TECHNICAL MEMORANDUMS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 64

AERIAL TRANSPORTATION

By

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Taken from
"Premier Congrès International de la Navigation Aérienne,"
Paris, November, 1921, Vol. II.

February, 1922.

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The origin of air traffic dates from the war. The important development of aeronautic industries and the progress made in recent years, under the impelling force of circumstances, rendered it possible, after the close of hostilities, to consider the practical utilization of this new means of economic expansion.

Among the many manifestations of commercial aeronautics, that of transportation, to which we will devote ourselves exclusively in this article, has thus far received the most attention and made the most progress. This is, in fact, because the existing aircraft seemed best adapted to transportation purposes and required only slight changes for immediate use. This explains its rapid progress, as compared with other forms of aerial activity (cartography, photography, etc.) which require special preparation and a long time for perfecting.

It seems advisable for the aerial transportation business, like all other industries, to take account of stock. This inventory must determine its moral and material status and investigate the virtues and defects resulting from its rapid growth. This alone will enable each company to determine the route to be followed by its pilots in the future.

We will here consider only France and her task, which is already sufficiently difficult. We hope the foreign delegates will also bring us valuable information from their respective countries.

We will first examine the present situation and the data we have at our disposal. Without repeating well known official statistics, we will endeavor to present these data in the form customarily employed in matters of transportation. Then we will consider the economic essentials which seem to have been demonstrated by twenty-six months of experience.

In all countries the economic problem is the same, namely, to win popular favor and the support of the public authorities. The solution of this problem is for those who have the faith to join forces and work in harmony. At the present time, the suc-

* From "Premier Congrès International de la Navigation Aérienne," Paris, November, 1921, Vol. II, pp. 128-142.

cesses, as well as the disadvantages, are not peculiar to any one country, but cross all boundary lines.

Status of Aerial Transportation in France, October 1, 1921.

Airplanes.- The following table sums up the situation:

Year	Pilots	Airplanes	Available HP.	Available Tonnage
1919	27	46	13,300	16
1920	72	183	54,000	83
1921	102	258	80,000	110

Unfortunately, these airplanes are all built on the principles of war machines (Berlin Spad 33), unless we except the converted war airplanes (Breguet limousine, Goliath F.60, Salmson limousine, Potez 9 limousine). They are constructed for general utility, without specialization.

It is interesting to note, in the above table, a more rapid increase in tonnage than in power, which indicates a better utilization of the latter.

The carrying capacity of these airplanes varies around 0.30.*

Companies.- Transportation service was performed in France by four companies in 1919, ten in 1920, and eight in 1921. The 1921 companies had a combined capital of about 25,000,000 francs.

These companies were founded by groups of aeronautic constructors or by means of capital obtained by subscription from various sources. One company, with the largest capital of all, was formed by a bank of foreign affairs. Two companies went out of business in 1921.

Routes.- Because, on the one hand, of the poor adaptation of the airplanes to commercial use and because, on the other hand, of the small financial resources of the companies, the routes exploited give but a faint idea of the logical routes for air traffic.

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* French definition: $\frac{\text{useful load}}{\text{total load}}$ and not German $\frac{\text{useful load}}{\text{weight empty}}$.

(Taken from "Premier Congres International de la Navigation Aerienne", Paris, November, 1921, Vol.II, pp.128).

These routes serve rather as the forerunners of future routes and are sometimes so advertised.

The Paris-London route, which is justified by itself, is the forerunner of lines to Central Europe and Italy.

The Paris-Amsterdam route is the forerunner of lines to Scandinavia and Russia.

The Paris-Prague route anticipates lines to Eastern Europe and Constantinople.

The Toulouse-Casablanca route is the beginning of the Paris-Dakar line.

The Bayonne-Santander line is headed toward Lisbon.

A special line operates successfully between Paris and Havre in correspondence with the steamship lines to North America.

The growth of these lines is indicated by the following table:

Year	Total length of Routes, in km.	Distance flown per month, in km.
1919	2480	57,000
1920	4310	135,000
1921	4280	280,000

Note the increased distance exploited and especially the more rapid increase in the distance flown per month, which is the index of the increased intensity of exploitation.

