STATE CONTROL OF CIVIL AVIATION IN THE BRITISH EMPIRE

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By

RONALD M. LEATHEM, B. A.

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CHAPTER ONE

THE GENERAL NATURE OF THE PROBLEM

"Transport is civilization:" today, with the growing dependence of prosperity upon cheap and efficient transit, this phrase is more applicable to aviation than to any other form of transportation. Within the British Empire there is no problem of political economy so vital as that of communications, nor is there any industry which could possibly promise such a return on capital invested as is offered by air transport. The relation of the State to aerial navigation in all parts of the Empire bears out this argument, and a study of this development indicates an economic advantage to British trade and progress.

Just as when the railway came into existence it found itself an activity for which the existing law made no adequate provision, so with aviation the question of its legal status was the first matter to be discussed. The first International Conference on Air Navigation was convened by the French Government at Paris in 1910. (1) The conference proved abortive as the participating states could not agree either to adopt an international charter of freedom of the air, nor to accept the doctrine of state sovereignty in the air space above national territories. The British Government declared at this time that "No regulations should be framed which in any way exclude or limit the right of any state to prescribe the conditions in which the air above its

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(1) L. C. Tombs. "International Organization in European Air Transport" p. 5.

territory should be navigated.(2) Great Britain did formulate the "Aerial Navigation Act of 1911", enforced in February, 1913, dealing with the rules of air navigation, the markings of aircraft and the like, but the outbreak of the war confined developments in aviation to military purposes, and it was not until 1919 that the question of international air transport was discussed, by which time there was feverish activity in Europe subsequent to the realization of the potentialities of aeronautics for commercial purposes.

The International Convention for Air Navigation was signed at Paris on October 13th, 1919, by twenty six countries including the United Kingdom, Canada, Australia, Union of South Africa, New Zealand and India, all of which at the present time have a separate vote on the Commission set up by this Convention.(3) The Articles adopted decree inter alia: that the contracting States have complete and exclusive sovereignty over the air space above their territories (both that of the Mother Country and of the colonies) and of the territorial waters adjacent thereto; that each State undertakes in time of peace to accord freedom of "innocent passage" above its territory to the aircraft of the other contracting States, provided that the conditions set forth in the Convention are observed; that each State is entitled for military reasons or otherwise to prohibit the aircraft

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(2) G. E. Woods Humphery "The Political Aspects of the Operation of International Air Routes" p. 2.

(3) Other signatories: Belgium, Bolivia, Brazil, China, Cuba, Czechoslovakia, Ecuador, France, Greece, Guatemala, Italy, Japan, Panama, Portugal, Roumania, Siam, U.S.A., Uruguay, Yugoslavia. Later: Bulgaria, Poland, Chile, Denmark, Sweden, Netherlands, Norway, Finland, Switzerland, Spain, Argentine.

of other contracting States from flying over certain areas of its territory; that each State may determine the route over which any air line may pass; that each State is entitled to conclude special Conventions with non-contracting States, provided they do not infringe the rights of the contracting parties; that every aircraft of a contracting State has the right to cross the air space of another State without landing, unless specifically ordered to do so; and that each State has the right to establish reservations and restrictions in favour of its national aircraft in connection with the carriage of persons and goods for hire between two points on its territory.(4)

The Convention has served a useful purpose as the basis for public air law but is liable to conflicting interpretations, as the above clauses show. The principle of freedom and equality of status is admitted, but is applied only to individual aircraft and not to regular air services, which are controlled more by the principle of sovereignty of the air. Freedom of innocent passage is conceded as a privilege and not as a natural right, and although every aircraft of a contracting State has a right to cross the air space above any State without landing this must be on "the route fixed by the State over which the flight takes place." Even this is open to further doubt by a later article which stipulates that the establishment of international airways is in the first place subject to the consent of the States flown over. These definite contradictions have provided a serious obstacle in the operation of international

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(4) L. C. Tombs. Op. cit. Compiled from pp. 42-69.

air transport, and in many cases the Convention is interpreted in such a way that a State may refuse permission for the establishment of a regular air service over its territory without giving any reason, a policy which has naturally led to inequality of treatment. An even greater barrier to universal airway progress is the fact that Germany, Austria, Hungary, Russia, Turkey, China and the United States are among the nations which have not adopted the Convention, and therefore have formulated separate laws.

After the settlement by the Convention of the political aspects of aviation, the British Empire Governments turned their attention to the economic organization of air routes. In common with all forms of transportation the first question to be considered was what class of traffic would pay for the service and how much would it be worth. Early experimentation showed that a service for mails only would be much easier to organize than one for mixed loads and could be operated at greater speed with comparative ease, but that its prospect of becoming self-supporting was very slight. Under a system of air mail surcharges, essential in the early days of aviation transport, it was discovered that only a small percentage, assessed at between 5% and 10%, of letter mail will bear surcharges, unless they are almost nominal and however great the saving of time.(5) A consideration of the volume of traffic in international mails indicated that there is a great variation in the amount of mail dispatched and

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(5) Organization of Air Routes. Lt. Col. H. Burchall p. 3.

received in the United Kingdom. The considerably greater amount that is sent to the Dominions and Colonies would result in a home-bound air service with unsaleable capacity. The latest figures available indicate that about 1,650 tons of first class mail per annum are carried from Great Britain to other parts of the British Empire, while the Empire sends only 950 tons in return. The problem of load factor, i.e. the ratio between load carried and capacity provided, is therefore of greater importance in air transport than in any other form.(6) On the other hand a composite load of passengers, freight and mail allows the utilization of large aircraft which are more economic in the cost of carrying a unit of weight through a unit of distance. (7) No "mails only" service has as yet paid its way on the air mail surcharges nor has one ever received subsidy at as low a rate on a comparable basis as has been possible for combined passenger and mail services. Empire aviation companies are striving to become less dependent on subsidy and have decided against separating passenger service from mails because of the resultant increase in cost.

The speed at which National Civil Aviation Transport Services should be operated presents another major problem which is inextricably linked with the question of subsidies. Should the speed of air transport be chosen so that the service will pay for itself, or should the taxpayer be ready to help with whatever subsidy is necessary for a substantially higher speed?

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(6) G. E. Woods Humphery. British Air Mails p. 2.

(7) Lt. Col. H. Burchell. Op.cit. p. 4.

The success of Imperial Airways Ltd. and indeed of all Empire lines, has been due chiefly to its attention to technical efficiency; flying risks have been greatly minimized and traffic has for this reason been attracted; improved equipment for the increase of comfort, and the provision of ample speed to surpass the alternative surface modes of transport have reduced the proportion of subsidy to traffic revenue to a point lower than that attained by most other companies in the world. A considerable increase in speed, say from 150 m.p.h. to 200 m.p.h. would involve a proportionally greater increase in engine power, even with the most efficient aerodynamic improvements in design. On some routes, particularly in Africa, the cost of fuel is high; if this is to be made even higher, and if the structure weight has to be increased to carry the larger engines, there must inevitably be a higher subsidy. (8) In this connection it has been officially declared that "speed is not everything even in flying. Beyond a certain point it loses its attraction for the majority of passengers. On short distance routes safety and reliability of service, and on long-distance routes safety, reliability and comfort become more important and attractive than speed."(9) It is on the long haul that the aeroplane is most successfully competing with rail and highway transportation for passengers and the most highly paying grades of traffic; and although the economic operating radius and efficiency of the aeroplane have not yet been conclusively determined, due to the

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(8) Imperial Airways. The Speed of British Commercial Aircraft p. 2.

(9) Ibid p. 6.

fact that aeronautics is still undergoing mechanical improvements, the question of speed is not for the time being an urgent one. When air transport is competing only with internal rail and road traffic speed is of greater importance but on inter-continental lines, when the competition is maritime, such as those operated by Imperial Airways, a saturation point in regard to speed is reached at under 150 m.p.h. An increase in the cruising speed of commercial aeroplanes is bound to come sooner or later, but it will only be as a result of slow adaptation caused by the diminishing importance in national transportation systems of the present rail and road factors. Aviation "will some day enjoy a practical monoply of high speed, long distance, passenger traffic and will also carry high-grade light express in increasing volume. As this stage approaches it becomes ever more and more necessary that the primary requirement of co-ordination shall be realized and the greater efficiency of the united system used to produce a broader and more complete fulfillment of the social function".(10)

In the organization of aeronautical progress it has been the general experience that initial general and indirect expenses have far exceeded direct operational cost. (11) Expenditures on docks, hangars, repair shops, machine and tool equipment, office equipment, gasoline tank equipment, and actual investment in

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(10) J. B. Rollit. Transportation as a National Problem. p. 53.

(11) Stephen Leacock. The Economic Aspect of Aviation, p. 222.

machines have involved unusually heavy outlays when compared with direct carrying costs. The argument for Government Control is based on this fact more than on any other. Considering the widespread utility to the State of passenger-carrying, mail transportation and the conveyance of express and perishable goods, (the ultimate selling cost of which can bear the extra cost of transportation in exchange for the time saving) a policy of diminishing financial aid may be regarded as a sound economic Governmental activity. To an increasing extent the airways are being used for the transfer of motion picture films, newspapers, luxury articles, medical and surgical materials, replacements for damaged industrial machinery, as well as an immense number of trade commodities. To accomodate this traffic and to maintain their relative position in modern transportation, commercial aeroplanes must have certain fundamental requirements. These include: (12) (a) absolute reliability of structure under all conditions of weather or fire hazard; (b) absolute dependability of power plant, accomplished possibly by multiple engines; (c) a speed of at least 100 m.p.h., with full load, in horizontal flight at sea level, on not more than 3/5 of the maximum horsepower; (d) pilot located forward to assure unobstructed vision when planes become common over air routes, particularly in bad weather; (e) a pay-load of at least 4 pounds per horsepower, with fuel for six hours of flight; (f) ability to operate 20 hours per day in the air with load. In other words, safety and reliability are necessary pre-requisites if air lines are to

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(12) Victor Page, Modern Aircraft, p. 692. Quotation.

earn dividends, and in order to compete with other forms of transport a commercial aeroplane must have the ability to accomplish the most ton-miles per horsepower and also be able to stay in the air the most hours per day. The question of safety in aviation will be discussed in a later chapter, but, from the point of view of organization, aeronautical engineers evaluate safety as the first requirement for money-making with aircraft. "This means safety on the ground, in the air, and under all conditions of wind, weather and vision. It means safety in a crash, if a crash should occur, for the same reason that railroad coaches are made of steel. It means a structure that cannot fail in the worst hurricane, and controllability that will enable the pilot to handle the ship in any storm or wind. The airplane should have no point of instability, no tendency to stall or to spin, but an ability to fly "hands off" under all conditions, with the engine on or off. It must be able to slow down to less than flying-speed without tending to anything but an even keel. It must come out of a stall by itself without the use of controls, and without falling off on a wing into a spin. Its reliability must ensure it against forced landings and its vision must allow it to continue during the most adverse weather conditions." (13)

Next to safety, personnel and ground organization are the most important items in the establishment of commercial flying companies. These two factors also figure largely in the costs of air transport. Included in the capital charges are the cost of equipment and furniture for field and executive offices,

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(13) Ibid p. 694. Quotation from Mr. A. B. Stout.

the outlay on engineering surveys, acquisition of real estate for a flying field (typical field comprises not less than 120 acres) as well as for terminals and emergency fields. The land will then have to undergo grading and surface water drainage; roads and runways (approximately 2,500 feet long) will have to be built, and water supply provided. In addition to the erection of hangars, there will also be required office buildings and dwellings for permanent field personnel and innumerable subsidiary structures, including construction and repair shops, warehouses for spare parts and supplies, and special housing for fuel and oil stores. Light, heat, power, telephonic and telegraphic communications, meteorological instruments and fire prevention apparatus are necessary in all landing fields, whether terminal or emergency. Actual equipment of machines includes spare engines, flying and navigating instruments, aircraft radio sets and complete equipment of engine and plane spare parts. Substantial investment is also made in various forms of ground equipment such as engine test stands, cranes, trestles, tractors and rollers, while equipment necessarily requires auxiliary automobiles, trucks and other incidentals. (14)

The operating charges include a large group of expenditures, such as rentals, executive salaries, engineering salaries, clerical and sales department salaries, cost of lawyers, advertising, telephone and telegraph bills, taxes and miscellaneous

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(14) Ibid. Data compiled from pp. 696-708.

items such as postage, express and freight. The main operating charges, however, are the wages of mechanics, pilots and engineers, and other remuneration to officials and clerks, radio men, and expenditures on supplies of gasoline, oil and grease. The insurance charges comprise fire, accident, property damage, employees liability, personal liability, freight loss, theft, tornado and lightning. Finally, depreciation is an important feature in as technical an industry as aviation.

In the above summary no attempt has been made to itemize all possible charges in air navigation, nor has any reference been made to definite figures in relation to the relative costs of component factors in air transportation.

In general, the cost of carrying a given load by air is higher than the cost of drawing it the same distance on land, mainly because of the power necessary to raise the load above the earth's surface. From the point of view of safety, this power expenditure cannot be reduced beyond certain limits. For instance, aeroplanes must fly at a certain height so as to have a large gliding radius to enable them to pick a suitable place in the event of a forced landing. To fly at such heights necessitates a large amount of power, but this is usually required only once during a flight and consequently, as in other forms of transport, the longer the distance between stops the more economical it is. However, the longer the flight the more fuel has to be carried and the less space there is for a paying load. Although no definite length of flight is

agreed upon by experts as absolutely practical, a journey of some hundreds of miles seems desirable. (14a) All transport costs increase with the rate of travel and, therefore the future of aerial transport will depend on how much value the commercial world will attach to speed. Already the cruising speed of air liners is about twice the average speed of the fastest long distance express train.

Variations according to mechanical inventions are so numerous and the circumstances attendant to the industry in different countries are so widespread, that it could not be within the scope of this thesis to analyse this phase of aerial navigation. Sufficient insight will have been given to the reader, nevertheless, to understand, at least partially, the enormity of the task undertaken by the British Governments in the development of air communications. And yet it was inevitable that the State should actively interest itself in so vital a part of the programme of future development, a part as impossible for private enterprise to achieve as would have been, for instance, the lighting of the coasts of the world in the interests of marine navigation by any institution other than the State. That this has been realized by the countries of Europe is demonstrated in the figures of financial aid given to air navigation for one year, 1933. Great Britain expended £1,242,047 in direct subsidy to aviation, and Imperial Airways was able with its share of the assistance to achieve a financial autonomy of 55%. In comparison, Great Britain stands high in the scale of successful air operators: (15)

(14a) J.L. Nayler and E. Ower, Aviation of To-day, p. 436.
(15) Issued by Air Transport Co-operation Committee of League of Nations.

Country	Receipts from Customers	Official Subsidies		Financial Autonomy	Load factor or Coefficient of Utilization #
Germany	9,569,399	17,311,071	Reichmarks	35.4	
Austria	454,474	1,486,500	Schillings	23.	46
Belgium	5,563,880	16,549,392	Belgian Fcs.	25.2	32
Finland	3,464,982	2,118,900	Finmarks	70	52
France	29,300,000	109,588,000	French Fcs.	21	53
Greece	7,076,354	14,752,667	Drachmas	32	70
Italy	6,889,255	72,377,644	Lire	8.7	42.5
Netherlands	1,241,777	404,268	Florins	76	54.1
Poland	447,993	5,603,215	Zloty	7.4	40.4
Sweden	889,453	970,500	Kroners	48	70
Switzerland	563,733	1,120,702	Swiss Francs	33	47
Czecho-Slovakia	2,415,819	13,860,000	C. Crowns	15	43

Every aircraft is licensed by its Certificate of Airworthiness to carry a maximum weight which must not be exceeded in flight. The pay load of the aircraft is what is left after deducting from this maximum permissible weight the weight of the aircraft, complete with engines, fittings, etc., crew, fuel, oil. The "coefficient of utilization" or "load factor" is the ratio between this pay load and the amount of cargo actually carried.

Figures for the other countries of the Empire show proportional outlays on an increasing scale: (16)

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(16) Report on the Progress of Civil Aviation, 1934, pp. 146,147.

	Financial Year	Total Civil Aviation Vote		Direct Air Transport Subsidy	
		$	£	$	£
Canada	1/4/34-31/3/35	212,000	43,568	361,500	74,291
Australia	1/7/34-30/6/35	£163,860		£98,500	
New Zealand	1/4/34-31/3/35	£14,850		-	
South Africa	1/4/34-31/3/35	£81,337		£74,000	
		Rupees	£		
India	1/4/34-31/3/35	14,24,000	106,827	-	
Southern Rhodesia	1/4/34-31/3/35	£13,683		£11,500	
Kenya	1/1/34-31/12/34	£17,430		£15,500	

Compared with other countries and empires, the British Empire now ranks second as regards route mileage in operation, the figures being: United States, 50,800; British Empire 41,390; Germany, 23,440; France, 21,290; Holland, 11,820.

A brief review of civil aeronautics in the United States, for later Comparison with the System of Empire Countries, will serve also to explain the supremacy in mileage of American Air transport. From the first the United States Government has declined to subsidize aviation by direct financial grants. The first step in the inauguration of an air-mail system was made possible when Congress granted $100,000 for the fiscal year ending June 30th, 1918, for experimental air-mail purposes.(1 This money was expended on the operation of a route between Washington and New York and continued, until May 31, 1921, to be run by Government machines and personnel. Expansion was very rapid and a through transcontinental service, with day and night flying, was introduced on July 1st, 1924. The Post Office

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(17) Ibid p. 119

(18) Civil Aeronautics in the United States, Bulletin No.1, p.4.

was empowered by law in 1925 to make contracts with private firms for the transport of mails, the operating company receiving a fixed sum for every pound of mails carried. (19) By the end of 1926 fourteen domestic air routes were operating on this basis. Then in 1926, by the Air Commerce Act, the Bureau of Air Commerce of the Department of Commerce was formed and undertook to establish and maintain the country's airways. Technical equipment, landing fields and radio facilities which had been developed by the Post Office Department were turned over to the new Bureau. At this time there were 2,041 miles of lighted airways; as at July 1st, 1935, this mileage had increased to 20,769. (20) However, in the words of the British Secretary of State for Air, "the American Air Transport industry has been artifically stimulated by a vast expenditure of public money, and by a long series of boom flotations through the medium of which the small investor, to his great detriment, poured millions of dollars into the manufacturing industries."(21) The United States leads the world in airways mileage, and has designed planes which are unexcelled in power and speed, but this has been achieved at the cost of huge monthly deficits.

Following disclosures made before a special committee of the Senate and investigations made by the Postmaster General, it was decided on February 9th, 1934, to annul all domestic air mail contracts ten days from that date. (22) The Postmaster

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(19) J. L. Nayler and E. Ower op.cit. p. 424.

(20) Aeronautics Bulletin op. cit. p. 6.

(21) The Marquis of Londonderry, quoted in Imperial Airways Gazette, February, 1935.

(22) Paul T. David, Economics of Air Mail Transport, p. 205.

stated that, with the exception of one company, "all the present domestic air mail carriers secured contracts based on conspiracy and collusion". (23) Not only for this reason but because the Post Office could not continue to carry such huge annual losses, it would have been necessary to reduce the air mail contract routes. The only company to show a gradually improving condition has been Pan American Airways. In 1930 its gross income was $7,000,000. Of this amount $1,000,000 or 27%, came from passengers, baggage, express and other revenues, while the United States contributed $5,100,000 or 73%. The return to the Federal Government for mails carried was only $500,000, leaving a subsidy of $4,600,000. By 1935, however, the annual gross revenue of Pan American had increased to $13,000,000 of which $ 6,500,000 or 50%, was derived from passengers, baggage, and express, while the other 50% was derived from Government contracts. The return to the United States for mails carried is now $2,700,000, leaving a subsidy of $3,800,000. (24)

According to evidence produced before the Federal Aviation Commission in January 1935, it was stated that "most, if not all, of the present companies carrying mail, express and passengers by air in the United States, can continue only so long as their capital reserves hold out or until their officers and stockholders are no longer willing to permit the dissipation of their money."(25

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(23) New York Times, February 10th 1934, p. 2.

(24) "Fortune", April 1936, p. 174.

