constantly progressing, but does not seem, in spite of everything, to correspond to the persistent efforts put forth by the government and private corporations. The very good results obtained might have been much better, if the public had had more confidence in the new means of transportation and if capitalists had not been so indifferent to the matter.

It might have been necessary to show financiers that commercial aviation is a thing of the future and, though at first thought the economic aspect of present results may appear unfavorable, that it is possible to anticipate a period when their efforts will be rewarded and the capital invested will bring good returns.

For the purpose of facilitating the formation of companies for the exploitation of long air lines, the Secretary of Aeronautics has obtained legislation by parliament making it possible to give government aid to certain companies for a period of ten years.

In fact, the financial legislation of July 31, 1920, authorizes the Secretary of Aeronautics and Aerial Transportation to grant ten-year subsidies to aerial lines, the public importance of which is recognized.

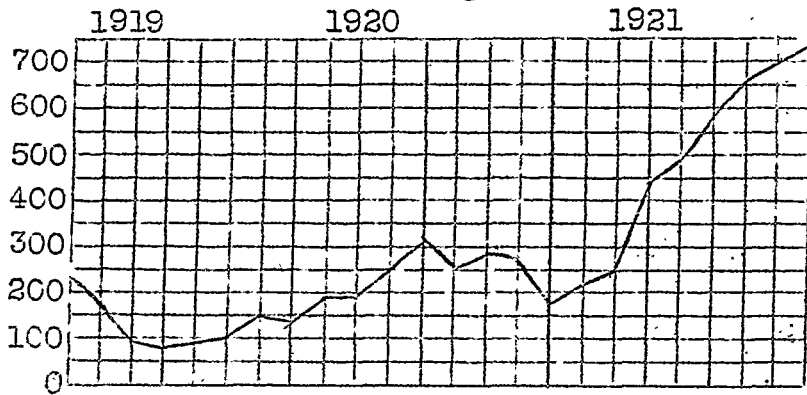
These companies are thus enabled to distribute their expenses over a long period. They will be assured of a minimum subsidy during this period and will be able to discount the future. This

measure should aid powerfully in the development of commercial aviation and render it possible for regular aerial transportation to make progress commensurate with the work and sacrifices of those who have from the first had faith in the future of aviation.

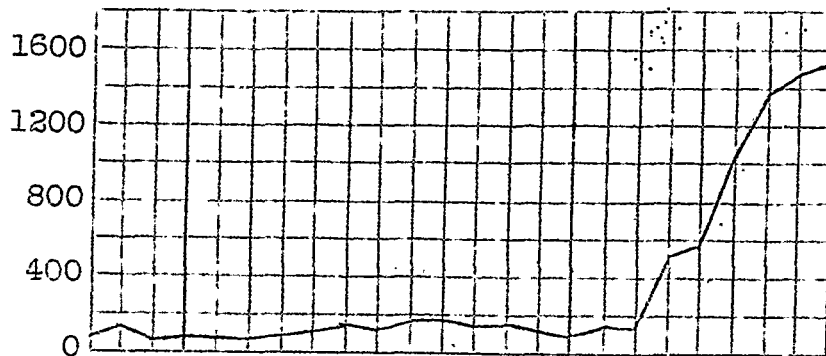
Translated by the National Advisory Committee for Aeronautics.

Commercial traffic of French aerial navigation companies.

Number of flights.



Passengers (paying).



Freight.