Operation.- The present status of aerial transportation gives but a faint idea of what it will become in the near future. The airplanes employed still possess all the characteristics of war machines. They deteriorate rapidly and are still subject to breakdowns, thereby necessitating intermediate emergency landing fields. The indispensable radiotelegraphic and meteorologic services are still being installed.

All these considerations oblige the companies to proceed cautiously, while being constantly ready to take advantage of the possibilities of the moment.

As indicated by the foregoing table, the lines began operations in 1919 and 1920, with infrequent trips. These trips were rather of the nature of repeated experiments for studying the airplanes, the aviation fields, the routes and the atmospheric conditions. In 1921 the companies brought their services more within reach of the public and increased the frequency of the trips to one a day (three a day between Paris and London).

The speeds (including stops) reached the following figures: Toulouse-Casablanca (four stops, one night on the ground), 60 km. per hour; Paris-Brussels-Rotterdam-Amsterdam (two stops), 100 km. per hour; Paris-Warsaw (two stops, one meal), 115 km. per hour; Paris-London (without stop), 110 to 140 km. per hour. The stops are necessitated by the airplanes, which can not make non-stop flights of over 500 km.

The saving in time effected, over the other fastest methods of public transportation, is about 5 hours on the Paris-London and Paris-Amsterdam trips, 13 hours on the Warsaw and 70 hours on the Toulouse-Rabat trip.

The safety, although not yet what it should be, is shown by the following figures: Up to September 1, 1921, 2,808,000 km. (1,745,000 miles) had been flown, with a record of 10 killed and 14 injured, including passengers and crew, or one killed for every 280,000 km. (174,000 mi.) and one injured for every 200,000 km. (134,300 mi.).

The regularity has constantly improved and has attained truly surprising results. If we understand by regularity the percentage of the trips completed, we obtain the following results:

Year	Paris-London	Paris-Brussels	Toulouse-Casablanca
1919	75	77	93
1920	95	93	96
1921	96	92	97

The fares have been frequently changed. They are, moreover, purely arbitrary, like all prices relating to a monopoly. The government establishes a maximum, below which the companies are free to fix their fares. In 1921 the fares were reduced about 40% below those for 1919 and 1920.

Purely as a matter of information and without wishing to draw any conclusion, we give the following table of fares and freight rates in effect in September, 1921.

Company	Route	Distance in km.	Mail to 20g.	Freight		Passengers	
				Tariff	Charge per kg/km.	Fare frs.	Per km. frs.
Messageries Grand Express	Paris-London	375	0.50	5-7.50	0.0133 to 0.0199	300	0.80
Messageries	Paris-Brussels	260	0.30	3-4.00	0.013	175	0.67
"	Paris-Amsterdam	440	0.50	5-6.50	0.013	300	0.68
Farman	" "			3-4.00	0.008	300	0.68
Franco Roumaine	Paris-Strassburg	440	0.75	2.50	0.006	150	0.375
" "	Paris-Prague	900	1.25	7.00	0.0077	500	0.55
" "	Paris-Warsawi	1400	1.75	9.00	0.0064	800	0.57
Latecoère	Toulouse-Casablanca	1850	0.50	9.00	0.0048	1560	0.86
Franco-Bilbaine	Bagaure-Santanda	200	0.25	2.50	0.0012	150	0.75
Messageries	Paris-Settano	300		3.50	0.0116	200	0.66
Ernoul	Bordeaux-Montpelier	420		6.60	0.0157	176	0.40
Sénème francaise	Nîmes-Nice	350		4.50	0.013	240	0.68

It should be remembered that these charges include the terminal charges which are often high and generally not included in the charges for other methods of transportation. Moreover, as regards passengers, the saving in time eliminates numerous incidental expenses of the trip.

Mail transportation.- All the important lines carry mail. This is perhaps a good way to distinguish the important lines from those which are not.

The companies make contracts with the Post Office Department with the following characteristics: Delays are fixed without liability for the company. The mail consists of "official and private correspondence of every kind, letters, postal cards, business papers, samples of merchandise and printed matter, ordinary or registered." The maximum weight of each piece is 100 grams (3.53 ounces). The mail is assembled in a special room at the post office, where the company sends for it about an hour before departure. The company is responsible to the Post Office Department in the same manner that the latter is to the public. In case of a breakdown, the company must forward the mail by the quickest route. An extra charge is made, according to the weight of the piece, the proceeds of which goes to the company. In 1931 these charges were lowered on all lines, resulting in a considerable increase in the quantity of mail entrusted to airplane transportation.