(25) Ibid

The major financial problem facing the aviation industry in the United States to-day is how it can be restored to a normal earning power basis. Whether this is to be by Government ownership and regulation is a question which is being actively debated. Arguments against the purchase of the aviation industry by the Federal Government include the difficulty of assessing the rate of capitalization at which the sale should be made. "If this price were to be based on the part record of earnings, original stockholders still holding certificates would be forced to lose heavily through depreciation of their original investments. Yet no stockholders would have strengthened assurance of adequate future earnings." (26)

In the light of the difficulties encountered by American aviation there seems reason to believe that British civil air transport is assured of an increasing measure of success. It has been proved, particularly in Great Britain, that of all the methods by which a direct subvention may be given, the principle of a grant, i.e. return for useful work performed, such as the acceleration of mail transport or for services productive of valuable experience, is the one most adaptable to economic operation. The alternative policy of making grants on the basis of the number of miles covered, or of the number of hours flown has been found to be fundamentally unsound as the grants can be earned without any direct return to the State or community, either by way of experience gained, useful work performed, development of more efficient machines, or establishment of regular air routes. A third scheme, which has often

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(26) Paul A. Dodd, Financial Policies in the Aviation Industry p. 168.

been considered but was discovered to be too difficult to carry out without discrimination, is that of making the payment of a grant dependent upon the carriage of a guaranteed load of mails within a fixed minimum time; in some cases this principle might involve the State in payments for certain services which might not, in fact, have been performed.

The final aim of civil aviation is complete financial autonomy, but this is an achievement which will not materialize for some years. European Air Transport Companies were founded by, and continue to exist because of, State guarantees and support, and this even when the majority of the original share capital was derived from private sources. (27) Many of these undertakings are private companies, but several are in fact State-controlled organizations, such as exist in several countries of the Empire, and which operate without any share capital, their requirements being provided by annual budget appropriations. Without the continued support of public credits each year the original share capital of the various operating companies would soon disappear. Great Britain has all along maintained that the public company which, under the State, operates national and international air transport must not be considered as a permanent monopoly. Although for a long time Imperial Airways was the sole subsidized aviation company that policy, as will be shown in the next chapter, has been adapted and made dependent on a consideration of load factors on the different routes. For national reasons it is beneficial that the State, aided by the

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(27) L. C. Tombs, op. cit. p. 31.

tax-payer, should develop Empire routes, but on lines which have high load-factors such as the London and Continental routes, other companies have been recently, and will be increasingly in the future, subsidized to provide constant competition in speed, safety, comfort and design with the older established company. The fundamental reason for this would seem to be that a monoply to Imperial Airways would debar English Companies from competing on routes on which there was intense competition from foreign lines. It is more important to the Empire that British aircraft should enter the trade channels of the world, an undertaking too large for a single unit to contemplate while aviation is still in a developmental stage.

The purpose of succeeding chapters will be to outline the attempts made by the various countries of the Empire to strike a balance between those policies of air transport development which are technically sound and those which are economically feasible.

CHAPTER TWO

GREAT BRITAIN AND THE BRITISH IMPERIAL SYSTEM

Great Britain has achieved results in the field of aviation which are second to none. Appropriately enough it was an army airship known as "Nulli Secundus" which blazed the trail of British air navigation on September 10th, 1907. Each successive year since, there has been a measured but steady advance in aeronautical invention, construction and operation. Even before Bleriot's crossing of the Channel, the first aeroplane flight in the British Isles had taken place, when S. F. Cody, an American, successfully journeyed 400 yards at an altitude of 12 feet and at a speed of from 10 to 12 miles an hour against the wind. A few months later the first Britisher to fly won the "Daily Mail" prize of £1,000 for a circular flight of one mile. On March 8th, 1910, the first pilot's certificate was issued in Great Britain. An experimental flight, which has been referred to as the "Germ" of an Imperial air route, took place on September 9th, 1911, when the "United Kingdom Aerial Post" was operated between the London aerodrome at Hendon and Windsor. The service was short lived but demonstrated the practicability of air transport, and the fact that the greatest problem in flying was weather conditions. With the formation of the Royal Air Force in 1912, the search for a solution to this problem was initiated. (1)

Before the War was over the British Government had the foresight to realize that peace would be accompanied by aviation

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(1) Data compiled from "Imperial Air Routes", A.E.W.Salt, pp 1-10.

difficulties and, consequently, they appointed in 1917 a Civil Aerial Transport Commission to advise the Air Board on the steps to be taken in the institution and maintenance of civil aviation. It was largely on the recommendations of this Commission that the Air Navigation Act of 1919 was based, and the system of temporary indirect subsidies to the early commercial firms was founded. (2) The first Air Ministry in England had been formed in 1918, and under it the Department of Civil Aviation was established on April 1st 1919 "to deal with the survey and preparation of air routes for the British Empire, to organize wireless telegraphy and meteorological services, and to undertake the licensing of civilian pilots, machines and aerodromes." (3) A complete administrative structure had thus been built up and at once steps were taken to organize and co-ordinate all branches of the new method of transportation.

Departmental changes began with the combining of all the Government Meteorological agencies, including the Marine, Statistical and Instruments divisions, and the British Rainfall organization, under the Department of Civil Aviation. Also, the assistance and experience of the Department of Supply and Research, a branch of the Air Ministry, were placed at the disposal of civil aviation firms. In accordance with Britain's obligations under the International Convention for Air Navigation, the Air Navigation Act of 1919, mentioned above, was passed to provide temporary legislation, provisional Air Navigation

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(2) Aviation of Today, by J. Nayler and E. Ower, p. 425.

(3) "Flight", July 1st 1920, p. 688.

Regulations coming into force on May 1st, 1919 (4) The main clauses in these Regulations, which refer to the registration of aircraft, the licensing of personnel, the issue of certificates of airworthiness, and the rules of the air, have been largely adopted by all Empire Countries, as will be seen in later chapters. The necessity of this cooperation was realized at the outset, and each department concerned was notified of the desire to have all Dominion and Colonial legislation conform to the International Convention, and, as far as possible to the British Air Navigation Regulations. To further this end close contact was kept with the Foreign Office, Colonial Office, India Office and Air Ministry, while a conference with representatives of the Dominion Meteorological Departments was held in September 1919.

Under the temporary subsidies already noted, the Royal Air Force and Commercial Companies were making steady progress, until by the end of the year 691 miles were regularly operated.(5) The first air mail was carried from England to the Continent on March 1st,1919, when a service was started by the 120th squadron of the R.A.F. in close co-operation with the General Post Office(6) The route was from Folkestone to Cologne and the service lasted until August 31st, during which time 1,842 flights were made, of which 96% were successfully completed; the cost of the mail carriage worked out at 1/0½ per ounce.(7) On August 27th of the same year the first regular Civilian Commercial Air Service for passengers and mail was started between Houslow, the first

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(4) Ibid
(5) Stephen Leacock, The Economic Aspect of Aviation, p. 215
(6) A.E.W. Salt, op. cit. p. 12
(7) Ibid, p. 14

terminal customs aerodrome in the world (8), and Paris by Air Transport and Travel, Ltd., which received considerable aid from the Government. Commencing the following month, another firm, Handley Page Transport Ltd. received similar assistance in operating a service from London to Brussels. The former firm achieved a record of 87% efficiency in the sixteen weeks of its operation on the London-Paris route and from May 1920 until it was taken over by Daimler Hire Ltd. a few months later, it ran a service from London to Holland.(9) One other company appeared at this time, the Instone Air Lines, which started as a privately owned mail service between London and the Continental office of Messrs S. Instone and Co.(10)

It soon became evident that the maintenance of these services would be of economic value to Great Britain; consequently Winston Churchill appointed, in April 1920, an Advisory Committee on Civil Aviation, better known as the Weir Committee(11 which was to "consider the essential steps in the national interes which the Government should take to develop Civil Aviation, bearing in mind the need for the utmost economy."(12) A fundamental doctrine which has since characterized British policy in civil aviation matters was expressed in the Weir Committee report as follows:- "We are persuaded that, in the long run, development must depend not on Government action, but on the enterprise of the members of the community who are interested. The function of the State is to encourage and assist but not to operate or initiate. A healthy industry can only find a sure foundation

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(8) "Flight" July 1st, 1920, p. 689
(9) "Flight" May 20th, 1920, p. 542.
(10) A.E.W.Salt, op. cit. p. 17.
(11) "Flight" April 15th, 1920, p. 410.
(12) Weir Committee Report, Terms of Reference.

in individual faith and effort. State help must be determined strictly with reference to the importance of the national interests involved".(13) As a corollary to this the Committee saw that transport communications on an International and Empire-wide basis were the most suitable fields for private enterprise and for the exploitation of British air services. The Committee's analysis of the situation led them to the conclusion that despite the indirect assistance then being granted, the development of civil aviation which had been attained might end,as might also the operational experience which is essential to expansion. Therefore, in contrast to the traditional British policy of leaving trade and industry to take care of themselves, it was recommended that direct State aid be given to civil aviation for a strictly limited period, "and on such conditions as will ensure that, in return for State assistance, private enterprise spares no effort to place civil aviation on an independent and self-supporting basis".(14)

The scheme which was actually recommended limited State financial assistance to a specified maximum sum, and made the amount of the individual grants to each company conditional on the regularity of the service, and proportional to the actual amount of income received from the public using the service. The system advocated was outlined as follows:- (15)

(a) That direct assistance should be given, limited to a

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(13) Ibid, Paragraph 2.

(14) Ibid, Paragraph 6.

(15) Ibid, Paragraph 8.

maximum sum of £250,000, within the two financial years 1920-21 and 1921-22, and that payments to companies operating on approved routes should be calculated on the basis of 25% of the total certified gross revenue of each company (exclusive of the Government grant) earned by the carriage of passengers, mails or goods.

(b) That the"approved"routes should be:-

(i) London to Paris and approved extensions therefrom.

(ii) London to Brussels and approved extensions therefrom.

(iii) An approved route as, for instance, England,- Scandinavia, on which the possibilities of a service employing flying boats or "amphibian" machines, or a mixed service of sea and land aircraft, can be demonstrated.

(c) That any company intending to run on the routes and notifying the Air Ministry of this intention would become an "approved" organization by fulfilling the conditions laid down as to regularity and speed of service.

(d) That a grant for an internal air service in Great Britain should not at present be made.

Although no definite grant was given until September, 1921, Instone and Co., Air Post of Banks (for transport of securities) and Handley-Page continued to operate with great success until they met severe opposition from lines subsidized by the French and Belgian Governments, necessitating an amplification of the temporary subsidy scheme in Britain. Even this was not sufficient, and in 1922 a permanent system of subsidies was introduced. The allotment was not according

to the terms of the Weir Report, although the underlying principles of distribution were the same. The total sum of £105,000 was granted, and divided as follows: London-Paris route £25,000; London to Cologne, £55,000; Manchester-London-Berlin £55,000; Southampton-Channel Islands-Cherbourg, £10,000.(16) Also, the aircraft and engines, originally obtained from the Government on a hire-purchase system, were then given to the operating companies outright up to a specified limit in Capital value, and 30% was offered off the cost of any new equipment required during the next financial year.(17)

A survey of air transport at the end of 1922 showed clearly that further subsidization was inevitable, due to the inability of the comparatively small operating companies to expend the necessary capital from their own resources on experiment, research and development. It was discovered also that the firms were not meeting with equal success, and this discrimination had, of course, to be removed. "To consider the working of the scheme of cross-channel subsidies and to advise on the best method of subsidizing air transport in the future," the Civil Air Transport Subsidies Committee was appointed on January 2nd, 1923.(18) This body presented its report, generally known as the Hambling Report, at the end of February with important recommendations which revolutionized British Civil aviation. In brief these were as follows:- First, the Committee did not advise the creation of a corporation

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(16) A.E.W. Salt, op. cit. p. 19.

(17) For a full statement of services in operation see Appendix G.

(18) "Flight" March 1, 1923. p. 120.

or company administered under Government control, but rather a commercial organization, preferably not an amalgamation of the existing companies, run entirely on business lines with a privileged position in regard to air transport subsidies. This company was to have a capital of £1,000,000 (of which, at first, £500,000 should be subscribed) and was to receive a further sum of £1,000,000 spread over ten years, from the Government, which also reserved the right to nominate one or two directors. The profits were to be divided as follows: (a) in payment of a cumulative dividend of 10% per annum on the ordinary shares of the company; (b) after this dividend has been satisfied, the balance of profits in any year was to be divided equally between the shareholders and the Government; (c) when the Government has received in dividends £1,000,000, the proposed subsidy without interest, the Government's interest in the company ceases and the whole profits of the company go to the shareholders. Special emphasis was placed on the necessity of guaranteeing the subsidy for at least ten years, but not in equal annual instalments. (19)

Agreements carrying out the recommendations of the Hambling Committee, with slight variations, were reached on December 3rd 1923. (20) The first agreement was made with the British Foreign and Colonial Corporation to form and register under the Companies Act a company limited by shares, with an initial share capital of not less than £1,000,000, divided into 1,000,000 shares of

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(19) White Paper, Cmd.No. 1811, February 23rd 1923, Great Britain

(20) "Flight" January 3rd 1924, p. 5.

£1 each. The objects for which the operating company (at that time it was planned to call it the Imperial Air Transport Ltd.)were to be formed were: to acquire on such terms as the President of the Air Council shall in writing reasonably approve, the businesses at present carried on by Handley Page Transport, Ltd., Instone Air Line, Ltd., Daimler Hire, Ltd., and British Marine Air Navigation Company, Ltd., as aerial transport companies, or, in default of such acquisition, to establish an air transport service to operate equivalent services." The consideration in cash for this purchase was to be provided, together with the initial working capital of the operating company, by means of 10/- per share, payable on application and allotment of the first 500,000 shares issued by the operating company. It was stipulated that all the directors and shareholders were to be British subjects, and that during the period of the agreement the President of the Air Council was to be entitled to nominate on behalf of His Majesty's Government two of the directors, who were to join the board after allotment and were not required to hold any qualification shares. (21)

The second agreement was to be signed by the President of the Air Council and by the Imperial Air Transport Company, Ltd., when formed. It required that "On or before April 1st 1924, the Company shall establish, and from said date until such time as the subsidy to be paid to the company shall have

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(21) Ibid

been completely repaid, shall continue to operate under the terms of this agreement, so far as applicable, an efficient air service for the transport of passengers, mails and freight between London and Paris, London and Brussels, London and Amsterdam and Southampton and the Channel Isles, or such other places approved by the President as, in the opinion of the company, may be commercially desirable." During the first four years of the agreement the company was to complete in each year a minimum mileage of 800,000 miles, and for the remainder of the period an average minimum yearly mileage of 1,000,000. (22) (Later in order to allow the company to get equal value out of larger and more modern aircraft, the mileage was estimated in terms of "horse power miles", 425,000,000 of these being regarded as 1,000,000 flown miles.)

The provision for the yearly allotments was agreed upon as follows:-

First four years, £137,000 per year	£ 548,000
Fifth year	112,000
Sixth year	100,000
Seventh year	86,000
Eighth year	70,000
Ninth year	52,000
Tenth year	32,000
	£ 1,000,000 (23)

For each of the ten years the President pays to the company a sum equal to 96% of the subsidy payable in the

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(22) A.E.W. Salt, op. cit. p. 23.

(23) Ibid, p. 22.

particular year by 12 monthly instalments, and the remaining 4% is retained, to be paid only after 1,000,000 miles has been flown in that year. If in any year it appears unlikely that the company will complete the minimum mileage, the President may withhold the monthly instalments payable in respect of the last two months of such year. If the company fails to complete the minimum mileage, it has to pay a proportionate sum as liquidated damages, and the subsidy is reduced accordingly.(24)

Included in the agreement were clauses debarring the company from manufacturing aircraft or aero engines except with the consent of the Air Council, and restricting the Government from granting any subsidies until after March 31st 1934, to any other commercial air transport company for a heavier-than-air transport service in Great Britain and Europe. This was not to include airship or lighter-than-air transport. (25)

The main alterations in the recommendations of the Hambling Report were in the allocation of profits. The distribution adopted required that 10% on the paid-up capital of the company is available for distribution among the shareholders, and the balance (if any) is applied in the following way: one third to repayment of the yearly subsidies; one third to the improvement of the air service provided by the company and the development of British civil air transport or either of them, in such proportions as the directors think fit; and the remaining third available for further distribution among

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(24) "Flight" January 3rd, 1924, p. 5.

(25) Ibid, p. 6.

the shareholders. A further provision was made that so long as the total amount repaid to the President out of the third of the profits above 10% is equal to the total amount of the yearly subsidies which have been paid, no further payment out of profits shall be made to the President, and any balance can be applied as the directors think fit.

On April 1st, 1924, the new company, now known as "Imperial Airways, Ltd., came into being. (26) The established policy of the British Government was "to regard the company as the British National Air Transport Company, with a specific mission to develop commercial aviation on an economic basis." (27) The subsidy was not being paid to support a flagging industry, but to speed up the expansion of an entirely new service of communications which was bound to become an Empire asset.

Trade and commerce were soon to take advantage of the beneficial methods of transit thus opened up. Apart from passengers who were beginning to use the air for travel, traffic by air was already including such commodities as manufacturers' samples, perishable goods, high grade luxury goods, bullion, interest bearing documents, and even breakable articles of value. The value of these had already reached several million pounds. In the light of this early utility of air transportation it is not surprising that in the ten years since 1925 the traffic ton mileage of Imperial Airways has increased from 391,000 to 3,000,000 and that the cost of operation per ton mile has decreased

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(26) "Flight", April 3rd, 1924, p. 196.

(27) Imperial Airways - Yesterday, To-day and Tomorrow, G. E. Woods Humphery, p. 1.

from an index of 100 to 40, that is from $1.20 to 48 cents.(28)

For two years Imperial Airways concentrated on the services operated prior to the merger, but in January, 1927, the company assumed control of the 1,100 mile route between Cairo and Basra via Baghdad which had since 1921 been operated for the carriage of mail by the Royal Air Force. The British Government agreed to pay Imperial Airways £95,000 a year for five years for the maintenance of a service fortnightly in either direction, and to establish meteorological and refuelling stations along the route. Three months later a weekly service was inaugurated to handle the unexpectedly large traffic. (29) In 1929 this route was connected with London in the west and Karachi in the East, completing a through service of 5,000 miles. It was then extended across India to Calcutta and Rangoon, next to Singapore and finally, in 1935, linked up there with Qantas Empire Airways who operate from Singapore to Brisbane, making the longest continuous airway in the world, 12,750 miles. Traffic on the Indian section has quadrupled in the five years since its inauguration. The London-Cape Town service of 7,900 miles was opened for service in 1932 and has met with equal success, the traffic on this route having doubled during the first two years. In all cases the traffic has greatly exceeded expectations and the reduplication of services coupled with the intensive use of each aircraft have rendered these lines second to none as regards economic operation. Imperial Airways are

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(28) Engineering Journal, Montreal, February 1936, p. 55.
(29) A.E.W. Salt, op. cit. p. 46.

worthily upholding what is their main justification for existence, namely to strengthen the structure of Empire communications .

In the actual system now operative in the United Kingdom the Air Ministry is responsible through the Director General of Civil Aviation for the administration of all civil flying. The Director General has a headquarters staff of about 40 and an outstations staff at Government aerodromes, wireless stations and elsewhere of about 200, while directly within the scope of his duties are: the administration of the provisions of the Air Navigation Act; representation on the International Commission for Air Navigation and on International Civil Aviation Conferences; consideration of all matters connected with the International Air Convention and international flying; the organization of civil air routes; the administration of schemes for Government assistance to civil aviation undertakings; the inspection and organization of aerodromes for civil purposes, including their licensing; the registration and certification of aircraft and and the licensing of pilots and technical personnel; the general development of civil aviation, both technical and operational, at home and abroad; and the interchange of information relating to civil aviation within the Empire. (30)

The Civil Aviation Directorate is not entirely self-contained and its services are supplemented by those of other departments of the Air Ministry when their particular functions are concerned, for instance when questions arise relating to financial, legal,

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(30) Memorandum prepared by British Air Ministry.

parliamentary or establishment issues. Questions of design concerning airworthiness certification are dealt with by the Directorate of Scientific Research and Technical Development, while the Directorate of Aeronautical Inspection carries out inspection duties in connection with the certification of civil aircraft engines and accessories, and affords technical assistance in the licensing and supervision of Ground Engineers. The inspection of private aircraft for the renewal of certificates of airworthiness is entrusted to an outside body, the Joint Aviation Advisory Committee of Lloyd's Register and the British Corporation Register, subject to general supervision of the arrangements by the Aeronautical Inspection Directorate. The actual issue or renewal of the certificates is carried out by the Civil Aviation Directorate. The Signal and Meteorological services for civil aviation are also provided by departments not working under the immediate control of the Director General of Civil Aviation. (31)

Direct subsidies come under two heads: (a) those to air transport; (b) those to light aeroplane clubs and to the gliding movement. As has been seen in the case of the first, the subsidies were for a long time confined to one large commercial organization instead of being divided among small companies competing with each other for the available air traffic. The object of the subsidies to light aeroplane clubs, a policy adhered to throughout the Empire, is to enable members of approved clubs to obtain facilities to learn and practice flying at reasonable cost. The conditions of the agreements with clubs secure

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(31) Ibid

that the payments are applied for this purpose and benefit bona fide clubs rather than profit-making organizations. The grants are paid in respect of the issue (£25) and the renewal (£10) of a pilot's license by a club member, the maximum subsidy attainable by each club per annum being £1,500. At the end of June 1935 there were thirty-five clubs subsidized in this way, with several applications awaiting consideration. The total membership of approved clubs during 1934 was 5,814, of whom 1,823 held "A" licenses at the end of the year.(32) A proposal has been approved to afford financial assistance to gliding clubs to the extent of £5,000 per annum as a maximum for the first five years, the monies to be allocated on the advice of the British Gliding Association. (33)

The Parliamentary Civil Aviation Votes have shown a growing contribution from the Government in recent years. The amount provided for expenditure in this connection for 1934-35 was £545,247, an increase of £24,200 over the 1933-34 provision. This was due particularly to the inclusion of £60,000 for subsidy payments to Imperial Airways for the India-Singapore section of the England-Australia air route, and also to a grant of £10,000 for initial work on the projected Bermuda-New York service, not yet in operation. There has been, however, a reduction in outlay on technical equipment, and in the subsidy paid to Imperial Airways for the Egypt-South Africa section. The itemised table for administration of civil aviation is as follows: (34)

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(32) All the World's Aircraft, 1935 p. 12a

(33) Report on the progress of Civil Aviation, 1934, p. 34.