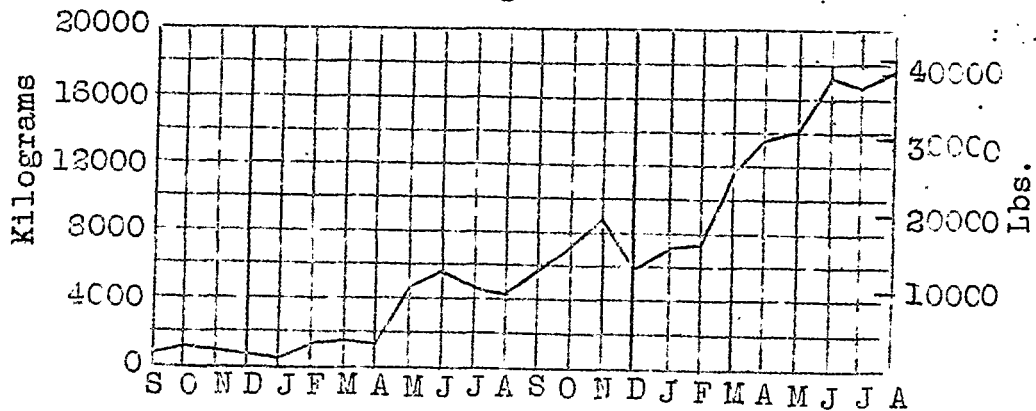
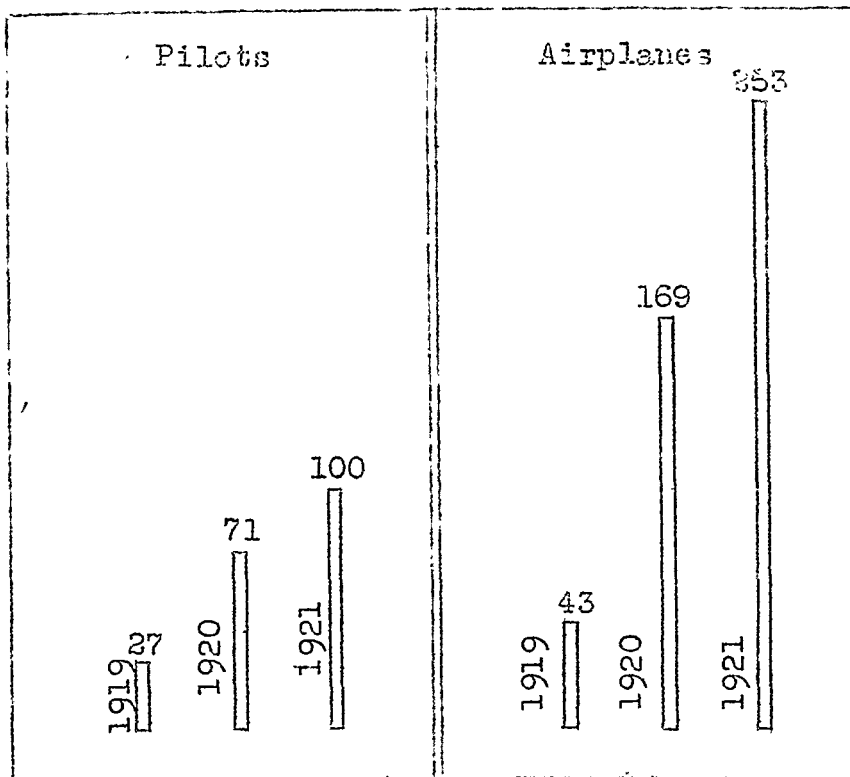


Fig. 1.

Pilots and airplanes in service of French navigation companies.



Regularity on all aerial lines beginning or ending in France.

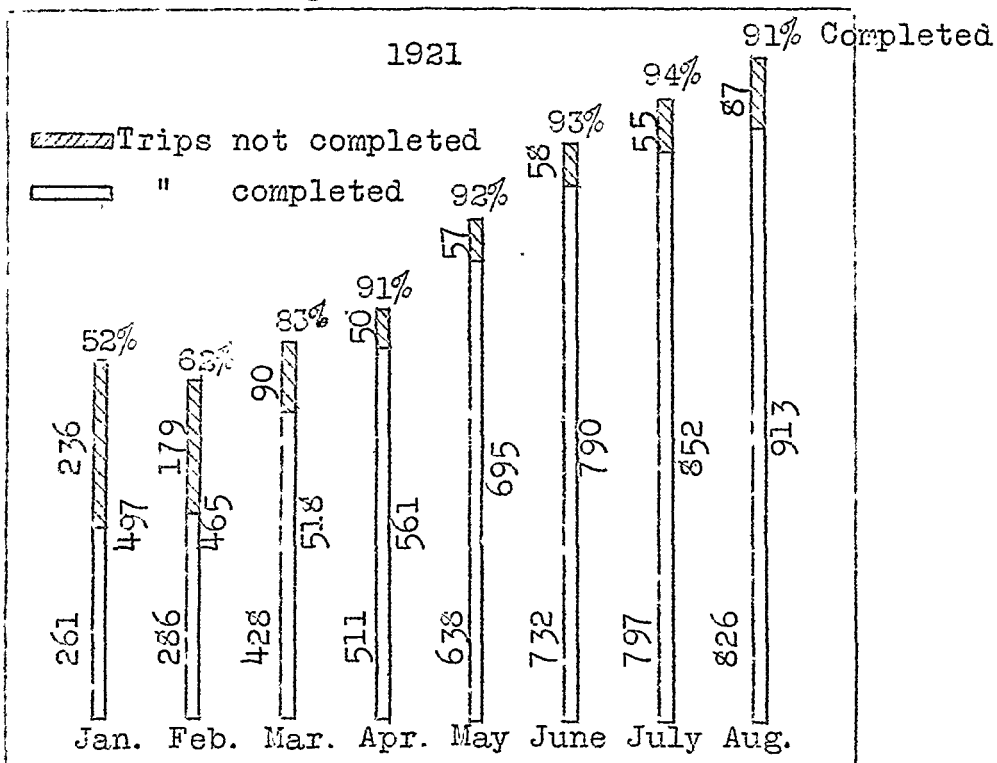


Fig. 2.

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