Parcels must be deposited at certain offices and are generally delivered at the domiciles. The maximum dimensions are generally fixed at 60 x 40 x 80 cm. Some companies also fix the maximum weight at 80 kg. The charges are established by weight, always counting a volume of 5000 cc. at least equivalent to one kilogram. Parcels are accepted for reshipment. They can be insured, the premiums being about 0.5% of their value.

The merchandise thus far carried has consisted principally of garments, furs, millinery, watches, electric apparatus, jewels, paintings, and even early vegetables. These are naturally luxuries, whose value justifies the higher transportation charges.

Passengers.- Passengers are taken and carried by automobile, either to the domicile or to a central office. They are allowed 10 to 15 kg. of free baggage, according to the company. The airplanes are generally fitted out with a cabin "de luxe," as comfortably as a first-class railway coach.

In addition to the tourists of 1919 and 1920, there were in 1921 many business men among the passengers. The tourists were chiefly Americans, English and Japanese, while the business men

were mostly Belgians and Germans. In both categories the French are the most "refractory."

Results.- Without going into details, we will summarize the results in the following table:

Year	Trips	Km. flown	Kg. mail	Kg. parcels	Passengers
1919	1490	319500	397	6960	527
1920	2381	353700	3920	49180	982
1921 (6 mos. only)	3342	1239600	4320	98500	4854

These figures require no comment.

As to parcels, the official figures unfortunately do not give the value of the merchandise carried. We have, however, succeeded in learning the amount of customs duties collected at the single port of Bourget for 1919 (4 months), 17,835 francs; for 1920 (12 mos.), 312,724 francs; and for 1921 (8 mos.), 560,000 francs.

Efficiency of aerial transportation.- Regarding the economic aspects, the significance of the following table will be apparent to every one.

Year	Km. per trip	Kg. mail	Kg. freight per trip	Passengers
1919	215	0.27	4.68	0.356
1920	305	1.65	31.00	0.420
1921 (6 mos.)	370	1.30	26.50	1.450

Receipts.- It would be interesting to know how much money the aerial transportation enterprises have been able to extract from the public. The question is a difficult one to approach and the figures can only be approximate. We think we are not very wide of the truth in estimating the receipts at 45,000 francs in 1919, 720,000 in 1920, and 1,800,000 for the first six months of 1921.

Future of Aerial Transportation.

The foregoing rapid exposition has demonstrated briefly, from its external manifestations, the present status of French aerial transportation. The results are brilliant and the nation has a perfect right to be proud of them. These results have been due to the pecuniary sacrifices of the government and to the courageous pioneers who, without thought of the morrow, without the calm of an assured position and simply sustained by their faith, have resolutely devoted themselves to the work, in spite of objections, doubts and difficulties.

We are, notwithstanding, only at the beginnings of the industry of aerial transportation, the period corresponding to the coasting period in maritime transportation. The study of the beginnings of maritime navigation is interesting, when compared with the present status of aerial navigation. We are sorry we can not dwell longer on it here. In 1835, an English scientist, Dr. Lardner, said at a public gathering in Liverpool: "As to the matter mentioned in the papers, of making a non-stop voyage from New York to Liverpool, it is perfectly chimerical and about as likely as a voyage from Liverpool to the moon." Nevertheless, in 1838 the "Great Western" went from Bristol to New York in 22 days at a speed of 8.5 knots per hour.

In the domain of economics, we are at the period of 1843 when De Posson wrote in a communication to the "Societe Maritime," at the close of a long technical article: "We do not cease to repeat that there is no possibility of profit from the great steamships which it is proposed to send across the ocean. ..... This navigation (by steam) will plunge hundreds of families into mourning and keep thousands of stockholders in mortal distress, on account of shipwrecks and the enormous resulting expenses."

Aerial transportation is now in the same transitional period. The organism, whose already brilliant results we have seen, is still but a fragile skeleton.

Factors Bound to Affect the Future of Aerial Transportation.