(34) Ibid, p. 79.

	£	Increase or Decrease over Previous Years £
Salaries and Wages	36,000	÷ 3,220
Supplies and Transportation	7,000	÷ 350
Technical Equipment, Stores, etc.	11,000	÷ 6,600
Works services	37,000	÷ 3,500
Miscellaneous Services	5,000	÷ 530
Headquarters Staff	19,247	÷ 1,200
Meteorological Services	13,000	-
Civil Aviation subsidies and Grants:		
(a) Imperial Airways Ltd.	561,000	÷ 13,000
(b) Light Aeroplane Clubs	16,000	- 4,000
	705,247	
Contributions from Dominion and Colonial Governments towards Imperial Air Services	129,000	- 17,000
	576,247	
Estimated Receipts: Rentals, Housing, Landing fees, Sales, etc.	31,000	÷ 4,000
	545,247	

There are ninety-three licensed civil aerodromes in the United Kingdom of which five belong to the State, twenty-two to municipalities, and sixty-six to private owners and individuals. Seventeen of these aerodromes have been approved as customs airports.

The Irish Free State is not included in any of the above statistics, and there is little to record in connection with flying in that country. There is no Civil Aviation Vote, but a token sum is included annually in the Public Services Estimates. As at December 31st, 1934 there were no regular services in the

State although several internal and external routes are under consideration. There was one unassisted light aeroplane club, at Cork, and the following figures represent total equipment: registered aircraft, 9; commercial pilots, 8; private pilots, 30; ground engineers, 3; licensed aerodromes, 2. (34a)

A survey of British activities for the year 1934, the latest year for which complete statistics are available, reveals the value of the Government's encouragement to Imperial Airways. The total mileage flown by the Company's aircraft on regular services was 2,315,100, and the total traffic ton mileage was 3,152,400, both of which represent increases of approximately 20% compared with 1933. During the year the increased popularity of the Empire Services caused the demand for accomodation to exceed the available capacity of the once weekly services. At the end of the year, therefore, the frequency of the London-Calcutta and London-Johannesburg services was increased to twice weekly. On December 8th 1934, the service connecting England with Australia was inaugurated, the final section from Singapore to Brisbane to be operated by Qantas Empire Airways, referred to in the chapter on Australia which follows. The time taken between London and Brisbane is 12 days, which shows a gain of 20 days over surface communications, on a distance of 12,750 miles.(35) 1934 was the final year in which the Paris-Brindisi stage of the Empire Services had to be operated

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(34a) Report on the Progress of Civil Aviation, 1934, p. 129.

(35) Report on the Progress of Civil Aviation, 1934, p. 7.

by train, an agreement being reached with the Italian Government and a provisional understanding with France making it possible to accomplish the whole journey by air.

In the course of subsidized flights on their European services during 1934, Imperial Airways carried out a total mileage of 760,300, which represents a total horse-power mileage of 1,535,618,000, which is three to four times the minimum which the company is required to operate under the terms of the agreement with the Government. (36) Apart from the importance of the services to passenger traffic, they are becoming indispensable in some cases to trade and commerce. In 1934 the value of goods imported into Great Britain was £1,234,029 and of bullion £21,019,299. Goods exported and re-exported amounted to £847,541 and bullion £4,694,401, making a total import value by air of £22,253,328, and export value of £5,541,942. (37) The total number of letters dispatched in the same year was 6,000,000. (38)

When regarded in the light of the following figures of traffic ton mileage it is clear that the present position of Imperial Airways has been reached through sound economic growth:-

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(36) Ibid p. 9.

(37) Air Annual of the British Empire, 1935-36, p. 59.

(38) Ibid, p. 58.

	Traffic Ton Mileage - Year ending March 31
1925	391,032
1926	393,937
1927	512,967
1928	583,668
1929	803,192
1930	1,017,773
1931	900,793
1932	1,251,753
1933	2,196,722
1934	2,733,603
1935	3,511,528 (39)

Thus, since the inception of the company, the aircraft of Imperial Airways have flown over nineteen million miles, supplying transportation services to twenty-four countries in four continents. The Company received a grant of £561,000 and earned a profit of £133,769 during the year ending March 31st 1935, paying a dividend of 7% on its issued share capital of £624,080. (40) The salaries and wages bill of the company amounts to about £350,000 per annum, with a staff of 1,800 people spread over 50 stations. Subsidiary and associate companies assist Imperial Airways to fly on an average of 17,000 miles per day, operating daily services in Great Britain and to France, Switzerland, Belgium, Germany, Austria and Hungary; also to maintain a service four times a week to Greece and Egypt, twice

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(39) The Engineering Journal, Montreal, February 1936, p. 55.

(40) Ibid

a week to Palestine, Iraq, India, Malaya, Burma, Siam, Anglo-Egyptian Sudan, Uganda, Kenya Colony, Tanganyika, Northern and Southern Rhodesia, the Union of South Africa, and once weekly to Australia. In all these services considerable increases have been made; details of the air mail dispatched from the United Kingdom since 1929 demonstrate what is perhaps the most valuable aspect of aviation (41)

	1929 lbs.	1930	1931	1932	1933	1934	Increase 1934 over 1933
India-Malaya Service (including Egypt Iraq etc.)	40,500	48,100	52,500	60,000	73,400	105,400	44%
Africa Service	-	-	5,500	15,900	24,700	38,300	55%
Other extra-European Services	8,100	16,700	23,300	24,400	28,800	30,200	5%
Continental Services	18,700	26,200	36,100	42,700	64,400	98,400	53%
lbs.	67,300	91,000	117,400	143,000	191,300	272,300	42%

Passengers and cargo carried to and from Croydon on the regular services are distributed as follows:-

Continental Services	1933	1934
Total number of passengers (in and out)	87,115 # (49,842)	93,830 # (49,570)
Total weight of freight, baggage and Mails (in and out) in tons	3,385 # (1,327)	3,445 # (1,328)

Figures in brackets for Imperial Airways Ltd. only.

Internal Services		
Total number of passengers (in and out)	-	8,091

(41) Report on the Progress of Civil Aviation, 1934, p. 116.

Under the Empire Air Mail Scheme which has been adopted by all the Dominion and Colonial Governments concerned except Australia, for the carriage of first class mail without surcharge in 1937, a significant advance in times and cost will be achieved, as is clearly seen from the following table:(42)

Route	Times taken by Services July 1934		Estimated Times to be taken under new Scheme.		
	Air Days	Surface Days	A Days	B Days	C Days
1. London-Sydney	14	31	10¼	8½	7¼
2. Sydney-London	13	31	9½	7¾	6¼
3. London-Singapore	10	23	6¼	5½	4¾
4. Singapore-London	10	23	6¼	4¾	4¼
5. London-Karachi	6¼	16	3¼	2¾	2½
6. Karachi-London	6¼	16	2½	2¼	2¼
7. London-Capetown	10¼	17	7	5	4¼
8. Capetown-London	10½	17	6¼	5	4½
9. London-Kisumu	6¼	22	4¼	2½	2½
10. Kisumu -London	7¼	22	3¼	3¼	2¾

The cost is estimated to be as follows:-

	U.K. Payment	Other Govts.	Total
1st year	£ 463,000	287,000	750,000
2nd year	388,000	287,000	675,000
3rd year	313,000	287,000	600,000
4th year	238,000	287,000	525,000
5th year	163,000	287,000	450,000

(42) Engineering Journal, Montreal, February, 1936 p. 55

The Commonwealth's rejection of the scheme was on the grounds that the proposals were not reconcilable with Australian conditions and requirements, and that the Cabinet had decided to maintain Australian control of the Sydney and Singapore Service. The United Kingdom was further advised that the surcharge would be retained for some time. (43) It is probable that within a short time the Commonwealth will come into line with the rest of the Empire.

The most recent development in the United Kingdom has been the raising of the limit for annual subsidies to £1,500,000 and the period in which subsidies may be paid is extended from the end of 1940 to 1953. The foregoing figure represents gross liability, and any contributions from the Dominion or Colonial Governments will reduce the liability. (43a)

Assuming that the objective of air transport is to convey on an economical basis the maximum volume of passengers, freight and mail, Imperial Airways have achieved a very satisfactory measure of success under Government control. Their subsidy in 1935 was little more than a third of the French, and about two-thirds of the Italian subsidy, and yet their ton mileage in the latest 12 months' period for which figures are available was 25% greater than the corresponding French figure, and more than 150% greater than the Italian. Again the passenger traffic between Croydon and the Continent substantially exceeded that of all foreign companies combined. (44) Indication that

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(43) Montreal "Star", January 31st, 1936.

(43a) Ibid

(44) Aeroplane, March 25th, 1936, p. 374.

foreign powers have examined Great Britain's policy of air transport monopoly,where Empire lines are concerned, is evident in the fact that Germany, France amd Italy have merged or are merging their previously competing companies into strong centralized organizations. Dangers of too universal a monopoly have been avoided by the Air Ministry in the decision to subsidise a new company, British Airways Ltd., which began operating a service on February 17th, 1936, between London and Scandinavia. (45) Although Imperial Airways will continue to be the instrument for developing Empire air routes, including the North Atlantic, in other spheres the Ministry is prepared to assist any other organizations which seem to merit support.

The British Government has realized that expansion on a self-supporting basis cannot be emphasized to too great an extent, but that this can only come about gradually. At the present time the progress of aviation is a matter which cannot be undertaken by conflicting private enterprise. The interests of the Empire in this phase of activity are far-reaching, affecting more than just the commercial field. The extent of the development to be achieved exceeds the bounds of self-supporting economic growth, and the investment is a long term policy which will in the future increase trade, consolidate Imperial security and advance social progress. Consequently there is, inevitably, a measure of Government responsibility.

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(45) Aeroplane, February 19th 1936,, p. 239.

CHAPTER THREE

CANADA

Canada claims the honour of having witnessed the first flight ever to have taken place in the British Empire, since, on February 23rd, 1909, Messrs Baldwin and McCurdy, associates of Dr. Graham Bell, flew a machine from the ice at Baddeck, Cape Breton. (1) These early experiments, however, were not followed by much activity before the war, except in the theoretical field. After 1914 the Dominion played an important part in training war pilots at several large training camps in Ontario, supervised directly by the United Kingdom Government. No Canadian units were formed until just before the armistice, and these were demobilized almost at once, with the result that Canada in 1919 found herself with no air organization, military or civil.

Immediate steps were taken by Parliament, and on Dec. 31st, 1919, the Governor-in-Council approved of the adoption by the Dominion of the clauses of the International Convention for Air Navigation, with certain reservations. (2) Canada's adherence to the Convention was therefore, proclaimed by the Air Regulations which took effect on January 17th, 1920. The Dominion proposed at this time to reserve the right to make reciprocal arrangements

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(1) Engineering Journal, February 1935, p. 68

(2) Report of the Air Board, 1920, p. 6.

with the United States for the regulation of international flying in the event of that Country not becoming a party to the Convention, and also made further reservations to the technical annexes of the Convention. The whole question of what was to be incorporated in the Canadian Air Regulations was presented to the Air Board which had been appointed for the general control of aeronautics by the Air Board Act (2a) which set up the first Board in July 1919. The Board decided that Canada could postpone the application of Article 5 of the Convention which reads: "No contracting State shall, except by a special and temporary authorization, permit the flight above its territory of an aircraft which does not possess the nationality of a contracting State." An agreement was then made with the United States to the effect that as long as the American machines were airworthy and their pilots properly qualified, they were to be treated as though they were Canadian, but it was stipulated that, between places in Canada, they were not to be engaged for hire, in the carriage of persons or goods.(3)

As soon as international affairs had been settled, the Board concentrated upon the establishment of national aviation. The Board, presided over by a Minister of the Crown, had been organized in three main divisions: (a) The Department of the Controller of Civil Aviation. (b) The Directorate of Flying Operations and (c) The Headquarters of the Canadian Air Force. Under these there was a Technical Directorate, a Director of

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(2a) The Statutes of Canada, 1919, Chapter 11

(3) Report of the Air Board, 1921, p. 6.

Medical Services and an Intelligence Officer. No definite limitations as to the duties of the above departments were laid down: the first named was responsible for the establishment of stations at Vancouver; Morley, Alta.; Roberval, P.Q.; Ottawa; Camp Borden, Ont.; and Halifax. (4) At the majority of these places the Dominion and Provincial Governments were given assistance in forest protection and survey, transportation work to inaccessible districts, photographic surveys and fishery patrols. The Flying Operations Directorate undertook the examination of machines and their certification for airworthiness; the licensing of pilots, navigators and engineers; the licensing of aerodromes; the survey of air routes; and enquiries into the cause of accidents.

The extent of flying activities in Canada at this time is summarised as follows:-

No. of firms engaged chiefly in manufacturing aircraft	1
" " " " " " jobbing "	2
" " " " " " operating "	30
employing aircraft as auxiliary services	3
No. of machine flights made - - - - - - - - - - - - -	18,671
No. of machine hours flown - - - - - - - - - - - - -	6,505
Approximate machine mileage - - - - - - - - - - - - -	422,462
Average duration of each flight in minutes - - - - -	21
No. of passengers carried - - - - - - - - - - - - -	15,265
Approximate passenger hours flown - - - - - - - - - -	5,164
Total freight carried in pounds - - - - - - - - - -	6,740

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(4) Report of the Air Board 1920, p. 7

(5) Report of the Air Board 1920, p. 7

Government operations:	No. of flights	398
" "	No. of hours flown	480
" "	Approximate mileage	33,612 (5)

After the war the British Government had presented to the Air Board, as a free gift, aircraft and aircraft material worth well over $5,000,000. In 1921 these assets were increased by an appropriation of $1,625,000. by the Federal Parliament. (6) This was divided into Administrative expenses, $120,000.; Civil Aviation, $680,000.; Air Force $825,000. As may be seen the emphasis in aviation matters was still placed on the military aspect. There was a definite liaison between the Air Force and the other services through the"Defence Committee", which advised on questions relating to organization, administration and combined training. During 1921 only one sixth of the flying done in the Dominion was on work of an economic character, but the following year 1,256 of the 2,541 hours of flying, or more than half, was for purposes of forest fire patrol and survey, aerial photography, mail carrying and transportation.(7) This work was carried out by three companies, two of which were operating under contract with the Ontario Government and several of the large pulp and paper companies, and the third a lumber company employing aircraft as a subsidiary to their main operations.

In 1923 two changes of importance took place. On January 1st the Air Board ceased to exist and the National Defence Act

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(5) Report of the Air Board 1920, p. 7

(6) Ibid p. 5

(7) Report of the Air Board, 1922, p. 15.

took effect, establishing a new department under the Minister of National Defence, who was made responsible for "all matters relating to defence, including the militia, the military, naval and air services of Canada". In Section 7 (ii) the Act further provided that "the powers, duties and functions vested in the Air Board by the Air Board Act, or by any order or regulation made thereunder, shall be administered, exercised and performed by or under the direction of the Minister of Defence". Thus the control of Civil Aviation passed into the hands of the Minister of Defence, where it still remains. The sections of the Air Board Act were revised under the Defence Act and the duties of the Defence Department in respect to aviation were outlined as follows:- (8)

(a) To supervise all matters connected with aeronautics.

(b) To study the development of aeronautics in Canada and in other Countries, and to undertake such technical research as may be requisite for the development of aeronautics, and to co-operate with other institutions in carrying out such research.

(c) To prescribe aerial routes.

(d) To take such action as may be necessary to secure, by international regulation, or otherwise, the rights of His Majesty in respect of His Majesty's Government in Canada, in international air routes.

(e) To investigate, examine and report on all proposals for the institution of commercial air services within Canada or the limits of the territorial waters of Canada.

Subject to the approval of the Governor-in-Council, the Department was allowed to make regulations with respect to:-

(I) Licensing of pilots and other persons engaged in the navigation of aircraft, and the suspension and revocation of such licenses.

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(8) Report on Civil Aviation, 1924, p. 20

(II) The registration, identification, inspection, certification and licensing of all aircraft.

(III) The licensing, inspection and regulation of all aerodromes and air stations.

(IV) The conditions under which aircraft may be used for carrying goods, mails and passengers, or for the operation of any commercial service whatsoever, and the licensing of any such service.

(V) The conditions under which goods, mails and passengers may be imported and exported in aircraft into or from Canada, or within the limits of the territorial waters thereof, or may be transported over any part of such territory.

(VI) The prohibition of aircraft over such areas as may be prescribed, either at all times or at such times as may be specified in the regulations, and either absolutely or subject to such exceptions as may be specified.

(VII) The areas within which aircraft coming from any places outside of Canada are to land, and the conditions to be complied with by any such aircraft.

(VIII) Aerial routes; their use and control.

(IX) The institution and enforcement of such laws, rules and regulations as may be deemed necessary for the safe and proper navigation of aircraft in Canada, or within the limits of the territorial waters of Canada.

Immediate application of the above regulations was carried out in the formation of Commercial Aviation Companies. Each projected company had to apply to the Secretary of State for incorporation and before a charter was granted those terms which concerned the conduct of air services were referred for advice to the Department of National Defence, a policy which is still in force. Other general rules laid down for air transport at this time, and still operative, include the provision that aircraft may be operated only from licensed air harbours; that no aircraft may be registered in Canada unless it belongs to a British subject

or to a company which has been incorporated in a British Dominion, and of which the President and at least two-thirds of the directors are British subjects; private planes do not require certification of airworthiness, unless they are flown out of the Dominion; personnel must be British subjects, and are divided into two main classes, ground and flying.

Commercial pilots' certificates are granted provided the holder passes a medical examination every six months. Flying tests include skill as a pilot; ability for cross-country and night flying; examination on the construction, maintenance and functions of aircraft; a knowledge of rules regarding lights and signals; a complete understanding of the Canadian Air Regulations and the International Convention for Air Navigation; and finally applicants must be familiar with map reading, orientation, location of position and elementary meteorology.

The second change was that The Dominion Government handed over the development of survey and photographic work to the Provinces; and Quebec, Ontario, Saskatchewan and British Columbia took advantage of this opportunity, having observed the expansion of aerial photographic surveying in the United States, where aviation was at this time being extensively used for the location of power transmission lines, highways and railroads, for town planning projects and real estate development.(9) This year did not see any development in passenger, mail or express traffic by air. The demand for express services was almost negligible, and with the

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(9) Report on Civil Aviation, 1923, p. 7

centres of population few and separated by great distances, traffic was very light and the communities were unable to bear the cost of rapid development. Canada with its innumerable waterways and wide prairies, its clear skies and steady climate offered unlimited possibilities for civil aviation and the importance of air mail and passenger services was not ignored in the early days. However, a careful survey of the matter had indicated that the establishment of an organized system of air transport in the country would entail very large capital and operating expenses without the guarantee of adequate returns for some years(10) Aviation authorities, nevertheless, examined the growth of air mail services in other countries, most of which had by this time developed state subsidized and operated aviation. Canada was content for the time being to use flying as an improved method of observation for Governmental Departments, limiting these activities in proportion to the then high costs of aerial navigation.

The most significant feature of State control of aerial navigation in Canada took place in 1924 with the entrance of the Ontario Government into the field of aviation (11). Having seen the success of the commercial firms with which they had made contracts, the Provincial authorities decided to operate a flying service as part of their Forestry Branch, with the

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(10) Report on Civil Aviation, 1924, p. 12.

(11) Ibid p. 13

definite aim of maintaining it on sound business lines, and by means of self-sustaining activity, to render direct benefit to the whole country. In this same year the Laurentide Air Services established the first air route for the regular conveyance of passengers, mail and freight to serve the new gold field at Rouyn in North-Western Quebec. The year also saw definite progress in the thorough application of aerial photography to surveying, exploration, and map production, and a start was made in its utilization for railroad problems, town planning and water-power projects. Numerous small aviation companies were formed throughout the country, but as their main activities were exhibition flying and short passenger flights, there was little demand for their services, once the novelty had worn off. Aerial transportation was yet without specified subsidies, and civil aviation had still to prove that large expenditure on the maintenance of passenger, mail and freight service was justifiable. Safety, reliability and economy still required development.

The Royal Canadian Air Force operations for Civil Government Departments were looked upon with favour by the Federal Government as being definite assets to the Force. Not only were the pilots gaining direct benefit from the flights made under varied conditions, but the training in photography, navigation, observation duties, wireless communication, and the maintenance of aircraft, was of greater value than any amount of routine training. The majority of this work was being done in the three prairie provinces, where the control of natural

resources still rested with the Dominion Government, and the Force was wholly responsible for providing the requisite service; in British Columbia the Force carried out similar operations on a repayment basis, whereas in Ontario and Quebec the Provincial Authorities controlled all air organization.

The two years 1925 and 1926 were conspicuous not because of new or experimental activity, but for the rapidly increasing utility of the established services. The Government claimed that the only two self-sustaining air transport routes operated during 1926 in the British Empire were the Canadian services from Hailebury to Rouyn and from Sioux Lookout to the Red Lake mining fields, both of which were without any Government subsidy whatever. (12) Increased returns in all departments of activity were experienced by every aircraft operating company. The Ontario and Quebec Governments were undertaking approximately a third more flying operations than in the previous year. (13) Aircraft was now being used for advertising purposes and technical improvements were providing for the development of winter work, thus reducing overhead costs; these had been a tremendous burden to organizations which had been inactive throughout a large portion of the year. The most important of these winter functions were the transport of passengers and mail to the Yukon, and survey work in the Hudson Bay territory.

Sufficient stimulus had now been given to political and business interests for active participation in all forms of

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(12) Report on Civil Aviation, 1926, p. 11.

(13) Ibid, p. 13.

aviation activities, with the result that 1927 was a peak year. Preliminary conferences were held and the founding of inter-city air mail services was considered. The successful operation of services to mining districts and remote parts of the country was cited and, following test flights, Parliament decided to vote $75,000. to be distributed by the Minister of Posts for aerial mail transport. (14) Two distinct aspects of the problem of distribution had to be considered. In the first place there was the benefit of mail carriage by air into districts such as the Yukon, the Mackenzie Basin, isolated mining camps, Anticosti, Magdalen and other regions inaccessible in winter. It was demonstrated that the costs of operating such services did not differ greatly from those for surface transport, and the claims of these parts of the country for air mails were undisputed. On the other hand there was the inauguration of regular scheduled services between the main centres of population in the Dominion. It was seen from the outset that in order to enjoy full benefits from such a service it was necessary to have a Trans-Canada route; the lower volume of business which a separate section was likely to provide would cost more to maintain than the greater volume which could be expected from a coast to coast service. Consequently work was begun to connect the cities located on a natural trans-continental route. The links established were:-(15) Montreal-Toronto; Montreal-Albany; Montreal-Rimouski (in summer); Winnipeg-Regina-Calgary; Saskatoon-Edmonton; Ottawa-Montreal-

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(14) Report on Civil Aviation, 1927, p. 35.

(15) Ibid, 1928, p. 34.

St. John-Halifax.

Before further studying the growth of these air mail services it is necessary to review additional changes made in the structure of aviation control during 1927. By an Air Force General Order of July 9th, issued under authority of the Minister of National Defence, the organization of aerial navigation was announced as follows:-

ADMINISTRATION

(1) Headquarters, R.C.A.F.

To administer and control all military air operations and to administer and control such units, formations, detachments, etc., of the R.C.A.F., as may be placed under such headquarters. These headquarters are to be in charge of the director, R.C.A.F., who is responsible to the Chief of General Staff.

(II) Directorate of Civil Government Air Operations

To administer and control all air operations carried out by state aircraft, other than those of a military nature, and to administer and control such units, formations, detachments, etc., of the R.C.A.F. as may be placed thereunder by instructions of the Honourable the Minister. This directorate is to be in charge of the Director of Civil Government Air Operations who is responsible to the deputy minister.

(III) Aeronautical Engineering Division

To act in a consultant capacity respecting all technical and engineering matters pertaining to the air services, and the carrying out of duties prescribed by the Air Board Act and Regulations thereunder. This division is to be in the charge of the Chief Aeronautical Engineer who is responsible to the

deputy minister.

(IV) Controller of Civil Aviation

To administer the Air Regulations, 1920, and to perform such further duties as may be directed by the Honourable the Minister. The Controller of Civil Aviation is responsible to the deputy minister.

At the same time alterations were made in the organization of the Interdepartmental Committee on Civil Government Air Operations, which had been authorized by Order-in-Council, P.C. 677, dated May 3,1926. The original committee has been organized so as to include representatives of all phases of State economic activity, having as its members the Surveyor-General, The Director of the Dominion Forest Service and the Chief Aerial Survey Engineer, all of the Department of the Interior; also the Director of Civil Government Air Operations, the Controller of Civil Aviation and the Chief Aeronautical Engineer. There were now added officers from the Postal and Air services, and, in addition, for the investigation of ice conditions in Hudson Strait, representatives of the Departments of Marine and Fisheries, and Railways and Canals. (16)

Two other important events in 1927 should be noted. One was the decision of the Defence Department to give grants in aid of the establishment of aero clubs in the largest cities of the Dominion, a study of which is included later in this chapter. The other was the opening of branches of British and United States

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(16) Report on Civil Aviation, 1928, p. 7.

aircraft manufacturers in Canada. (17) The Dominion was beginning to make good the time lost up till then, and with the inauguration of scheduled air mail services, Canadian aviation achieved a well-rounded activity.

The first of these regular air mail services was established by the Post Office Department in December, 1927, with the winter service between Leamington and Pelee Island on Lake Erie. Shortly after, a line was operated between Murray Bay, Seven Islands and Anticosti, and from Moncton to the Magdalen Islands (18). In 1928 the summer service between Rimouski and Montreal for the delivery of overseas mail was extended to Toronto and Ottawa. The Montreal-Albany service commenced in this year and the Winnipeg-Calgary contract was let; to run for a period of three years. (19) During the next year the Montreal-Toronto line was linked with Detroit, and also Toronto with Buffalo. The route from Montreal to St. John and Halifax was regularly operated, while experimental flights on the Mackenzie air route were carried out.(20) The last of the services to be started was the Winnipeg-Regina-Calgary and Edmonton route, which created the peak of air mail mileage in 1930. The complete operation of air mail services was not to last long, however. In 1931 stringent economy in Federal

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(17) Report on Civil Aviation, 1927, p. 16.

(18) The Economic and Commercial Aspects of Aviation in Canada J.G.Nelles, p. 89.

(19) Ibid, p. 90

(20) Ibid, p. 91

expenditures led to the withdrawal of some of the mail services, and the suspension of further airway construction. In the appropriations for 1932 the vote for air mail routes was cut from $829,481 in 1931 to $100,000. In the 1932-33 estimates the reductions were drastic and no appropriations were voted for air mail routes. (21)

These reductions were but part of the tremendous retrenchment enforced by the Dominion Government during 1931 and 1932. While there were only four other Government activities curtailed to a greater extent than civil aviation, it is doubtful whether it was a wise move to render completely unremunerative the capital invested by Federal, Provincial and Municipal authorities in airway development. In spite of the depression, other countries were experiencing a progressive increase in aeronautics. Each year new projects had been developed, while traffic on established airways was steadily mounting. The increased traffic had resulted in a lessening of overhead expense, and thus, more frequent schedules. Again the greater diversity of loads which the growing use of aviation has brought about was reducing the operating costs, freight rates and passenger fares. Although all this was being maintained by a generous supply of state subsidies yet the increase in commercial traffic was rapidly diminishing aviation's dependence on Government support. One example of this is shown by the fact that, while passenger traffic on the United States railways decreased by 46% between 1929 and 1932, the airway passenger traffic increased by 210%.(22)

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(21) Ibid p. 66

(22) Report on Civil Aviation, 1932, (unpublished).

Economy applied to as important an economic function at a time of natural expansion will have serious effects in the readjustment which is going to take place when all these services are renewed, and new ones are inaugurated.

Coincidental with the curtailment of activity outlined above, changing conditions in 1932 necessitated another reorganization of the Air Services. The transfer of control over natural resources to the Prairie Provinces made the maintenance of important Royal Canadian Air Force units no longer necessary, and the reductions in appropriations required a simpler form of organization. The changes made at this time constitute the administration which is still operative, and were contained in General Order No. 22, 1933 (23).

The Controller of Civil Aviation remains as before responsible to the Deputy Minister of Defence, but the other three Directorates were consolidated as follows:- "The Royal Canadian Air Force and Civil Government Air Operations Directorates will be consolidated and together with the Aeronautical Engineering Division, will be placed under the Senior Air Officer, who will discharge the duties and responsibilities prescribed for the Director R.C.A.F., in King's Regulations and Orders for the R.C.A.F., effective November 1st, 1932." The Chief Aeronautical Engineer's duties, defined under General Order 149, read, in part, as follows:- "The Technical Stores and Equipment sections of the Royal Canadian Air Force and the Civil Government

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(23) Ibid

Air Operations branch will be consolidated and placed under the Chief Aeronautical Engineer, effective October 1st, 1932."

The Chief Engineer will:

(a) be responsible to the officer in charge of the Air Service for the supply, maintenance and development of Service Aircraft, Technical Air Stores and Equipment.

(b) advise the Deputy Minister on technical matters pertaining to Civil Aviation, and for this purpose will communicate direct with the Controller of Civil Aviation.

Under this new consolidated directorate there is an Airways and Airports Division with the following duties:(a) the inspection, licensing and registration of airports and seaplane bases, to meet the requirements as laid down in the Air Regulations; (b) the supervision, development and maintenance of the Government airports at Rimouski and St. Hubert; (c) the investigation, survey, construction and maintenance of air mail routes, including communication systems for the collection and dissemination of meteorological reports and radio for the guidance of aircraft in flight, lighting where required for night flying, and the provision of intermediate aerodromes where necessary.

Equipment on a regular airway is composed of the following facilities-(24) intermediate aerodromes at intervals of 25 to 30 miles; revolving electric beacons at intervals of 10 to 30 miles or, alternatively, gas beacons at intervals of 5 miles; radio beacon stations for the guidance of aircraft along the route; teletype service for ground communication purposes and

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(24) Ibid

a meteorological system. For the construction and maintenance of these it had been the policy of the Department to contribute half the cost of the field lighting equipment of terminal airports, and all other expenditures were to be met by civic or private funds. The 1931 report on Civil Aviation gives the distribution of these as follows:-

Private investment in the acquisition of 14 sites	$ 1,030,776
Municipal investment in the acquisition of 22 sites	805,793
Total cost of acquisition of 36 sites	1,836,569
Private investment in development and improvements 24 sites	1,054,267
Municipal investment, as above, 26 sites	1,405,401
Total cost, development and improvements, 50 sites	2,459,668
Total Investment	4,296,237
Total Private investment	2,085,043
Average outlay (less cost of 10 sites)	86,877
Total Municipal investment, 26 sites	2,211,195
Average outlay (less cost of 14 sites)	85,046 (25

As can be seen the contribution of the Dominion Government to aviation has been small when compared with the above figures of municipal and private expenditures. The cutting down of appropriations already discussed appears even more serious in the light of these considerations.

Rather than attempting to trace the history of Canadian Aero Clubs development chronologically, it was thought advisable to take the year 1932 as a suitable year in which to review this movement. By this time the Clubs had completed their fifth

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(25) Economic and Commercial Aspects of Aviation in Canada, J.G. Nelles, p. 28.

year of operation under the standard conditions laid down by P.C. Order No. 1878, dated September 24th, 1927, and supplemented by further assistance under the terms of P.C. Order No. 1309, of June 11th, 1930. Briefly these required a club to:-

(a) Provide its own flying field.

(b) Arrange for the services of an Instructor and Air Engineer.

(c) Have at least 30 members prepared to qualify as pilots.

(d) Have not less than 10 members already qualified, and, in return:

(e) Each approved club will receive two aeroplanes and engines as an initial grant.

(f) A further issue annually, for a period of 5 years, will be made of one aeroplane and engine complete, providing the Club purchases an aeroplane of equal value.

(g) The sum of $100 will be granted to each club in respect of each member who qualifies as a pilot.

(h) The sum of $2. per hour will be granted to each club for a club member continuing his training and qualifying for a commercial pilot's certificate.

(i) An issue of closed aircraft in lieu of open aircraft to clubs graduating at least 25 pilots, will be made.

(j) One parachute will be lent to clubs providing one other at their own expense. (26)

On November 1st, 1929, a Canadian Flying Clubs Association was formed, and since 1930 it has received an annual grant from the Department of Defence, the only condition being that it must employ a permanent secretary whose qualifications and duties are acceptable to the Department. This organization, which has headquarters in Ottawa publishes a monthly magazine, "Canadian

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(26) Report on Civil Aviation, 1932, unpublished.

Aviation", and is the sole representative in Canada of the Federation Aeronautique Internationale of Paris, the governing body of world sporting and competitive flying. The association acts as a liaison body between the twenty-two government-sponsored clubs and the Civil Aviation department. Under date of July 9th, 1935, Order-in-Council P.C. 1868 was passed authorizing a new agreement for a term of three years dating from April 1st 1935; one new provision in this agreement was that the Government would issue one new aeroplane to each club without the stipulation of a similar purchase by the club. (27) At the same time the Government has laid down a minimum amount of ground school training as a condition of payments of grants for licenses in order to ensure the progressive raising of the standard of proficiency and safety.(28) The total flying time for the year 1935 by the Aero Clubs of the Dominion showed an increase of thirty-one percent over the previous year, (29) and the Association's balance sheet showed Revenue at $7,375 and Expenditures at $7,313.59, or a profit of $61.41. (30)

The flying clubs aspect of Canadian aviation is apparently an economic asset and the functions performed are mutually satisfactory to both parties concerned as evidenced in the

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(27) Annual Report of the Executive Secretary of the Canadian Flying Clubs Association for the year ended December 31, 1935, page 1.

(28) Ibid, p. 2

(29) Ibid p. 5

(30) Ibid p. 6.

following quotation from the Report already cited: "The broad foundation laid by the clubs through a high standard of elementary training is, clearly, the first essential. Without it difficulties would certainly be encountered in increasing measure as impending future developments of air services take shape. As yet, no other agency has been discovered capable of meeting the situation as efficiently and economically as that devised by the Federal authorities in the present Club System". (31)

Turning again to the general development of all flying activities between 1932 and the present time, the main features to notice are: first, the steady increase in commercial aviation and the gradual re-establishment of the air mail services. During 1933 there were 90 commercial aircraft operators in Canada. (32) Estimates of expenditures for civil aeronautics, including control of commercial and private flying, construction and maintenance of airways and aids to air navigation, airship bases and flying clubs totalled $1,600,000. for the year ending March 31, 1934, a reduction, nevertheless, of $150,000 from the appropriation for the preceding year. However, an upward revision was adopted for the air mail budget, which was increased from $136,500 to $361,500, (33) while the total Civil Aviation Vote rose in the same period from $187,000 to $212,000. (33a)

In the main their activities were under contract for forest fire patrols, timber cruising, and air photography, but they were also developing the transportation of passengers, express

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(31) Ibid p. 10.

(32) The Canada Year Book 1934-35, p. 744

and mail, instruction, advertising and short passenger flights. The fifteen commercial firms (most of which are subsidiaries of Canadian Airways Ltd.) operating regular air mail services under Post Office Department contracts in 1933, had increased to twenty-five at the end of 1934, during which year 625,040 lbs. of mail were carried, 534,737 route miles were flown and 4,014 single trips made. (34) The routes now being served are: Yearly services:- Montreal-Albany; Sioux Lookout-Narrow Lake; Fort McMurray-Aklavik; Prince Albert-Lac La Rouge; Amos-Siscoe; Winnipeg-Pembina; Prince Albert-Ile a la Crosse; Lac du Bonnet-Bisset; Cameron Bay-Coppermine; Fort Chipewyan-Fond du Lac; Fort Resolution-Cameron Bay; Rouyn-Kewagama; Atlin-Telegraph Creek. Summer services:- Montreal-Rimouski; Vancouver-Victoria; Winter Services:- Leamington-Pelee Island; Quebec-Seven Islands; Seven Islands-Natashquan; Havre St. Pierre-Port Menier; Moncton-Charlottetown; Charlottetown-Magdalen Islands.

The growth of civil aviation under the Defence Department has also shown a sound and progressive improvement during the last three years, as illustrated below:- (35)

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(34) Report on Civil Aviation, 1934 p. 3.

(35) Material collected for Report on Civil Aviation, 1935, but not yet published.

	1933	1934	1935
Flight	106,252	128,031	153,211
Hours	53,299	75,871	88,451
Miles	4,538,315	6,497,637	7,522,102
Passengers	85,006	105,306	177,472
Passenger Miles	3,816,862	6,266,475	7,936,950
Freight lbs.	4,205,901	14,441,179	26,439,224
Mail lbs	539,358	625,040	1,126,084
Ton Miles	237,300	838,114	1,852,081
Pilots killed	8	4	4
Pilots injured	7	7	6
Passengers killed	14	3	7
Passengers injured	6	2	9
Third parties killed	3	2	3
Third parties injured			
Accidents	19	14	15

According to the latest available statistics there are 101 licensed aerodromes in the Dominion, including the Customs Airports at Fernie (B.C.), Fredericton, Hamilton, Lethbridge, Montreal (two), Moose Jaw, Regina, Toronto, Vancouver, Vernon (B. Walkerville (Ont.), Winnipeg and Prince Rupert. (36) As at December 31st, 1934, there were in Canada 330 commercial and 8 private aircraft, 405 commercial and 427 private pilots.(37) With Canadian Airways operating all but about 700 of the 4,000 miles of scheduled air lines in the country, aviation is being developed economically and efficiently. When the transcontinent

(36) Aircraft Year Book, 1934

(37) Report on the Progress of Civil Aviation, 1934, p. 123.

Air Route construction scheme is complete, Canada will possess a system ranking high in the world's airways.

An interesting possibility is forecast that all transportation units in Canada are going to be placed under a Transport Board. No details have as yet been announced at the time of writing but the report seems to be considered as authoritative. (38)

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(38) Montreal Star, April 11th, 1936.

CHAPTER FOUR

AUSTRALIA AND NEW ZEALAND.

Australian activity in the field of Aviation has been continuous and progressive since 1920. The Commonwealth ratified the decisions of the International Air Navigation Convention of 1919 by introducing legislation the following year in the form of the Commonwealth Air Navigation Act and Regulations.(1) These Regulations have been added to and amended periodically, following amendments of the International Air Navigation Convention and the results of local experience.

Wide expanses of low-lying country and the great distances separating the Commercial centres render Australia particularly adaptable to the new form of transport. In general, climatic conditions do not vary greatly, and this combination of assets was early realized by those interested in aerial navigation. The first successful Australian flight in a power-driven machine, which took place in 1909,(2) was followed at once by Commercial experiments, these being soon

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(1) Acts of the Commonwealth of Australia, No. 50 of 1920.

(2) Official Year Book of the Commonwealth of Australia No. 16, 1923, p. 335.

utilized for war purposes when Aviation Schools were established in Victoria and New South Wales. The next impetus to flying activity came in 1919 when the first flight from England to Australia was successfully completed, a feat which inspired a decision, at the Conference of Federal Ministers and State Premiers, to pass the Bill mentioned above.