Aerial transportation must be, first of all, international and it is on this fundamental principle that everything concerning it must be considered. The factors to be considered are both of a technical and of an economic order.

A. Technical Factors.

These are the most important, since it is perfectly evident that the service can only be improved, in so far as technical measures and conditions render it possible.

In the first place, aerial transportation must inspire confidence or, in other words, it must be safe. To increase the safety must therefore be the foremost and constant object of all efforts. Then since speed is the essential commercial characteristic of aerial transportation, everything possible must be done to increase it.

The technical factors affect both the carriers and the organization of the service.

1. Carriers.*

Aeronautic researches will render it possible to construct airplane cells which will be proof against all accidents during flight. Starting and landing alone will present some danger, since they require suitable fields. Efforts must therefore be directed toward eliminating unforeseen landings, improving power plants, distributing the power and enabling repairs during flight.

Then come the principal factors (speed, carrying capacity and radius of action), between which it will be necessary to make compromises. These compromises will require the airplanes to be specially constructed, according to their use. For postal service, very swift airplanes with a relatively small carrying capacity; for parcel carriers, airplanes of medium speed, of large tonnage and long radius of action, in order to avoid trans-shipment; for passengers, intermediate airplanes offering the maximum degree of safety and comfort, with quiet, warmth, visibility, ventilation, freedom to move about, etc.

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* We will consider in this article only aircraft heavier than air. The indications regarding aircraft lighter than air are, in our opinion, too unsettled for us to undertake their commercial exploitation. The cost (ten million francs for a 77000 cu.m. airship, and twenty-eight million for a station including one hangar, one gas plant and one workshop) seems prohibitive. The net cost per ton-kilometer varies between 2 - 3 francs (Gal. Maitlaur) and 17 - .25 francs (L'Aeronautique). The English commission for studying the lines of the Empire has just rejected the present commercial utilization of airships.

The airplanes must likewise all be designed with the view of diminishing their original cost,* their cost of operation, and their durability.**

2. Organization.

a) Material organization.- Since breakdowns are still liable to occur with the transitional airplanes now in use, good landing fields are necessary all along the routes. These fields can be dispensed with in the near future.

At the terminals, near large centers of international commerce, large aviation fields are required. Their number should be small, in order to avoid dispersion of energy and means.

But there will be special need of a detailed marking system both by day and night, beacons, radiotelephones, both cables, etc. These are second in importance only to the airplanes themselves in the development of aerial transportation.

It is beyond the frontiers that the companies will have their longest routes and on these sections they will have to provide everything from their own resources. It would thus appear that government aid on their own territory would amount to comparatively little for them. Moreover, such aid would benefit foreigners without any assurance that our own citizens would be reciprocally benefitted beyond our frontiers.

b) Operation.- We can never sufficiently emphasize the fact that safety must be guarded above all. It is therefore necessary to proceed with caution at all times. Unfortunate accidents would cause us to descend rapidly the hill so difficultly ascended in the road to success.

It is the most difficult task of the companies to combine this prudence with the initiative necessary to accomplish great things. There must be neither febrile enthusiasm nor administrative routine. There must be coolness and conscious energy,

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* Net cost of airplanes:

	Per kg. useful load	Per passenger place
Breguet 14 Limousine	122 fr.	18750 fr.
Mail type 9 "	155	16200
Berlion Bleriot 33	140	17500
Goliath	126	12500

** Metal airplanes and airplanes that can be taken apart and assembled by non-specialized personnel.

combined with a profound knowledge of aeronautic matters.

In particular, it is evident that night flights will greatly increase the efficiency of exploitation. The problem of safe night flying is an aircraft problem which must be solved cautiously and gradually.

The education of the pilots must be continually supplemented by courses in navigation, radio, airplane construction, etc. They must be kept under strict discipline and imbued with a consciousness of the importance of their work.

The air routes must be carefully studied, including the winds, clouds, tempests, temperature, humidity, flying altitude, dangerous points, etc.

B. Economic Factors.

Confidence of the public.- This will take a long time to win and only actual accomplishments can contribute to it. Consequently, prudence must be continually exercised.

The interests of the companies are one, whatever may be their field of action and their nationality. We will see farther on that it is especially by means of the postal service that we hope to inspire confidence.