The functions and organization of the Commonwealth Civil Aviation Branch as outlined in 1920 and developed thereafter, follow closely those adopted in other parts of the Empire. The Air Navigation Regulations are administered by the Department of Defence through a special Branch under a Controller of Civil Aviation,who also advises the Minister of Defence as to the disposal of the annual Parliamentary Grants for Civil Aviation purposes. The Branch has three divisions, each of which is controlled by a Superintendent, viz:- (a) "Civil Flying Operations" section, which include supervision of personnel, of subsidized aero clubs and air service contractors, and of the Air Navigation Regulations applicable to civil flying operations (b) "Aircraft" section for registration, supervision of ground engineers, air worthiness tests, and for technical investigations (c) "Aerodromes" section covering selection, maintenance and development of Government Aerodromes and emergency landing grounds,

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(3) Report on Civil Aviation in Australia, 1933 (Issued by Controller of Civil Aviation) p. 6

inspection and licensing of public aerodromes and the preparation of air route maps.

It is expressly stated that nothing in the Regulations shall interfere with the right of any State Government in respect to "the right to own and/or use for the purposes of the Government of the State Aircraft operating within the State".(4) In practice, however, the Commonwealth Government controls all the important airway systems, and there has not been any conflict as yet between Provincial and Federal rights. Until a definite stipulation regarding the respective powers of State and Central Governments in aviation matters is made, the Commonwealth may, and does, bring the matter under the jurisdiction of the defence power, the trade and commerce power or the posts and telegraphs power. By June 30th, 1934, the central Government had acquired or leased 204 landing grounds over the following routes: Perth-Wyndham (2,067 m); Perth-Adelaide (1,453 m); Adelaide-Sydney (790 m); Sydney-Brisbane (550 m); Brisbane-Camooweal (1,226 m); Camooweal-Darwin (802 m) Katherine-Ord River (375 m); Cloncurry-Normanton (221 m); Melbourne-Launceston (342 m); Melbourne-Hobart, via King Island (487 m); Melbourne-Hay (223 m); Mildura-Broken Hill (189 m)

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(4) Statutory Rules, 1921, No. 33, Part 1, Section 4.

Melbourne-Charleville, via Cootamundra (900 m); The foregoing routes have a total mileage of 9,635. (5) In addition there has been considerable activity on the part of local governing authorities who, with technical aid and supervision from the Civil Aviation Branch, have established altogether 135 public aerodromes, making, with the 77 Government aerodromes and 154 Government Emergency Grounds, a total of 346 recognized landing grounds in the Commonwealth.(6)

Government assistance to civil aviation has been in force now for fifteen years in Australia. The annual vote for this purpose is disbursed under the following main headings: (1) Subsidies to air service contractors; (11) Bonuses, subsidies and equipment to the Associated Aero Clubs of Australia; (111) Acquisition or lease of sites and their preparation for use as Government aerodromes and emergency landing grounds on approved aerial routes; (1V) Drainage, runways, buildings and other improvements on Government aerodromes; (V) Maintenance of Government aerodromes and emergency landing grounds in fit condition for use by aircraft; (Vl) Salaries, wages and administrative expenditure (7). Despite the necessary retrenchment in Commonwealth budgets during recent years, the services supplied under the above headings are being well maintained, as seen by the Civil Aviation Vote for 1934/1935:-

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(5) Official Year Book of the Commonwealth of Australia, No. 27, 1934, p. 193.

(6) Transport and Communication, Bulletin No. 25 (page 30).

(7) Report on Civil Aviation in Australia, 1933, p. 9.

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Salaries		19,640
General Services (Travelling, Printing, Office Requisites, Maps, Petrol and Oil, Postage and Telegrams, I.C.A.N. contribution, etc., etc.)		10,020
Development of Civil Aviation		
Subsidies for Air Transport Services	£98,500	
Grants to Aero Clubs	7,000	
Miscellaneous	7,200	
	£112,700	
Less amount estimated to be recovered from Postmaster-General's Department for conveyance of mails	£ 20,000	92,700
Rentals, Repairs, Maintenance, Fittings and Furniture (Under control of Department of Interior)		2,500
TOTAL - ORDINARY SERVICES		£ 124,860

Additions, New Works, Buildings, etc.

Buildings and Works (Under control of Department of Defence)	£ 2,000	
Not including £51,130 in special allocations made from Unemployment Relief Funds for improvement works on Civil Aviation and controlled by the Department of the Interior.		
Buildings, Works and Sites (Under control of Department of Interior	£37,000	
		39,000

TOTAL - CIVIL AVIATION APPROPRIATION £163,860 (8)

Following reorganization in 1934, the Government awarded to Qantas Empire Airways Ltd. (a combination of interests of Imperial Airways Ltd. and Qantas Ltd.) the contract for a service

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(8) Report on Civil Aviation in Australia, 1934, p. 7.

between Darwin and Singapore, to connect with the Imperial Airways Service to India and Great Britain, and linked up with the Brisbane-Darwin route. A new assignment of contracts placed the operation of the major subsidized services in the hands of Qantas Empire Airways Ltd., Butler Air Transport Ltd., MacRobertson-Miller Aviation Co. Ltd. and Holyman's Airways Pty. Ltd., with a distribution of subsidies as shown in the following table:- (9)

Service	Contractor	Minimum No. of Aircraft to be used	Average Subsidy over the 5 yr. period
Singapore-Darwin 4361 miles	Qantas Empire Airways Ltd.	5 D.H. 86's	£63,685 per annum = 2/9 7d per mile, reducing from 3/1 per m. 1st year to 2/8 per m. 5th year.
Cloncurry-Normanton 216 miles	Qantas Empire Airways Ltd.	1 D.H. 83	£2,557 per annum = 2/2 7d per mile, Reducing from 1/11¾ per m. 1st year to 1/10½ per m. 5th year.
Charleville-Cootamundra 629 miles	Butler Air Transport Ltd.	2 D.H. 84's	£6,255 per annum = 1/10 9d per m. Reducing from 1/11¼ per m. 1st year to 1/10½ per m. 5th year.
Perth-Daly Waters 2,252 miles	MacRobertson-Miller Aviation Co. Ltd.	3 D.H. 84's	£17,565 per annum 1/6 per mile
Melbourne-Hobart 460 miles	Holyman's Airways Pty. Ltd.	2 D.H. 86's (1 D.H.84 in emergency reserve)	£12,199 per annum = 10.2d per m. (Reducing from 1/- per mile 1st year to 10d per mile 5th year

The above services are maintained weekly in each direction except the Melbourne-Hobart one, which is operated six times

(9) Ibid p. 9.

weekly each way, via King Island and Flinders Island alternately. The minor Subsidized Services are distributed as follows:- (10) Brisbane-Cracow - Aircrafts Pty. Ltd.; Rockhampton- Mt. Coolon, Rockhampton Aerial Services Ltd., Sydney-Bega, Adastra Airways Ltd. and Adelaide-Port Pirie-Eyre's Peninsula - Adelaide, Commercial Aviation Co. Ltd. All these are weekly schedules except for Sydney to Bega, which is bi-weekly. Both major and minor subsidized services are available for the conveyance of surcharged air mails as well as passengers and freight. A later development resulted in the awarding of a contract for the benefit of South Australia, previously dependent for delivery of its overseas mail from the Cootamundra Air Service Terminal by rail via Melbourne to Adelaide. This State now has a direct delivery by means of an air service between Bourke (N.S.W.) and Adelaide via Wilcannia, Broken Hill and Renmark, connecting at Bourke with the main system.

With all the new services now in operation the Government's annual liability for subsidies, averaged over a period of five years will be from 15-20% greater than during the previous five years (11) The new subsidy rates are considerably lower than formerly, and already the Government is benefitting from the greatly increased air mail revenue which has resulted from the stimulus of a through air mail schedule between London and Australia. The annual net cost of the new system, which has involved approximately 140% increase in the mileage flown, is

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(10) Australia Year Book, No. 27 p. 194.

(11) Report on the Progress of Civil Aviation (England) p. 123

very considerably below the net cost of the purely internal services operated previously. The economic value and security of Australian subsidized flying may be judged from its record over the three year period, 1932-1934, when 5,673,405 passenger miles were flown, 236,372 lbs. of freight and 81,373 lbs. of mail carried, with only four accidents involving death or injury (12) Four of the services included in the above statistics showed a record of 100% efficiency and have ensured constant and increasing use of the air for commercial transport in the Commonwealth.

The position of unsubsidized air service in Australia is constantly changing. Withdrawals of service and liquidation of the operating companies have been frequent. The two main services have been the daily Brisbane-Sydney one, and the Perth to Adelaide line. These carry mail, passengers and goods. During 1934 three new services carrying passengers and goods only, were added to the one line (Brisbane-Rockhampton) then existing in this category. These were Sydney-Newcastle (Northern Airways Ltd.)(13) Hobart-Launceston (Tasmanian Airways Pty Ltd.), Cairns-Cooktown (T. H. McDonald).

A comparison between the aircraft mileage, passenger traffic and air mail traffic between unsubsidized and subsidized services over the years 1932 to 1934 inclusive, gives a general idea as to the place in transportation economics which aviation is playing at the present time in Australia.

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(12) Report on Civil Aviation in Australia, 1934, p. 4.

(13) Later England Airways Ltd.

Year	Machine Miles	Passenger Miles	Passengers Carried	Av. Pass. Load per m.	Average Air Mail Carried lbs net
1932	Sub. 564,693	2,162,468	3,074	3.82	28,622
	Unsub. 341,390	1,232,956	3,269	3.6	4,031
1933	Sub. 553,693	2,195,135	3,030	3.96	32,351
	Unsub. 516,416	2,132,291	6,092	4.1	7,147
1934	Sub. 645,273	1,542,006	3,441	2.4	32,000 #
	Unsub. 667,230	3,008,383	9,938	4.5	24,000 #(14)

The rapid and steady growth of the unsubsidized service is the best evidence of the air-mindedness of the Australian nation and demonstrates the economic place which such a unit has in the transportation structure.

Following the example of Great Britain, the Commonwealth Government decided in 1926 to give assistance to the Aero Clubs which had been formed shortly after the war, in the form of facilities loaned to them which would enable instruction and practice not only for the older pilots, but also for the youth of the country. The indirect result of an increased enthusiasm on the part of the public concerning aviation matters has fully justified the aid given by the State. The scheme initiated in Sydney and Melbourne was soon extended with the result that there are now six Associated Aero Clubs, one in each State, excluding subsidiary organizations not assisted by the Government.

A three year agreement is made between the Commonwealth and the Clubs, the latest of these having been signed on November 1st, 1933, with Establishment Grants of £300 per annum per club, provided a required equipment and staff are maintained, and a

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(14) Australian Year Book No. 27, p. 196.

minimum of 600 flying hours are carried out. A pilot Bonus of £20 for each pupil trained to 'A' License Standard is awarded and also a Renewal Bonus of £10 for each pilot member who renews his license after completing the necessary period of flying in club aircraft. A limitation in the maximum amount which each club can earn is stipulated; a club must maintain 2 aircraft and in return can earn 10 Pilot Bonuses (£200) and 20 Renewal Bonuses (£200); for each additional aircraft the maximum increases by 5 Pilot Bonuses and 10 Renewal Bonuses. The Department of Defence reserves full powers regarding distribution of aircraft and requires maintenance by each club of its approved minimum, either by repair of damaged machines or purchase of new ones. The aviation training, and the measures taken to promote interest in flying, are subject to approval of the Department. (15)

Other functions performed by aviation in Australia are already well developed. The Commonwealth Government, in co-operation with the Governments of Queensland and Western Australia have started air survey operations as part of a combined geological and geophysical survey of the mineral-bearing areas of North West Queensland, the Northern territory and the north of Western Australia. (16) The cost, estimated by a Committee of Commonwealth and State Geologists, is to be approximately £150,000 over a three year period.

Gliding too has derived benefit from Government assistance

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(15) Report on Civil Aviation, 1934 p. 19.

(16) Ibid, p. 27.

the first grant taking place in 1933 (17) when the sum of £600 was allocated as a subsidy for properly incorporated Gliding Clubs during a period of twelve months, the scale in operation being £5 per quarter for primary gliders, £7-10-0 per quarter for secondary gliders and £10 per quarter for Sail Planes. Very few clubs have fulfilled the qualifications for assistance under this heading, but many of the associations have provided valuable training for future air pilots.

The most recent development has been the inauguration of the "Australian Aerial Medical Services" an organization which embraces all Flying Doctor Services in the Commonwealth. This body has nation-wide representation and is financed both by private donations and Government grants, with active cooperation of the State Governments. In one district alone, the Wyndham (Kimberley) district, the Commonwealth reimbursed the cost of aerial ambulance work up to £500 for the first year, funds being provided from the"Development of Civil Aviation Vote". In New South Wales, the Central and Local Governments have granted financial aid to the Far West Children's Health Scheme, which operates an "Aerial Baby Health Clinic" The Commonwealth grant is £21 for each of seven round trips flown over an approved circuit

NEW ZEALAND

Development of Civil Aviation began later and has been somewhat slower in New Zealand. Although the Dominion was a signatory to the Paris Convention in 1919, the first Air Navigation Act was not drawn up until 1931 and further brought into line with

Empire aviation plans by the Air Navigation Regulations of 1933. The actual structure of aviation control is similar to that of Australia, with a Controller of Civil Aviation under the Minister of Defence, but for some time there was very little expansion in this connection, chiefly because the population of the whole country, and of the main cities, is not large, with a resultant small travelling public. During 1935 a new and active interest in Civil Aviation was apparent in the parliamentary Vote which for 1934-35 was £14,850, a considerable increase over the previous year's figure of £2,250 (18). Two companies were formed in 1929 to operate scheduled air services throughout the Dominion, more or less in the form of air taxi work. One company formed at Rotorua had only a short existence, but a third company has been successful and the three operate at Auckland and Timaru.

The work of the Aero Clubs, also started in 1929, has however expanded rapidly with the help of Government subsidies. Light aircraft are loaned to the clubs and payments are made proportionate to the number of pupils who qualify for their "A" licenses. Eleven Aero Clubs have been assisted in this way, and by 1934 had received £9,410.(19) They have trained over 400 pilots to the "A" license standard and, during the year 1933-34 alone, 100 pilots were trained, the sum of £1,755 being spent in subsidies (20). Several of the aerodromes operated by the Aero Clubs are owned by the cities or boroughs and are leased to the

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(18) Report on the Progress of Civil Aviation 1934, p. 127

(19) New Zealand Official Year Book, 1935, p. 182

(20) The Aero Clubs are as follows:- Auckland, Western Federated, Hawke's Bay, Wairanapa, Wellington, Marlborough, Canterbury, Otago, Southland, West Coast Federated.

clubs while there are also a few clubs which carry on without Government assistance.

Actual Government expenditure on civil aviation during a five year period has been:- (20a)

1929-30	£ 7,530	1932-33	£ 4,243
1930-31	8,698	1933-34	1,813
1931-32	2,093		

The relative position of aviation in the Government Budget may be seen from the following figures for land defence during seven years from 1927 to 1934:- (21)

Year	Military Forces	Aviation	Total
1927-28	£ 453,580	£ 28,179	£ 481,759
28-29	425,813	38,782	464,595
29-30	401,645	53,183	454,828
30-31	229,050	48,749	277,799
31-32	156,311	26,663	182,974
32-33	180,112	27,715	207,827
33-34	215,950	48,773	264,723
Public Works Fund: Vote Contingent Defence			
1927-28	39,706	280	39,986
28-29	23,029	44,623	67,652
29-30	7,896	38,870	46,766
30-31	363	13,449	13,812
1931-32 to 1933-34	Nil	Nil	Nil

Even air mail services do not as yet play an important part in New Zealand communications. Although some experimental services had been carried on as far back as 1920 and 1921, between

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(20a) New Zealand Official Year Book 1935, p. 183.

(21) Ibid

Auckland and the North and between Christchurch and Timaru, they never reached a point where they could be placed on an economic basis. Later, at the end of 1930 tenders were invited for the conveyance of mail by air once daily each way between Auckland, Wellington, Christchurch and Dunedin, but of the tenders received none possessed the requisite qualifications.

During 1931-32 the New Zealand Air Mail League arranged a number of special air-mail flights, and although the statistics compiled from these trials will prove valuable for operating future services, the Government authorities appear as yet to see no real need for regular air services within the Dominion. Special flights were again undertaken in 1933 and 1934 as follows:- (22)

Date	Flight	No. of Letters Carried	Net Weight of Letters Carried
Dec. 12 1933	Auckland-Invercargill	10,638	166
Feb. 17 1934	Auckland-Sydney	39,255	550
Mar. 29 1934	Kaitaia-Sydney	21,866	317½
Apr.11-12 1934	Sydney-New Plymouth	39,971	515
Apr. 12 1934	New Plymouth-Auckland	24,582	295
" " "	New Plymouth-Hastings	678	12
" " "	New Plymouth-Wellington Christchurch	12,324	165
" 14 "	Kaitaia-Sydney	22,189	289
Jul. 2 1934	" "	9,891	150

In 1934 a Transport Licensing Act for Commercial Aircraft Services was passed, which stipulates that no air services may be started without a license on which the schedules and other conditions are laid down, and is framed on the Road Traffic Act, 1930,

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(22) New Zealand Official Year Book 1935 p. 290

which has controlled and restricted road passenger services in Great Britain. It is under the jurisdiction of the New Zealand Transport Coordination Board, whose decisions have on many occasions already conflicted with those of the Controller of Civil Aviation. Some amendments regarding the respective powers of these two bodies seem inevitable in the near future (23). Under the T.L.A. licenses have been granted during 1935, with funds supplied by the enlarged Civil Aviation Vote mentioned above. On February 7th 1935 a license was granted for a period of five years for a service over the route Wellington-Blenheim-Nelson-Hokitika. The Company, Cook Strait Airways, is also licensed to carry on air-taxi services commencing from or terminating at Wellington, Blenheim or Nelson. Another air-taxi license was granted to the Mount Cook Tourist Company, for a period of five years, to operate flights from Hermitage to places in the South Island and to Wellington. This Company is also given permission to run sight-seeing flights from Hermitage, restricted to the Provinces of Canterbury, Otago and Westland. A five year contract is also in force now between the New Zealand Government and Air Travel (New Zealand) Ltd. for an air service from Hokitika to South Westland, while the East Coast Airways began a licensed service from Hastings to Gisborne on April 30th 1935.

Special licenses for the operation of regular services have been granted to eleven aero clubs for a period of four years but the Government intends ultimately to confine the activities of the aero clubs to training and private flying. In addition to the Aero Clubs, Light Aeroplane Clubs share in the Government

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(23) "Aeroplane" February 26, 1936, p. 266

subsidies. Seventeen such clubs were assisted in 1934, the same number as in 1933, and it appears that they owe their existence to this financial aid. Of the ten unassisted clubs in existence in 1933, only one remained active at the end of 1934.

As at January 15th 1935 there were in New Zealand, 75 civil aircraft, 48 commercial and 357 private pilots and 65 ground engineers. There were 32 licensed aerodromes. (24)

Turning to New Zealand's external airway relations we find that much pioneer work, Government investigation and mutual commercial agreements have to be carried out before this section can become an integral part of the Empire Communications. During recent years most of the experimental flying across the Tasman Sea has been conducted by the Trans-Tasman Air Service Development Co. Ltd., which was controlled by Sir Charles Kingsford Smith, whose disappearance has greatly retarded development of this work However, no agreement has yet been reached between this company and Imperial Airways who have recently (January 1936) placed before the British Cabinet a scheme calling for a subsidy of £150,000 for this project, but they have not called for tenders. Australian and New Zealand interests are antagonistic to the plan, unless it can be adapted so as to include the experience and personnel of the local companies. The scheme as it stands will link only Brisbane and Auckland and it is to this that the New Zealand Government has taken exception, claiming that all parts of the Dominion South of Auckland, and all parts of Australia North of Queensland will have such an indirect service that it

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(24) Report on the Progress of Civil Aviation (England) 1934, p. 128

is doubtful whether letters by air mail will take much less time than letters by sea. The whole plan has been devised to link up more directly with the British Air Mails but the vast amount of correspondence and passenger traffic between New Zealand and the Commonwealth has not received sufficient consideration. And yet it is more practical to have the Trans Tasman Service a continuation of the main route than to be forced to organize an entirely separate service. A solution of this problem is a necessary pre-requisite to the development of this important communication.

CHAPTER FIVE

SOUTH AFRICA

A Frenchman, Albert Kimmerling, is accredited with the first aeroplane flight in South Africa, the event having taken place at Capetown in 1909 (1). In the following year one of the features at the yearly Pretoria Show was an air flight, while in 1911 Dr. (later Admiral) John Weston began to demonstrate flying to the public of Kimberley, Bloemfontein and Johannesburg. About the same time a Mr. Guy Livingstone formed the South African Aviation Syndicate, which, in December 1911, was responsible for the first official air mail to be flown in the country (2) According to the Johannesburg "Star" the journey of five miles from Kenilworth to Muizenberg was made in 7½ minutes. (3) The syndicate, which had begun operations at Capetown and had then transferred to Kimberley, was forced into liquidation in 1913, and its assets were bought by one of the members who then opened a flying school. Although nine officers were detailed for training in the school by the Defence Department, its activities were curtailed very soon due to accidents.

There was no further development of aviation in South Africa until 1917, in which year an aerial recruiting tour of the Union was undertaken resulting in the erection of an aerodrome and hangar by the Department of Defence at Young's Field, Wynberg. The next

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(1) Encylopedia of Aviation.

(2) South African Railways and Harbours Magazine, Dec. 1935, p.1497

(3) Johannesburg "Star" December 28th, 1911.

few years were spent in experimental flights and in securing statistical information regarding weather conditions, all of which confirmed the growing opinion that South Africa was particularly adaptable to aerial development.

Today Civil Aviation in South Africa is directly under the control of the Minister of Defence, under whom there is a Director of Civil Aviation (who is at present also Commander-in-Chief of the Union Defence Forces). Then, there is an Aeronautical Inspection Division consisting of two Warrant Officers of the South African Air Force, who hold military rank in the Defence Force of the Union and have military duties apart from their inspection duties in Civil Aviation. Apart from the Director of Civil Aviation himself and the Aeronautical Inspection Organization, the remainder of the staff of the Civil Aviation Directorat are civilians, although they depend to a very great extent upon the military staff for technical operations.

By the Aviation Act, No. 16 of 1923, which became operative on July 1st, 1924, a Civil Aviation Board was set up consisting of seven members who function in an advisory capacity. Their term of office is normally three years and they are elected as representative of the Directorate of Civil Aviation, and of the Industrial Commercial and Flying Club interests (4). The Board is continuall providing information to the Ministry and, in return, is granted very complete power in aviation affairs, including control, after issue of special proclamation, to provide for a state of war or great National emergency. However, the Minister does not have to

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(4) Letter of Director of Civil Aviation, July 8th 1935.

accept the advice of this Board, nor is he compelled even to ask it. The Act provides for the adoption of the International Air Navigation Convention and empowers:-

(a) the issue of proclamations to give effect to the Convention;

(b) the ratification of and giving effect to amendments;

(c) the application within the Union of any of the provisions of the Convention.

As in the other cases under review, provision is also made for the issuing of regulations, which cover, inter alia, the licensing and certificating of personnel, machines and aerodromes, the registration of aircraft, the safety and security of persons and property, and the holding of accident enquiries. (5)

The Aviation Board is empowered to distribute the moneys appropriated by Parliament for (a) the establishment and maintenance of aerodromes and road approaches thereto; (b) for the purchase of land for this purpose, and (c) for land being expropriated for aerodromes, as though the acquisition were a defence purpose under Section 87 of the Defence Act (No. 13 of 1912). Approval and Licensing of aerodromes for public purposes is also within the jurisdiction of the Board.

An interesting feature of the Act is the clause stipulating that actions for trespass or nuisance against aircraft for flying over private property are barred, providing of course, that reasonable height and the rules of flight are observed. It is understood, however, that damages may be recovered for loss or damage by the aircraft or by articles falling from the aircraft,

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(5) Official Year Book of the Union of South Africa 1933-34, No. 16, p. 796.

and the Act does empower the detention of aircraft for breach of law or regulations. These provisions are applicable to all aircraft except those used for Military, Naval or Government activities, although they may be applied in the latter case by special proclamation.

Until September 1931, the administration of Civil Aviation had been operated by the Department of Posts and Telegraphs, but by Act No. 21 of 1931 power was transferred to the South African Railways and Harbours Administration, which was to operate aircraft for the transport of passengers and goods. This Act became effective on February 1st, 1934 and since this date, with the exception of the subsidized London-Capetown service, which has a year more to run on its contract, all regular air services in the Union and South West Africa have been controlled by the South African Railways and Harbours Administration under the name of the South African Airways. Two companies are included in this merger, Union Airways Ltd. and the South West African Airways Ltd. (6). These services include the weekly transport of passengers and mail between Durban and Capetown with intermediate landings at East London and Port Elizabeth; also a daily service in each direction between Durban and Johannesburg. South West Africa is also served by a regular schedule between Windhoek and Kimberley, while at the end of 1935 definite plans were initiated for the linking of Johannesburg with Lourenco Marques and Walvis Bay, with the additional possibility of a weekly service connecting Windhoek and Capetown.

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(6) Pamphlet, South African Railways and Harbours Administration

South Africa's external airmail services, started in January 1932, have greatly increased in popularity with the public, and, as stated in an earlier chapter, since December 30th, 1934, there has been a twice weekly service between London and Johannesburg. The Imperial Airways duplicate air liners leave London every Sunday morning and are scheduled to reach the Rand Airport at Johannesburg on Monday afternoons (8 days), while in the opposite direction the service is scheduled to leave the Union terminal every Saturday morning, arriving in London on Sundays. The original air service, which leaves London on Wednesdays and Capetown on Tuesdays, remains unchanged. Other ports of call within the Union are Victoria West, Kimberley and Pietersburg and aerodromes have been declared for Customs purposes at these and at Durban, Barberton, Walvis Bay and Windhoek. (7)

The weight of mails despatched from the Union since the inauguration of the service are as follows:-

Destinations	Letter Mails			Parcel Mails		
	1932#	1932-33#	1933-34#	1932	1932-33	1933-34#
	lb	lb	lb	lb	lb	lb
Union	636	396	668	98	151	872
S.Rhodesia	105	206	358	10	196	337
N. Rhodesia	14	57	112	2	27	45
Tang.Uganda Kenya	111	1,006	1,510	30	262	598
Sudan	3	24	23	-	-	-
Egypt	48	427	679	-	-	-
United Kingdom	1,018	5,881	11,970	44	390	1,269
India	-	113	248	-	-	-
Europe (excluding U.K.)	320	1,758	5,281	-	1,108	

Ending March 31st

(7) Official Year Book of Union of South Africa 1933-34 No.16 p. 746

With the extension of the service to Australia in December 1934, it is now possible to send mail by air from the Union to Australia and vice versa, the time necessary for transmission being 14 days to Port Darwin and 16 to Brisbane and Sydney. For the benefit of these services and for the internal air mail services, the South African Government established during 1935, ten wireless stations to supplement the three already in existence. Modern direction finding equipment has been installed at these stations so as to triangulate the entire Union.

Government aid to Light Aeroplane Clubs has not been developed in the Union to the extent that this has been done in Australia. From 1927 to 1934 no State Subsidies were given to Flying Clubs, although during that time ten clubs were formed on a self-supporting basis. However, due to financial difficulties all of these, except the Johannesburg Aeronautical Association and the Rand Flying Clubs at Germiston, have been compelled to cease flying. Consequently in June 1935 the Government drew up a programme of State aid for Civil flying. (8) Under this plan Light Aeroplane Clubs or Aircraft-operating Companies who train citizens of the Union as pilots, will receive a grant of £100 per pilot on the following basis:-

(a) £50 will be paid on the pilot joining the South African Reserve of Pilots. Such pilots must have had 50 hours flying experience and be in possession of a current "A" Pilot's license.

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(8) British Air Ministry Resume of Commercial Information, Series 6, No. 2, April-June, 1935.

(b) £50 will be paid on the pilot qualifying for the South Africa Air Force Special Reserve of Officers.

(c) Pilots on the South African Reserve of Pilots will be required to take an initial course of training for 30 days for the first year, and 15 days per annum thereafter. Such training will be given free of charge and, in addition Reserve Pilots will receive a necessary messing allowance.

The Department of Defence also decided at this time that the Air Force would take up gliding as part of their training at Durban and Capetown. As soon as the necessary number of machines and qualified instructors was available assistance was given to the general public in the formation of Gliding Clubs. The connection between the Air Force and Civil Aviation therefore, is more definite in South Africa than in other Empire Countries. The units into which the Force is organized are so constituted that they include facilities for the development of all forms of aviation, military or civil. At Roberts Heights, where the aircraft and artillery depot are situated, there is a general mechanical transport section, with repair and construction workshops and a reserve aeroplane field for the training of Active Citizen Force Artisans for the South Africa Air Force Reserve. At the same location there is also a Central Flying School, consisting of one training and two Service Flights, capable of training 40 to 50 pupils per annum. Similar smaller units are maintained at Capetown.

Actual expenditure in this department since 1928 has been as follows:-

	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34
Aerodromes and Aviation Stations	£ 69,526	30,605	26,695	30,256	31,090	35,849

The expenditure in connection with the Administration of Aviation Act, 1923, and that of the Trans Continental Imperial Airways Mail and Passenger Service, administered as from 1932-33 under the Defence Vote, is not included in the above figures, but is given below as a separate table since it now comes under the heading of Posts, Telephones and Telegraphs.

The Department has also seriously considered giving assistance, as aviation develops, to the Municipalities and other bodies who have borne the main burden in regard to the construction and maintenance of aerodromes throughout the Union.(9) As yet there is no provision for this development in the yearly budget, which is divided as follows:-

Administration of Aviation Act 1923	1928-29 £	1929-30 £	1930-31 £	1931-32 £	1932-33 £	1933-34 £
Salaries, Wages etc.	1,687	1,880	2,262	2,917	2,606	3,582
Transport	354	601	960	1,088	600	616
Incidental Expenses	174	85	291	716	253	620
Subsidy for Civil Aviation	-	4,796	8,000	8,000	8,000	10,000
Transcontinental I.A. Mail & & Passenger Service Subsidy	-	-	-	31,259	99,662	94,000
Incidental Expenses	-	-	2,986	2,547	909	1,224
TOTAL	2,215	7,362	14,499	46,527	112,030	110,042

The following statement, showing the number of passengers and the amount of freight and mails carried by all Airways in the

(9) "Cape Argus" Capetown , May 24th 1935.

Union during 1933 and 1934, indicates the extent to which the foregoing monies are expended:

		1933	1934	Increase or Decrease
Imperial Airways				
Passengers embarked (10)	No.	1,050	1,202	÷ 14
" disembarked	No.	364	625	÷ 71
Freight loaded	Lb.	2,753	4,106	÷ 49
" unloaded	Lb.	3,796	6,594	÷ 74
Mails loaded	Lb.	25,094	38,471	÷ 53
Mails unloaded	Lb.	20,962	39,674	÷ 89
South African Airways (11)				
Passengers carried	No.	2,388	1,973	- 17
Mails and Baggage carried	Lb.	12,935	16,712	÷ 29
Freight carried	Lb.	67,632	76,319	÷ 13
	Miles	319,531	246,306	- 23
South West African Airways (Pty) Ltd.				
Passengers carried	No.	166	135	- 19
Mails flown	Lb.	1,110	5,581	÷ 403
Freight carried		616	466	- 24
Mileage flown		81,840	82,082	

To complete the picture of aerial transport in South Africa, a schedule of the Post Office charges is appended: (13)

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(10) Includes passengers travelling between points in the Union.

(11) The decrease in passengers carried and mileage flown in 1934 was due to the curtailment of the Johannesburg-Durban service from a daily to a tri-weekly service for seven months during 1934.

(12) A division as between mails and baggage cannot be made.

(13) South Africa Year Book, 1933-34, No. 16, p. 741.

	POSTAL ARTICLES (Exclusive of Parcels)
Within the Union	1½d per half oz.
Great Britain, N. Ireland Irish Free State	6 d " " "
To other European Countries except Russia	1/- " " "
Southern and Northern Rhodesia	4d " " "
Kenya, Uganda, Tanganyika	5d " " "
Egypt	9d " " "
India	1/- to 1/3 " " "

PARCELS

Within the Union	9d per half pound
Union to South West Africa	1/3d " " "
" " Rhodesia (North & South)	1/6d " " "
" " Kenya, Uganda, Tanganyika	2/- " " "
" " Great Britain and N. Ireland	3/6 " " "

Air Mail parcels are not accepted for destinations other than the above.

South Africa, more than any other Empire Country, is experiencing a stimulus in aviation by the international competition which surrounds it. Included in the many companies successfully operating lines through or adjacent to South Africa are the Rhodesian and Nyasaland Airways which parallel the Imperial Airways route from Bulawayo to Salisbury, and, in addition to connecting Victoria Falls with Bulawayo and Lusaka, provide a triangular schedule between Salisbury, Blantyre and Beira. This Company also operates between Lusaka, Broken Hill and N'dola, connecting here with the Transport Aerien du Katanga which runs a service to Elizabethville. Madagascar is linked up by the Service de la Navigation Aerienne, which crosses Mozambique and continues to Broken Hill, whilst in West Africa the Sabena and Regie Air Afrique connects the Belgian Congo with

Europe. A link with the Imperial Airways route is provided by Elder Colonial Airways from Khartum, across Africa to Lagos and other West Coast ports, and in East Africa the Wilson Airways operate from Nairobi westward to Mwanza and eastward and southward to Mombasa, Zanzibar and Dar-es-Salaam. (14)

The success of the foregoing services in the Union is still problematical. During the period April 1st to September 30th, 1935, South African Airways operated at a deficit of £26,881, the loss for September alone being £6,430 (15). However, it must be taken into consideration that during this period there have been many alterations in the services, including the reduction in Empire air rates and the duplication of services. As soon as adjustment is made to the new scale of operating costs there seems little doubt that air transport will be placed on a revenue-bearing basis. Statistics confirm this optimistic view of the future. During the first six months of 1935 there was an increase of 84% in letters carried on Imperial Airways Routes compared with the same period in 1934 (16). The growth of air mail traffic in South Africa is reflected in this increase: figures concerning air mail conveyed during August and September 1935, as compared with those for the corresponding month of 1934 show increases of 252% and 348% respectively.

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(14) South African Railways and Harbours Magazine, November 1935, p. 1419

(15) Ibid, December 1935 p. 1641.

(16) Ibid, November 1935, p. 1420.

Incorporation of the Airways System with the South African Railways and Harbours Administration fortunately came after a period of reorganization. As in other countries the Administration had not fulfilled its original purpose of uniting all railways under one efficient administration, managed independently in the interests of the whole country, free from party, Provincial, Sectional or District interests. There had been excessive control by the Cabinet and the Railway Board had frequently allowed practices which could not be defended on business principles. (17) However as soon as the Railways began to lose hold on their monopolistic condition and were threatened by competition from both the air and organized road transport, machinery was set up to deal with the question of rates, competition and control. A strong movement took place in favour of the establishment of a Ministry of Transport Communications whose duties would be to co-ordinate railway and road-motor transport and to advise on and control the future development of air transport in the Union. Despite a strong representation to Parliament in this connection by influential economic and business leaders, no change was made in the actual organization of transport control. The present system, therefore, would seem to be firmly established. The Government through the General Manager of South African Railways and Harbours, holds a complete monopoly of all scheduled civil air lines, with the exception of the Imperial Airways Service. So far the Government has not imposed any restrictions on charter work or on air taxi work by private enterprise. There is a weakness, nevertheless, in the overwhelming

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(17) The Railway Policy of South Africa, S.H. Frankel, p. 5

absorption of Civil Aviation by the State, in that there is also a complete subjugation to Military influence. Again our survey would seem to indicate that expenditure has been much higher than the results have warranted. Costly Junkers Aeroplanes with a cruising speed of 140 m.p.h., have been acquired, the running costs of which, on the 300 mile Durban-Johannesburg Service, are computed to be £100 per plane per trip (18). Even if the machines were full on every trip they would only just pay their running costs at the fares charged, quite apart from establishment and overhead charges. Passenger traffic on this route is by no means sufficient to warrant this and that is why there is an operating deficit of several thousand dollars per month on South African Airways. The outlay of money from the unlimited funds at the disposal of the General Manager of the South African Railways and Harbours seems indicative of a belief that Civil Air Transport can never be made to pay. This attitude towards a transportation unit must be abolished if South Africa is to develop an Airways System which will also be a national asset.

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(18) "Aeroplane" August 14th 1935, p. 204.

CHAPTER SIX

INDIA

Civil Aviation did not become a departmental activity of the Government of India until 1927.(1) Consequently, such analysis of the subject as is within the scope of this thesis is concentrated upon the rapid development of internal services, which pressure of external conditions had forced upon Indian Aerial Authorities. There had been sporadic attempts to establish internal aviation services in India since 1919, when Sir George Lloyd, at that time Governor of Bengal, had succeeded in promoting the inauguration of a postal mail service between Karachi and Bombay (2) The Royal Air Force had been responsible for the maintenance of the service, but public support was lacking and the venture soon failed. This early set-back to air transport was responsible to some extent for the attitude adopted towards aviation for some time after by the Indian Government. It was stated that no parliamentary grant for this purpose could be given and, as no country at that time was operating without State assistance, it was considered inadvisable to attempt further air activity.

In 1920 the Department of Commerce and Industry had formulated the Indian Aircraft Rules which contained the usual specifications regarding general conditions of flying, registration and nationality, registration marks, licensing of personnel, mails

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(1) The Indian Year Book, 1928, p. 540.

(2) The Indian Year Book, 1935-36, p. 562.

and wireless apparatus, use of aerodromes, general safety conditions, rules of the air and conditions for carriage of passengers and goods. One feature of the Act, peculiar to India, is that the provision of these rules as to registration of aircraft, licensing of personnel, and airworthiness, shall not apply in the case of any foreign aircraft during one month from the date of its arrival in India: provided that -

"(a) No person shall fly or land, or assist in flying or landing, any foreign aircraft over or in British India except on or with the invitation or permission of the Governor-General-in-Council, and in the case of any such aircraft landing on such invitation or with such permission, the exemption provided by this rule shall apply only to such extent and on such conditions as may be specified in the invitation or permission; and

(b) Where any foreign aircraft after first landing in British India, is flown over any part thereof in such manner as may be necessary in order to proceed to a foreign destination, all the provisions of these rules shall apply in the case of such aircraft, unless there are carried in the aircraft and produced for inspection, as and when required by any officer, certificates and licenses issued, and log books in the form approved by a responsible authority in the Country to which the aircraft belongs, complying substantially with the requirements of these rules." (2a)

In the early twenties, French and Dutch air services started to operate across the Indian Continent, and as, under

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(2a) Indian Aircraft Rules, 1920, (amended to November 29, 1930)

the terms of the International Air Convention to which she was a signatory, India was required to provide ground facilities for the aircraft of other Countries, it was realized that some form of civil aviation programme was inevitable. Thereupon, the Department of Industries and Labour took up the matter with the result that in 1927 a Civil Aviation Department under the Minister of Industries and Labour was set up.(3) With the inauguration the following year of the weekly London-Karachi service of Imperial Airways, the Indian Government recognized the importance of making the necessary ground organization to enable the continuance of a chain of communication from England to Australia.(4) And the first step taken was the institution of Government scholarships for the training of young Indians in Civil Aviation. A strong national feeling to preserve Indian personnel for the organization of both internal and external air services was evident.

In 1928 eight men were sent to England for training with a view to their future employment in the Department of Civil Aviation as Aerodrome Officers, Inspectors of Aircraft and Engines etc. (5) The system has now been adopted as a permanent procedure, other students having been sent over in 1930 and in 1933. (6) The course lasts for a period of three years and two months, during which time each man receives a scholarship amounting to £240 per annum; one stipulation for eligibility to gain these

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(3) The Indian Year Book 1928, p.

(4) Imperial Air Routes, Major A.E.W. Salt, p. 203.

(5) The Indian Year Book, 1932, p. 540.

(6) Ibid

scholarships is that the applicant must possess a B. Sc. degree in Engineering or Physics. The training is not primarily for commercial piloting, but for all phases of aeronautical science. The students go through a post graduate course at the Imperial College of Science and Technology, and are attached for a certain time to selected aircraft works and to Croydon Aerodrome.