Building industry.- Aerial transportation is intimately connected with the condition of the building industry. It can not continue to exist, unless fed by a vigorous and progressive industry. This industry must be national (French), since aerial transportation, which requires considerable aid from the government, must not be tributary to foreign countries.

The situation is analogous to that of maritime transportation. At the beginning of the utilization of steam navigation (1841), because steamships were not built in France, the decrees of September 21, 1793, and the law of 1816, which forbid the registering of the vessels as French, had to be broken. Consequently, the laws of 1861, 1866 and 1881 recognized the dangers resulting from a building industry incapable of anticipating the progress of the corresponding industry of utilization. Nevertheless, it may sometimes be necessary to take advantage of a foreign industry.*

* The "Compagnie Transatlantique" instituted its first service in 1862, with side-wheelers, at the time when the English abandoned them. It was by purchasing ships from England, notably the Normandie in 1883, that France was able to rival and even excel in speed the steamships in service on English lines.

We can understand the prime importance of establishing a really vigorous and prosperous aeronautic industry. Any temporary progress in aerial transportation is of no significance unless based on a building industry that is well and firmly established.

Establishment of lines.- The lines must connect large commercial cities, junctions of roads and important political centers. If these conditions are fulfilled, it matters little whether there is much patronage at first, as it will be sure to come as a result of the confidence inspired by regular functioning.

The branches of international lines generally offer no incentive for separate exploitation. They can not be even justified on the pretext of trial, as the operating conditions are entirely different from those of the whole system. It would be better to make less frequent trips over the whole line than to exploit regularly any section offering no economic inducement.

Aid in the form of prepared routes is very small.- The routes exploited by the companies are largely beyond the frontiers and money spent in establishing aerial routes in another country would aid foreigners as much as citizens of our own country.

In the first place, the role of the governments should be to make arrangements between themselves. They should have a program and endeavor to bring about accord with private establishments.

Another important matter is financial aid, since we have shown that the companies can not operate without such aid, on account of the excessive costs. Such pecuniary aid, however, enfeebling it may be in principle, seems unavoidable.

The aid need not be proportional to the trips made, nor even to the tonnage carried, but it would seem better for it to vary according to the financial results of the enterprise, thus taking the form of a partial guaranty, with a sharing of eventual profits. This would constitute a sort of partnership between the government and the private industry. "The "modus vivendi" would be difficult to find in any other way.

Transportation companies.- Regular service of such a complex and technical nature can only be performed by large companies. In order to operate a line properly, quite a large number of airplanes is required, as also offices and storehouses (often far from the company's headquarters) and it is necessary to communicate and discuss continually with the pub-

lic authorities, merchants and industrial concerns of different countries.

We have already mentioned that transportation companies, especially maritime companies, seem specially suited to take up aerial transportation. They have already done so in England (Instone Line) and in Germany (North German Lloyd and Hamburg-American). Their agents are already acquainted with the people and their directors informed in the economics of transportation.

Banks and large commercial establishments should also take an interest in aerial transportation, as they will secure direct advantages from it.

At the present time, nothing on this order exists in France. The movement will not start until the government adopts a program and principally a program of financial assistance.

Several French aerial navigation companies are constituted by a constructor or a coalition of constructors. Some have seemed to see in this formation an obstacle to the business, but we consider such a view ill-founded. The "vertical concentration" which allies constructors and exploiters seems to us, on the contrary, an excellent basis, on account of their community of interests.

The directors of the companies must be familiar with the economics and science of transportation. More even than the sea, the air demands special qualifications.

Competition between home companies.- Such competition seems hardly possible, since the functioning of a company depends rather on its having a monopoly. The government has competition at its disposal as a means of action, but its utilization would seem abnormal, since the government would have to suffer the consequences of the resulting struggle.

The government has other means of action at its disposal, just as efficacious and more economical, than to put two French companies into competition on the same line.

There is a field, however, where the home companies may find themselves in competition, namely, in regard to the distribution of the zones to be exploited. It will be advisable to imitate the policy of the "conferences" adopted in maritime navigation. This policy is indispensable if we would avoid waste of capital and energy.

"Horizontal concentration" is necessary and the companies can derive only benefits from it, the extent of which perhaps can not now be foreseen.

Charges.- The economic laws of the determination of charges in the case of a monopoly tend to approach the value of the service rendered. This happens on lines where there is no foreign competition where one is obliged to pay for each shipment whatever he can afford to pay. This is the reason for one characteristic of aerial transportation, "ad valorem" charges.

When there is foreign competition, the prices approach the net cost to the exploiter, after deducting government aid. Thus the complexity of the problem is made evident, as also the desirability of an international agreement, of which we will speak further along.

A common and permanent characteristic of the charges is the absence of any uniform ratio between them and the distances, by reason of the magnitude of the general expenses and the saving in time, which varies according to circumstances.

The role of the government is particularly difficult. Its intervention is indispensable, in consideration of the aid it gives the enterprises, but, on the other hand, there should be sufficient flexibility for adaptation to commercial necessities.

The difficulty of reconciling these two conditions renders the problem of a good system of charges almost insoluble, though susceptible of solutions more or less approximate and imperfect.

Mail transportation.- We believe that it is by carrying mail that aerial transportation will become popular. Diagrams and statistics, whose accuracy is often doubted, are soon forgotten. Lectures and meetings are excellent propaganda, but it is only through continuous and persistent exemplification that the confidence of the public is won.

When a merchant has become accustomed to receiving regularly at 6 p.m., mail leaving Warsaw or Rabat the same morning or London or Rotterdam at 3 p.m., and when this state of affairs shall have become normal, regular and indispensable, his confidence will be gained and he will not hesitate to entrust himself to the airplane.

The postal service requires a perfect organization, carefully worked out in all its details and devoid of any weakness.

With these new methods of transportation, there must be correspondingly new methods in the auxiliary services: special mail depositories in all post-offices, rapid transportation to the airdromes (if possible, by pneumatic tubes), rooms for assorting mail at the airdromes, delivery by express, etc., the time schedules being judiciously adapted to the commercial requirements of the community.

The companies should endeavor to anticipate the needs of the commercial public, which is ignorant of the possibilities of aerial transportation. In this connection, there are modifications to be proposed for facilitating the transportation of parcels by mail. The law of June 27, 1920, prohibited the importation of all parcels, excepting samples without marketable value. This prohibition was a result of the postal convention at Rome (May, 1906), and was renewed at Madrid, (November, 1920), but fortunately, is not rigorously applied.

Regarding parcels of declared value, it is desirable to obtain the elimination of the maximum limit of 1 kg. and the simplification of the examination on arrival, which now requires the submission of the parcels to three officials of the post office, customs and finance departments before their delivery.

Transportation of freight.- This will constitute the second step in the conquest of the public. The latter, after observing the regularity of the mail deliveries, will more readily entrust merchandise to the aerial carriers.

The latter must adopt special new measures for this work and calculated to improve its efficiency: such as collecting and delivering at the domiciles, transporting by automobile, reshipping on other lines guaranteed by the company, receiving parcels from railway stations to be forwarded by airplane, reducing insurance charges, etc.

Here also the field is vast and the companies should endeavor to discover new possibilities for aerial transportation, such as carrying samples, articles for selection and quick return, fruit, early vegetables, prepared dishes, etc.

The double role of the companies is to organize transportation and study the needs of the public, which is ignorant of the possibilities of aerial transportation and the services to be expected from it.

Carrying passengers.- It will only be after the functioning of aerial transportation has gained the confidence of the public that the latter will wish to travel by airplane itself. It must not be forgotten that the passengers are "voyageurs de

luxe" and that it is advisable to arrange the details of the service accordingly.

Tickets should be easily obtainable at agencies and hotels or by telephone; heavy baggage should be forwarded at the trouble of the company by the fastest usual ways; the aerial service must be combined with swift land and sea service; voyagers must be conveyed by automobile from the aviation field to the center of the city; the waiting rooms must be comfortable and provided with telephones and telegraph, for the use of the voyagers up to their departure and after their arrival on the field. Lastly, the airplanes themselves must be continually improved: in the matter of comfort; in diminishing the noise from the engines; in ventilation, cleanliness, Pullman seats, couches, washstands, etc. The passengers should be able to send private radio messages, in order to announce their arrival, make appointments, etc.