During the same year work was begun on the route which was to serve the dual purpose of a link for Imperial Airways and a route for the development of a new commercial service for India itself. The first sections to be constructed were Karachi to Delhi (690 miles), Delhi to Calcutta (815 miles), and Calcutta to Rangoon (810 miles). A new landing ground was made at Gaya, between Delhi and Calcutta, and hangars were erected at Karachi, Delhi and Calcutta. (7) Arrangement was made that after December 30th, 1929, the Imperial Airways service from London to Karachi was to be extended to New Delhi, with a special stipulation regarding the conveyance of mails between the two cities to the effect that the service was conducted by the Postal Department of the Government of India, and that Imperial Airways chartered to them machines for the purpose. (8) In effect, this meant that technically the service from Karachi eastwards belonged not to Imperial Airways but to the Indian Government. This contract expired early in 1932, when the Government decided not to renew their charter with Imperial Airways, and let out a new contract to the Delhi Flying Club for the carriage of the weekly Karachi-

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(7) Imperial Air Routes, Major Salt, p. 204.

(8) The Indian Year Book 1934-35, p. 549,

Delhi air mails, a temporary arrangement pending the adoption of a permanent scheme.

Total expenditure of the State, under the heading of "Works", for the development of the Karachi-Calcutta service and the Karachi-Delhi air mail during these first years was generous and a practical investment. In 1927-28 there had been a modest outlay of Rs. 30,000 but for the next two years the figures were Rs. 2,04,000 and Rs. 14,15,000 respectively.(9) However, in 1931 the Government was forced to reduce its grant to civil aviation very considerably, the figure then standing at Rs. 11,80,000. One immediate effect of this was thecessation of activity on the Karachi-Calcutta route and the sale of the four aeroplanes which had been operating this line. Reductions in the "Works" appropriation for aviation became even more drastic; from Rs. 4,80,000 in 1931-32 the allowance dropped to Rs. 2,02,000 the following year, reaching the lowest level, Rs. 1,59,000 in 1933-34. (10) After a few years of greatly curtailed activity a new scheme was organized which resulted in the formation of a new Company known as Indian National Airways Limited. This concern received technical support and general assistance from Imperial Airways, and its main function has been the establishment of branch and feeder services such as the Calcutta-Rangoon and the Calcutta-Dacca lines.(11) Along with a private company, Tata Sons Ltd., which operates a weekly service each way from

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(9) "The Statesman" Delhi, 28-8-34

(10) Ibid

(11) Indian Year Book 1935-36, p. 564.

Karachi via Bombay to Madras, Indian National Airways have made a successful start in a field where there is great scope for future expansion. These limes have contributed to the growth of civil aviation mileage which increased from 1,505 in 1928 to 4,870 in 1933.(12) During the same period the weekly scheduled mileage has risen to 12,640, and as another gauge of their economic utility, the amount of petrol consumed in civil aviation has in creased from 52,000 to 3,730,000 gallons. (13)

The condition in 1934 was none the less very serious. After five years in which financial conditions had been such that new expenditures on aviation had only been granted in exceptional cases, the ground organization provided throughout the country was in an unsatisfactory state. Consequently the Standing Finance Committee of the Assembly deliberated on the problem and decided to organize a scheme of air routes to be financed from loan funds. The chief obstacle to overcome was the lack of aerodrome facilities. Several of the most important landing grounds were unsuitable for use and were even dangerous during the monsoons, while the considerable increase in the amount of night flying required proper lighting facilities. Some of the airports, notably Karachi, were most inadequately supplied with administrative and control buildings, and the hangar accomodation at several airports, including Calcutta and Rangoon, was quite insufficient. The main reason for this was that the inadequacy of the sums placed at the disposal of the Civil Aviation Directorate in previous years had resulted in uneconomic expenditure; temporary

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(12) "The Statesman" Delhi 28-8-34.

(13) Ibid

equipment had been constructed and it was now necessary to replace this by permanent buildings. At the time there prevailed low rates of interest, while labour and materials were cheap, so the Government obtained the agreement of the Secretary of State to provide funds from capital for expenditure on ground organization in order to raise the standard, which, supplemented by improvements financed from revenue, would be adequate for a long-term period and would ultimately cost the country less than if it were to continue to use the existing equipment.

India with its 1,802,000 square miles and its geographical position between Europe and the East, offers great opportunities in respect to air routes. In the first place there is a great future for survey work; it was estimated in 1929 that only 7,397 square miles or 0.41 of the whole area of India had been surveyed, chiefly by an independent company, the Indian Air Survey and Transport. (14) Secondly if an inter-city scheme were carried out linking up with the international route numerous benefits, direct and indirect, would occur, such as the increase in revenue from Customs and Excise duties on petrol, landing and housing fees, income tax and the like. With these considerations in view the Finance Committee drew up a schedule of expenditure for landing grounds and aerodromes directly connected with civil Aviation for Meteorology, and for wireless facilities. The latter two items were listed in the budgets of the Meteorology

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(14) Imperial Air Routes, Major Salt, p. 205

Department and Posts and Telegraphs Department respectively, with the stipulation that these departments will recover by debit to the Civil Aviation Department an amount sufficient to cover all recurring expenditures such as interest on capital, depreciation, maintenance and operation. (15) The Finance Department sanctioned the recommendations of the Committee and division of the Rs 92,57,000 (approximately $3,000,000) granted was as follows: Aviation, 76,70,000; Meteorology 5,66,000; Wireless 10,21,000, the total outlay to be spread over a period of about three years. The outstanding feature of the improvements was the provision for night flying over the whole distance from Karachi to Calcutta by beacons at intervals of 100 miles throughout the route, by automatic boundary lights and illuminated wind indicators. In addition, the main aerodromes at Karachi, Delhi, Cawnpore, Allahabad, Calcutta, Akyab and Rangoon were to be fully equipped with floodlights as well as the minor illuminations of the intermediate landing grounds.

The Government further agreed to start on the following programme of improvements: (a) Runways and surface treatment at Delhi, Gaya, Akyab, Bassein and other aerodromes that are liable to disablement during the monsoon. (b) General betterment of conditions at Calcutta, Chittagong and Rangoon, with the possible provision of new aerodromes (c) Construction of hangars of 140 feet span for the larger aircraft landing at Karachi, Allahabad,

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(15) The Statesman, Delhi, 28,8,34.

Calcutta and Rangoon (d) New emergency landing grounds where the distances between aerodromes are too great for safety, and in the Irawaddy Valley for an alternative to the Burma Coast route during the monsoon (e) New Meterological observatories and quarters. (16)

The total Civil Aviation budget for the financial year 1933-34 was Rs 10,03,000, divided as follows: (17)

Direction and Staff	Rs	2,81,400
Works		1,66,400
Grants to Clubs		1,32,000
Wireless		3,50,000
Scholarships, etc.		32,000
Grants-in-aid for landing and housing charges in connection with air services		1,200
Special Grants-in-aid from the Petrol tax		40,000
		10,03,000

With the impetus afforded by this expanding activity in air development the tide turned regarding Civil Aviation in India. The number of aircraft arrivals increased from 316 in 1933 to 364 in 1934; the number of departures from 302 to 365. The value of general merchandise imported during the year amounted to Rs. 5,35,831 and the value of precious stones imported increased from Rs 31,48,685 in the previous year to Rs 38,78,355 in 1934. Imports of bullion and currency stood at Rs 1,66,638. The corresponding figures for exports

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(16) Ibid 29-8-34

(17) Indian Liaison Letter, No. 64 July to December 1932.

were: merchandise Rs. 10,638; precious stones Rs. 52,983; bullion and currency Rs. 1,03,930. (18)

Another factor which greatly influenced the growth of aviation activity in this country was the decision of the British Post Office that after November 17th, 1934, a flat rate of 6d per ½ oz. was introduced for all letters from the United Kingdom to all places in India served by the Trans-Indian Service. (19) Previously, the postage on an air mail letter from the United Kingdom to Karachi had been 6d per ½ oz. with a surcharge of 2d per ½ oz. for internal carriage by air to any place in India served by an air service. The immediate results of this move are clearly demonstrated by figures supplied by the Trans-India Service and the Karachi-Madras Service:-

Quantity of Mails from the U.K. carried by

	Trans-India Service	Karachi-Madras Service
Month	lbs	lbs
October, 1934	1,682	1,202
November, "	2,392	1,626
December, "	4,020	2,516
January, 1935	3,755	2,576
February, "	2,418	1,911
March, "	3,577	2,808

There was also a considerable increase in the total quantity of mails carried from England to India, which from 5,352 lbs in October 1934 rose to 8,189 lbs in March 1935.

In the opposite direction, the combined air mail and postage rate on letters to the United Kingdom was reduced, with

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(18) Air Annual of the British Empire, 1935-36, p. 77

(19) Ibid

effect from November 28th, 1934 to 7½ annas for the first half ounce and 7 annas for each additional half ounce. Results similar to the table above were achieved:

Month	Total Mails to the United Kingdom lbs.
November, 1934	5,405
December, "	7,041
January, 1935	6,611
February "	8,130
March "	7,566

Evidence that air transport was becoming a practical business operation was next shown by the formation of two new unassisted air transport companies (a) the Himalaya Air Transport and Survey Ltd., of which the primary aim was to organize an air service between Hardwar and Gauchar, to cater for the pilgrim traffic to a shrine at Badrinath; (b) the Irawaddy Flotilla and Airways Ltd., for the establishment of internal services in Burma. (21) The latter company receives technical collaboration from Imperial Airways Ltd., and operates services from Rangoon to Mandalay and from Rangoon to Moulmein. (22) At this same time Tata Sons, Ltd., of which mention has already been made, was completing its second year of operation, under a ten year Government contract, on the Madras Air Mail Service, with a record of 100% regularity. The mail loads carried during 1934 had totalled 41,487 lbs, an increase of over 76% compared with 1933, passengers and freight were only carried to a limited extent by this Company.

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(21) Jane's All the World Aircraft, 1935, p. 24 a.

(22) Report on the Progress of Civil Aviation, 1934, p. 130.

If, as is likely, the Imperial Airways Service to India is increased to four or five times per week, and existing schedules are speeded up, there is a rapid and continuous period of expansion to be undergone by Indian aviation, requiring the organization of internal feeder services on a standard comparable in speed and frequency to the Empire Services, particularly after May, 1937, when all first class mail will be carried by air throughout all British Nations.

The Flying Club movement originated in March, 1927, when the Indian Legislative Assembly, at the request of Sir Victor Sassoon, M.L.A., discussed the question in detail. The principle of subsidizing these clubs was heartily approved, and at once the Aero Club of India and Burma was formed, composed, incidentally, of about 40 members of the Legislature. (23) Its first meeting was held at Simla in September of the same year and during the next three months 100 more members of the Assembly and 197 other members joined. Committees were formed at Delhi, Calcutta, Bombay and Allahabad in order to develop interest in the movement and to utilize the Government grants which were to be provided. The Aero Club entered into an agreement with the Royal Aero Club of Great Britain and became its official representative in India and Burma.

In December 1927, Sir Victor Sassoon made the Government an offer to the effect that provided a grant of Rs. 30,000 were made to the Aero Club for the year 1928-29, and a grant of Rs. 20,000 to each club formed, he would bear any deficit incurred

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(23) The Indian Year Book, 1934-35, p. 549.

between the Club's income and expenditure until the grants became available. The Government agreed to this and also decided to provide each club with an initial equipment of two aeroplanes, a spare engine, and a contribution towards the cost of a hangar, where no hangar was already available (24). These grants commenced on April 1st, 1928, and were subject to renewal at the end of two years. To date nine clubs have been formed under this agreement at Delhi, Bengal, Madras, Bombay, Karachi, Lahore, Jodhpur and Kathiawar. These clubs provide the only facilities for instruction in aviation, and are under the general direction of the Secretary of the Aero Club, who exercises control and general control of activities under the Director of Civil Aviation with the Government of India.

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(24) Ibid, p. 550.

CHAPTER SEVEN

THE RELATION OF CIVIL TO MILITARY AVIATION

Civil Aviation has a very definite potential military aspect. A transportation system which underwent its first experiments in time of war, thereby becoming irretrievably linked with the question of defence, and which has been so greatly influenced technically by other than commercial considerations, must of necessity be linked in people's minds with the fighting forces of the world. On the one hand, therefore, aviation can be one of the greatest powers of destruction in existence, on the other, as has been seen in preceding chapters, it can be a unifying agent for peace. Although there is no doubt that if it had not been for the impetus of military requirements during the war, the aircraft of to-day would certainly not have reached the high standard already attained and now being continuously used for commercial purposes, still the expansion of civil aviation has been greatly retarded by its connection with military problems, and in turn, from the point of view of armaments, air power has become increasingly difficult to maintain because of division of labour, expenditure and personnel between two great aircraft developments.

At the Disarmament Conference of 1932 seven Governments advocated total abolition of naval and military aircraft. Germany proposed that, besides such abolition there should be more extreme

regulations for civil aviation than those of Versailles. Spain demanded abolition and also proposed internationalization of civil aviation. Sweden, Denmark and Hungary likewise supported abolition, and Russia proposed that, failing abolition, there should be drastic, proportional and progressive reduction. Italy advocated similar partial limitation, and France proposed that air transport should be internationalized and other civil aviation controlled. Great Britain was not as definite and wished only "such limitations or prohibitions as will weaken the attack and so remove the temptation of aggression". (1) This latter policy was later adapted to a proposal of complete abolition provided that an effective system of control for civil aviation could be worked out. No workable scheme for action on these principles has yet been achieved.

To-day, Great Britain as much as any other European nation is re-arming in the air, a decision having been made in July, 1934, to increase the Royal Air Force by forty-one squadrons, a step taken because "we can no longer hope that an international convention will solve the problems which agitate the whole of Europe".(2) The British Government's continued air policy of international disarmament received a temporary set-back, but hope has not been abandoned of reaching some limitation in the near future. Unless England's endeavour to persuade other nations to reduce their air armaments is successful, then there is only one course of action open to her, and that is to safeguard European peace by

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(1) The League of Nations Union, London. The Problem of the Air pp. 8, 9.

(2) Ibid, p. 11, quoting Lord Londonderry.

becoming impregnable in the air. The United Kingdom had been fifth among the World's air powers, behind Russia, Italy and France, and not far ahead of Germany, and in order to become strong enough to offer adequate assistance to other nations with which she has made pacts, an expansion programme was amply justified. Among the alternative suggestions for the maintenance of peace has been that the League of Nations should be provided with an international police force, but as yet no solution of the practical difficulties of location, recruitment, administration, financing and control has been produced.

There have also been efforts to secure the abolition of bombing planes, and it has often been maintained that commercial aircraft can easily be transformed into bombers in the event of war. This theory, however, is not generally accepted. The trend of modern aircraft design has been towards more and more specialisation and war planes must have qualities productive of great speed, great power of climbing at high speed, and the ability to perform rapid manoeuvres, without the necessity of possessing long endurance or a great capacity for carrying loads. Despite this fact there seems to be at present a growing demand from the commercial companies for greater weight - carrying capacit increased speed, and greater range, combined with a reduction in the ratio of power to weight, and, consequently, there is a reserve of planes with a high degree of military efficiency. "If military forces are retained and under these conditions attempts were made to convert the civil machines into bombers, the number

would not be great enough to make very much difference; secondly, if a plane is a good civil machine, it will be a bad bomber for bombing is a very highly technical skilled operation." (3) Of course, if there were no regular air forces at all then every civil machine would be used as a bomber, and a certain amount of this would be done in any case, but the difficulties of thus converting civil machines and personnel to war purposes are greater than many people realize. However, from the point of view of ground organization, the aspect is somewhat different. Countries supplied with a system of aerodromes and emergency landing fields, with their accompanying supply and repair equipment, would find these invaluable in war.

It would seem therefore that for the mutual benefit of each, civil and military air development should be separated. A United States Federal enquiry into the military value of civil aviation held in 1934 concluded that the value consisted of the provision of a system of high speed communications for government and essential industry - for providing to some extent a reserve of trained personnel, but that "any similarity between transport and military airplanes is of almost incidental importance."

Substantiation of this theory that civil aviation has a relative insignificance is given in figures for the distribution of expenditures for air services over the period 1929 to 1933, which show that nations of the world allot 11% to civil and 89% to military aviation. The majority of European States allocate

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(3) Major J. A. Robertson before the Conference on Aviation, London, April 3rd & 4th, 1935.

less than 5% of their annual air votes to the development of commercial aviation. The complete divorce of military from civil aviation will nevertheless continue to present serious obstacles until commercial air transport becomes entirely self-supporting. Government subventions tend to be dependent in some way or another upon considerations of defence, for instance in the case of Imperial Airways, which must in the event of war turn over all its equipment to the Government in return for the aid received by the company in time of peace.

Efforts to prevent countries from utilizing civil aviation for military purposes have found expression on many occasions in the various disarmament conferences and in the meetings of the Air Commission set up by the first conference.

In 1926 Sub-Commission A of the Preparatory Commission for the Disarmament Conference decided that civil aviation personnel and material "constitute possible war armaments of very high value on account of the ease and rapidity with which they can in most cases be utilized for certain military purposes." This opinion confirmed the conclusions of three international committees of air experts, arrived at independently, meeting at Paris, Geneva and Washington between 1919 and 1922. (4) During the following year another League Committee of Experts on Civil Aviation maintained that "every effort should be directed towards differentiating more and more clearly between civil and military aviation; in this way, civil machines will become capable of a maximum economic return and will become less and less useful for

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(4) L. C. Tombs, Op. cit. p. 15.

military purposes". (5) In 1932 the Countries of the British Empire were among the signatories to a resolution stating that civil aircraft should be submitted to "regulation and full publicity," and that civil aircraft not conforming to the specified limitations should be subjected to an international regime so as to prevent effectively the misuse of such civil aircraft. (6)

In all cases it is agreed that the limitation, reduction or abolition of air armaments are conditional on some degree of internationalization for civil air transport.(7) The chief benefits to be derived from this method are first that it would constitute a real obstacle to the utilization of civil aircraft for military purposes without stopping development or technical progress, and secondly that it would co-ordinate the efforts of the different nations, put an end to unnecessary competition and duplication, reduce Government subsidies, and improve traffic through general unification. To accomplish this, the creation of "International Air Transport Unions" has been proposed, and these bodies alone would be permitted to own transport aircraft of size and power beyond the limitations imposed on other national aircraft. These Unions would have a legal status recognized by the contracting countries enabling them to register the aircraft to be internationalized and either to retain ownership thereof

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(5) Ibid

(6) Ibid, p. 16.

(7) Interdependence, Vol. 12, Nos. 2-3, 1935, p. 67.

or to convey it to the international operating companies. The carrying out of the administrative and economic functions of the Unions would be in the hands of an Assembly, a Council and a Managing Committee, consisting of representatives of all the member States. The Council's main duties would be to grant concessions for the establishment of international air lines and of lines of special importance, the latter being dependent on whether the commercial output of these lines would authorize the Union to assume their cost of establishment and maintenance, and, if not, the operating deficit would be covered by the country making the application. The initial financial resources of the Unions would be constituted by subscriptions paid by the various countries in proportion to the contributions of material made to the Unions, and, in return, orders for new material would be divided equitably between the Member States, which would, in the first place. have allowed the Unions to utilize the existing organizations of civil aviation, except that the flying grounds would remain the property of the States. The directing staff and personnel, chosen from among the nationals of the member States in an equitable proportion, would through the Unions, be under the control of the League of Nations. (8)

Against this plan, however, it has been said that "leaving aside the fact that no committee of experts has yet succeeded in defining the difference between naval and military aircraft on the one hand, and civil and commerial aircraft on the other, and conceding that what constitutes civil aviation is clearly

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(8) Ibid, pp. 67-69.

defined, what is to ensure that civil aviation will not, in the event of war, be used for military purposes?" (9) There is little doubt that even if the scheme were workable in principle - a fact not yet agreed upon by the interested nations- innumerable technical difficulties would occur in its practical operation. The French Government at the Air Commission of 1933 considered that the internationalization of civil aviation must be supplemented by an international air police force. (10) This in itself would constitute a major problem which will inevitably delay the formation of any form of international control, and it is this question which has caused the complete inability of the Disarmament Conference to make any progress towards a solution of the problem.

In a discussion of the apparent urgent need for co-operation from European nations in particular, it must not be forgotten that a process of internationalization has been in force in Europe since 1919 when a group of British, Dutch, German and Scandinavian air transport companies formed the International Air Traffic Association, known generally as the I.A.T.A. Included in its membership at the present time are Imperial Airways, British Continental Airways, Tata Sons, Ltd., and companies representing France, Italy, Germany, Belgium, Poland, Norway, Spain Sweden and Switzerland. The organization is "a free union of national subsidized companies and not a cartel dividing up the European air network".(11) Each Company retains its identity

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(9) Brig.-Gen. C.P. Groves, Behind the Smoke Screen, p. 319.

(10) L. C. Tombs, op. cit. p. 19.