International Competition. Convention of October 13, 1919.

The industry of aerial transportation will exercise its activity beyond the frontiers in a domain which knows only the relentless law of supply and demand.

As in the case of maritime navigation, the nations will seek to protect their flag by special measures.

The international convention of October 13, 1919, made an effort to forestall these measures and avoid their rigor.

Chapter IV of the convention considers aerial navigation over foreign territory. Article 15 gives the right to every aircraft to pass over a country without alighting, on condition of previous permission and following a fixed route. The article provides that no special tax shall be imposed on foreign aircraft landing in a country. Article 16 stipulates that a state may pass a preferential law in favor of its citizens only for transportation between points in its own territory, as is done in France in the merchant marine, in favor of the coasting trade, the fisheries and transportation between France and Algiers. It may be anticipated that international aerial competition will be severe.

We have already seen that aerial navigation is dependent on the building industry. To return to the example of the merchant marine, who at first possessed the only ship-building industry, monopolized all the navigation lines. The French and

then the Germans entered into the competition later, after having organized their ship-building industries, but could not overtake the English.

The situation is different for air traffic. The war developed in each country an active aeronautic industry, which only demands employment and the opportunity to develop simultaneously with those in the other countries.

This competition will not be slow in manifesting itself and already the agents of the companies, which are seeking to stake out the first sections of the grand international lines, are beginning to make themselves heard.

For commercial aviation, which already has enough difficulties to overcome, such a contest would be harmful and possibly fatal.

International enterprises, like national ones, must be centralized. Their interests are common. Let us hope they will realize it before they clash. We must have "conferences" and "pools," whose essential principle will be the establishment of minimum rates, below which the participants agree not to go, and whose other principles will regulate departures, stops, commercial services, agencies, etc. It is to be hoped that the public administrations will have sufficient flexibility not to fetter these understandings. This policy of international agreements has been little followed by our grand maritime administrations, the routine of which we often reproach.* Let us hope that the aerial companies will manifest more initiative and more vitality.

Already an agreement of this character has been concluded between the "Compagnie française des Messageries aeriennes," the Belgian company S.N.E.T.A. (Societe Nationale pour l'Etude des Transports Aeriens) and the Holland company K.L.M. (Koninklijke Luchtvaart Maatschappij), for the exploitation of the Paris-Amsterdam line. These three companies are absolutely independent, but have entered into agreements with each other in

* On the contrary, the English are excellent in this respect. The International Marine Company bought a large amount of the stock of three Anglo-American companies and then formed a combination with the Hamburg-American and the Lloyd of Bremen. The two latter companies guarded the general administration of their affairs by the sole reservation of observing reciprocal engagements in regard to certain charges and the traffic in certain regions.

regard to matters of common concern, like transportation charges, time schedules and service conditions.

The Germans, who excel in organization, but whose aerial activity was curtailed by the treaty of Versailles, have already formed an important combination for the line: Amsterdam-Bremen-Hamburg-Warnemünde-Copenhagen-Stockholm, with the companies: Sevenska Lufttraffik Aktiebolaget (Stockholm), Danske Luftfahrt (Copenhagen), K.L.M. (The Hague), and the Deutsche Luft Reederei (Berlin).*

Aerial transportation is still in its infancy, but is gaining vigor every day. Its real future "consists in traversing the grand routes of the globe and making trips of 4000 to 5000 km. (3000 miles) in 24 hours." We should not forget this a single instant when thinking of its future. The air will be the commercial way "par excellence." The aerial transportation lines will belong to those who secure bases, agreements and markets soon enough.

The task will be hard. There is no occasion to become intoxicated with illusions or wild dithyrambs. The foundation stones will be just so much heavier and more difficult to move and assemble, as the edifice itself is destined to be more important.

The future will belong to the nation which shall be the first to establish a vigorous building industry and shall then have the greatest potentiality for economic expansion.

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* In this connection, the study of the German cartels regarding maritime and fluvial navigation are particularly interesting. Haelling's treatise on the "Vereinigte Spediteure und Schiffer" explains the financial operation of the Rhine cartel and its commercial organization.

Translated by National Advisory Committee for Aeronautics.