(11) L. C. Tombs, op. cit. p. 147.

and ultimate freedom of action. Article 1 of the Statutes provides that the object of the Association is the establishment of unity in the exploitation of air lines in which territories of two or more States are concerned, but this body does not favour the internationalization of civil aviation.

The scope of the I.A.T.A. is not restricted to European Companies and is gradually expanding to India, Africa and other continents. Its committees consist of branches for the study of international post, radio telegraphy, technical advance, finances, air law, combined air and rail transport, and the unification of accounts. Tariffs are formulated by the I.A.T.A. and then submitted to each Government, as are the general conditions for the transport of passengers and baggage and of goods. The I.A.T.A. encourages the pooling arrangements between companies, but does not take any direct part in their conclusion. (12)

Then within the League of Nations there is a Communications and Transit Section which performs research and co-ordination functions in connection with air navigation. This body endeavours to deal with the problem from the legal and technical point of view, without recourse to purely political considerations. The Transit Section has no legislative powers but, through the inclusion of States not members of the League, it is able to secure diversified opinions on all international air matters and has built up numerous instruments of international co-operation. Again the division between civil and military duties is indefinite.

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(12) Information Bulletin, I.A.T.A., No. 21, The Hague, 1934, p. 59.

The Transit Committee is charged with the technical examination of the communications system, of importance to the League at times of emergency, but subsidiary to this there is the more economic study of air navigation which is undertaken by a special Air Transport Co-operation Committee, working under the direction of the Transit Section. (13) This latter committee, after analysis of the situation, announced that considering the present state of legislation, and of economic and political conditions under which civil aeronautics are developing, it will be difficult to reach a more fully developed measure of co-operation, and recommended the Governments and companies to extend and improve the present system by means of bilateral or multilateral agreements, aimed to avoid unnecessary competition and to increase the economic efficiency of the international air service. (14)

The brief review which has been given of the relation between civil and military aviation will be sufficient to show that to-day the two are very definitely intermingled. To what extent each nation will be able to separate the growth of the two air branches will depend on the political situation in Europe. In December, 1934, the British Government announced that the civil aviation vote would no longer be considered jointly with military expenditure and that the Director of Civil Aviation would thereafter be Director-General but would not

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(13) L. C. Tombs op. cit. p. 184.

(14) Ibid, p. 187.

become a member of the Air Council. (15) This, though, is not the general custom in Europe; Russia for instance adopts the policy that civil aviation is a military reserve, all such organizations being closely linked with the military air forces. (16) Germany's extensive development of civil air transport has enabled her to attain the rank of a first class Air Power, since her military machines are, for the most part, adapted from civil types, and her commercial air fleet is considered as a ready reserve for war. (17) The attitude towards aerial development depends, too, on the relative importance of aircraft construction in each country. Great Britain, France, Italy, Germany and the United States are in direct competition for the markets of all the industrial countries of Europe, South America and Asia. Foreign sales of planes and engines, both military and commercial, are valuable in defraying the cost of maintaining their aircraft industries ready for war production. Control of the international air routes is thus of importance to the European Powers in order that they may secure the fastest possible transport systems, as a basis for increasing their foreign trade generally, and as an important outlet for the sale of their aeronautical products. However, the establishment of international airways is still dependent on the policy of State Sovereignty. While the very existence of European air transport depends on direct and indirect Govern-

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(15) The London Times, December 21, 1934.

(16) The Aircraft Year Book for 1934, p. 233.

(17) Brig.-Gen. Groves in the "Observer", London, February 9th, 1936.

mental subsidies, and until provisions are made for the international control of both civil and military aviation, there will not be any significant progress towards the further co-ordination of the various national air transport companies in Europe. "Lacking such international organization, the air peril will continue to disturb, or even terrify, the nations, and air transport itself will not have attained that degres of freedom which alone will enable it to serve Europe and the World." (18) A final consideration to be noted is that nations are apt to over-emphasize the point of view that all civil aviation is necessarily a product of war preparation; some degree of aviation transport is an essential part of the natural transportation equipment of any advanced country.

It is evident that civil aviation, when subjected to an economic and military analysis, must be considered as at least the foundation for air power in war, if for no other reason than that the wastage in time of war is so high that adequate reserves could not be kept on hand. It would seem, at least, that Great Britain is acting upon this theory and no longer intends to lag behind other leading States in any coefficient of aerial strength, civil or military.

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(18) L. C. Tombs, op. cit. p. 204.

CHAPTER EIGHT

THE FUTURE

Transportation as an economic function is passing through a transitional stage in most countries of the world to-day; adjustments are necessitated by new forms of competition, and in many cases by financial requirements. The newest form of transport, some aspects of which have been under review in this thesis, is yet in process of discovering its relative utility and scope. That it is destined to become in the future the most essential factor in organized communications seems certain, but the form in which it will appear, the method which will be adopted, and the time taken before this is accomplished, all these are uncertain. Historical retrospect indicates that in all probability commercial aviation will assume a position relative to armed air forces similar to that attained by the mercantile marine in relation to the navies of the world.

To the layman, to the travelling public and to the prospective shipper, the most important feature of aviation and its future is the question of safety. The percentage of people in the world who may be said to have complete confidence in air transport is, unfortunately, very small. Aeronautical engineers are aware that upon progressive improvement in design and construction depends aviation's chances for successfully competing with rail, highway and marine transportation. Criticism has been levelled at the press for the exaggeration and publicity which is given to air disasters: although this may be a true accusation, it is, nevertheless, justifiable from the point of

view of the inherent news value these events have for the newspapers, nor can it be proven that greater emphasis is laid upon air accidents than on those occurring in other transportation operations. The real root of such detrimental effect as the press accounts have on air development lies in the lack of differentiation made in newspaper articles between accidents which happen on regular scheduled lines, and those on private or experimental flights. Also, the causes of accidents are not given sufficient attention in many of the journalistic articles which appear at the present time. There is an urgent need for the public to have full statistics on all phases of aeroplane crashes if the prevalent scepticism regarding the reliability of aviation is to be eradicated. It is only by a thorough and continuous study of data compiled on the subject of safety in the air that one can be made to realize the amazing degree of efficiency which has already been attained, and which is steadily being increased.

The record of the United Kingdom, and particularly of Imperial Airways, is proof enough that accidents to civil aircraft are becoming more and more the exception rather than the rule. During 1934 no accident requiring notification under the Air Navigation Regulations occurred to any aircraft belonging to Imperial Airways, in connection with the subsidized regular service, and there were only two fatal accidents on unsubsidized regular services. (1) Complete figures for all accidents to civil aircraft in the United Kingdom for the year are given below:-

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(1) Report on the Progress of Civil Aviation, 1934, p. 89.

	Major	Minor	Total
1. Subsidized Regular Services	-	-	-
2. Unsubsidized Regular Services	2 (2#)	4 (1ø)	6
3. Other flying for hire	3 (2#)	10	13
4. Subsidized Club flying	7 (5#)	5	12
5. Unsubsidized Club and School flying	4 (3#)	9 (2ø)	13
6. Private flying	11 (8#)	33	44
7. Racing and Exhibition flying	2 (2#)	-	2
8. Aircraft Tests and Trials	-	-	-
	29 (22#)	61(3ø)	90

Total crashes. ø Minor crashes involving third party casualty.

These figures are considerably higher than those of 1933 or any previous year, due mainly to the number of accidents in private flying. Of the total number about 50% were caused solely by errors of judgment or faulty airmanship. Engine failure caused twelve minor and two serious accidents, and there were four cases of structural failure in flight all with fatal consequences. Emphasis is laid upon the fact that no disasters were caused by fire in the air. (2) Bad visibility and other weather conditions accounted for three fatal accidents. The order of importance of engine defects has been given as follows: "mechanical breakages, defective water circulation, defective lubrication, poor carburetion and defective ignition. Valves and valve operating rockers and push rods, head the list of mechanical breakages. Piston breakage comes next. Connecting rod and crankshaft breakage is now rare and can generally

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(2) Ibid p. 90.

be attributed to lubrication defects." (3) These contingencies are greater in number and more frequent in occurrence than those in other transport units but comparison between fatality risks in the various systems of travel indicate that the efficiently operated airlines are reducing the risk involved in air transportation to a point which will compare favourably with the risk involved in operating individual passenger automobiles. The largest air mail carrier of the United States, for instance, averaged 17,225,921 passenger miles during the year 1932 for each passenger fatality, compared with 20,840,000 passenger miles to each passenger fatality in ordinary automobile transportation.(4) However, much lower percentages are evident if total flying operations are taken in the United States, and further elimination of operational risk will be necessary before American air transport becomes generally adopted by the public. Some of the figures given show this need:-

	January-June 1933
Miles flown in scheduled transport operations	25,862,120
Miles flown in miscellaneous operations	32,748,485
Total	58,610,605
Accidents all services	813
Miles flown per accident, all services	72,091
Accidents, scheduled transport operations	48
Miles flown per accident, scheduled operations	538,794

(3) Victor Page Op.cit. p. 587.

(4) Paul T. David, Op. cit. p. 175.

	January-June 1933
Accidents, miscellaneous operations	765
Miles flown per accident, miscellaneous operations	42,808
Fatal accidents, all services	85
Miles flown per fatal accident, all services	689,536
Fatal accidents, scheduled operations	5
Miles flown per fatal accident, scheduled operations	5,172,424
Fatal accidents, miscellaneous operations	80
Miles flown per fatal accident, miscellaneous operations	409,356 (5)

Two factors will tend to diminish flying risks in the future: these are, first, the rigid investigations now undertaken by State authorities into the causes of accidents to aircraft and, secondly, the scientific and aeronautical research now being carried out, as for instance by the Air Ministry in the United Kingdom. One example of recent work in this connection is the use now being made of a special heavy type of oil which lessens even more the risk of fire. Imperial Airways have therefore, now installed smoking compartments in their newer planes, and in addition are beginning to benefit from the use of such oil on account of its low cost. Also there has been continual development in methods for increasing the power output of petrol engines and it is expected that the petrol engine will rival the heavy oil engine in economy of fuel consumption. (6)

One form of instruction about which the Governments of the Empire have reported very little is that of autogiros and helicopters, but again, as in the case of the aeroplane, the problems

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(5) The Aircraft Year Book for 1934, p. 434.

(6) Report on the Progress of Civil Aviation, 1934, p. 40.

concerned with the design and mechanics of this type of machine will take time to develop and for a solution to be reached. A leading American Aeronautical Engineer has said "there is no question today that sooner or later a workable helicopter will be built and that it is merely a matter of design, additional information and perhaps a leaven of mechanical genius that are necessary to solve the problem." (6a) An autogiro has a fuselage with engine and propeller similar to ordinary aeroplanes, but instead of fixed wings it has a four-bladed air screw, supported on a mast above and in front of the pilot, by which it is sustained in flight. This screw is not driven by the engine but rotates by the pressure of the air slipstream of the propeller. To date the machine has not shown as good climbing power or as high a top speed as an aeroplane fitted with the same engine. The principles behind the helicopter are somewhat different. It is sustained in flight by a lifting propeller, made to rotate by an engine, and it has the advantage of almost a vertical ascent. In this it supercedes the autogiro which needs a few yards of runway for rising and for alighting, even though it can descend at a steep angle to the vertical. The main difficulty yet to be overcome with the helicopter is that since its ability to stay in the air depends entirely upon the power of the engine, if this should break down the machine must necessarily fall. Yet transportation authorities throughout the world agree that there is a definite place for this type of vehicle in the transport system, particularly in short internal routes. So far, the advance made in the

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(6a) Victor Page, Op. cit. p. 678.

solution of these problems is not disclosed, but it is known that considerable research is being done and that there is a definite future for helicopters. It is too early yet to forecast the revolutionary changes which may be brought about by progress in stratosphere research upon which scientists have now embarked.

Allied with the study being made into the construction and equipment of all types of aeroplanes there is also considerable activity in analysing the economic usefulness of airships and it is justifiable to prophesy that the near future will see further utilization of lighter-than-air machines. Any comparison between aeroplanes and airships for our purpose must rest on the performance of each per unit cost, and therefore consideration must be given to the relative aerodynamic efficiency, size and comfort of the two types of aircraft, and also to their comparative ranges of operation and their speeds. Regarding aerodynamic effeciency, conclusions have been reached which were based on (a) the initial percentage of useful load, (b) the initial cost per unit of gross weight, (c) relative operating costs, (d) insurance and safety, and (e) the rate of depreciation. Results indicate that the airship will be used whenever possible for carrying passengers in comfort, but opposed to this there is the difficulty of insufficient loads in airships. Lighter-than-air craft will continue to be a longer range vessel than the aeroplane, dependent on variations in the volume of traffic available. Although the cost of transportation per ton-mile is greater by aeroplane than by airship, this will not limit the use of the former within its own field, the comparative scope of heavier-

than-air and lighter-than-air machines being similar to the relation between rail and water transportation. As regards fuel consumption it is estimated that an airship of 150 ton capacity travelling at 70 m.p.h. requires only one quarter the fuel per ton mile, and at 105 m.p.h. only one half the fuel per ton mile, that is needed to propel one ton of airplane through one mile at either speed. (7)

One of the main qualifications of the airship for its future importance in aerial navigation is its superiority over the aeroplane from the angle of safety, although the misfortunes of Great Britain and the United States with dirigibles would seem to bely this assertion. The question of construction does still present a major problem, but when this is successfully overcome, as has been done by Germany, actual operational risks are very much less in the airship than in other forms of aircraft, chiefly because of its ability to land at low velocity and, in most cases, not to land but to stop at a mooring mast. Then again engine stoppage is one of the most frequent causes of accidents to aircraft, either through mechanical breakages or through lack of fuel; in an airship the power plant is divided into three or more units and partial breakdowns have very little effect on the progress of the ship, while, in fact, a complete cessation of motive power does not necessarily mean a crash, as an airship can remain in the air and "free balloon" for approximately 24 hours.

In view of the foregoing statements it would seem that airships should have been more prominent in the past and ought in the future to play a more important part in air transport,

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(7) Victor Page, op. cit. Data compiled from pp 43-50.

but it is because of the depreciation and cost factors, primarily, that there has been so little development of this phase of modern aviation. Aeroplanes can be bought for less that $2,000 per ton for lightweight machines, $5,000 and under per ton for ordinary wood and fabric or composite construction, and approximately $8,000 per ton for all-metal planes. Airships cost about $10,000 per ton for small non-rigid constructions and up to $20,000 per ton for semi-rigid and rigid types, all the foregoing figures, including the cost of power plants. Actual inflation of an airship alone may cost anything up to $100,000 if helium is used.

From the military point of view a comparison has been made between the approximate estimate of money invested by the United States in airships, plant and equipment during the fifteen year period 1920-1935, and the amount spent by Great Britain during the same period on one particular aircraft carrier. The United States itemised statement for expenditure given below is little more than half the sum spent by Great Britain, and is also considerably less than the cost of a single first-line battleship:

(approximate round figures)

Naval Air Station, Lakehurst	$10,000,000
Naval Air Station, Moffet Field, Cal.	5,000,000
U.S.S. Akron	4,000,000
U.S.S. Macon	4,000,000
U.S.S. Shenandoah	2,500,000
U.S.S. R. 38	1,500,000
Airship Equipment on U.S.S. Patoka	500,000
Mooring Masts (5)	150,000
	$27,650,000 (7a)

This represents an average yearly expenditure of about

(7a) Aeroplane, February 13, 1935, p. 177.

$1,845,000 for which training has been given to officers and men and experience to designers and engineers, not to speak of permanent facilities for expansion when the time comes. The airship disasters of the United States are not considered by experts to portend the failure of lighter-than-air construction.

The probable future of airships will depend on the success of Germany's Graf Zeppelin and the Hindenburg. The former completed its seventh consecutive year in September, 1935. It has flown round the world, to the Artic, and across the North and South Atlantic, the latter on regular schedules; since April 1934 it has made monthly and later fortnightly trips between Germany and Rio de Janeiro. (8) A joint Congressional Investigation in the United States maintained that a properly organized commercial airship can operate at two cents per passenger mile between New York and Buenos Aires. (9) These facts regarding oceanic air travel have been responsible for the plans of the German Government to experiment on the North Atlantic in the Summer of 1936.

Transatlantic air crossings in general are of the utmost importance at the present time, and in the immediate future great strides in this connection are expected. The Atlantic is the last great service which Imperial Airways has pledged itself to operate, and plans which have been worked on for many years were partially divulged at an air mail conference of British, Canadian, Newfoundland and Irish Free State delegates held at

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(8) Aircraft Year Book for 1934, p. 180.

(9) Literary Digest, April 7, 1934, p. 50.

Ottawa in November, 1935. (10) This Conference was followed by discussion with American representatives at Washington, and the outcome of the meetings was an agreement based on obvious and inevitable co-operation between Pan-American Airways and Imperial Airways, Ltd. The routes which had been studied were Newfoundland-Ireland, New York-Bermuda-Azores-England, and Canada-Greenland Iceland-Faroes Islands and England. (11) It was agreed to start survey flights on the first named, and also on the Bermuda-Azores route, in the summer of 1936, with experimental services to begin shortly after; actual scheduled operations are not expected to start until 1937 at the earliest, while at the Washington Conference it was agreed that Imperial Airways should have the Westbound mail contract and Pan American the Eastbound contract, and also that the British Government should maintain a floating radio beacon 600 miles west of Ireland and the United States one about 600 miles off Newfoundland. (12) Possibilities regarding terminals and the like on the route from Newfoundland to England have not yet been worked out since the whole matter of the carriage of mails has not yet been definitely decided, the understandings relating chiefly to landing rights for British planes in the United States and vice versa. (13) In the British Air Estimates for 1936 appropriations are made to Imperial Airways of £20,000 for the experimental flights, and £75,000 towards the cost of constructing flying boats. The Air Base at Bermuda is to be ready in the summer of 1936, and the annual subsidy to Imperial

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(10) Aeroplane, November 27, 1935, p. 669
(11) Ibid, December 4, 1935 p. 696
(12) Ibid, December 11, 1935, p. 726
(13) Ibid, December 18, 1935, p. 756.

Airways for the operation of Bermuda-New York service in co-operation with Pan American Airways is to be £18,000, one fifth of which will be contributed by the Government of Bermuda.(14) Details of the projected Atlantic services are, however, not known to the public as yet; in Canada particularly very few authentic reports have been issued. A Canadian aviation official has said that "probably on no subject of current importance is the public mind so vague. Conspicuous by its absence has been anything in the nature of an official statement to the public of this country by the Federal Authorities concerned." (15) The reasons for this are, of course, understandable: Canada's National policy is so indefinite that there is no organization with which to deal regarding the operations under discussion. Until the Dominion has a trunk service to link up with the inter-colonial services, the full benefit of Atlantic Air Mail routes cannot be realized.

This lack of preparedness on the part of one State to participate in international and intercontinental airways must be overcome in the near future if air transport is to expand along natural lines. Some form of denationalization will be necessary in the air development of countries participating in any general scheme such as the Transatlantic plans. As was necessary in European aerial navigation, a technical uniformity of equipment - in aircraft, engines, instruments and ground organization - is the most urgent requisite in Empire communica-

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(14) Aeroplane, March 11, 1935, p. 313.

(15) Canadian Aviation, February 1936, p. 4.

tions. It was shown in the preceding chapter that in the discussions of aerial disarmament at Geneva nearly all the Governments represented concluded that either international ownership or international control was a necessary preliminary to the abolition of air armaments. An elaboration of this proposal has been put forward in Mr. Jonathan Griffin's book "World airways - why not?", and although the scheme is somewhat impractical in its entirety, it contains the germ of a policy which might be adapted to the British Empire's air activity.

Mr. Griffin's plan is to vest in an international company the ownership of all civic aircraft and aerodromes, together with spare parts and airway equipment. The company's directors would be responsible to a special international representative body, composed of the Ministers of Communications - either transport or mail - of the participating countries. The company would itself control a system of main or primary air lines and would provide a complete system of airways for Europe and adjacent countries, fully equipped for regular mail and transport services, night and day, under all climatic conditions. The actual lines would not all be operated by the central body, but decentralisation would be secured through a system of secondary regional air lines, to be operated by approved companies hiring the necessary material from the controlling organization. The Directors of these secondary companies would be of several nationalities, and the company would be given sufficient powers to co-ordinate all services and to appoint a proportion of the Directors. This would necessitate the very difficult duty of allocating orders

for materials and employment and, of course, the staff would have to be international, with a definite proportional percentage being drawn from each nation. (16)

Although a limited degree of international control might be applied to civil flying in Europe or elsewhere, the existence of nationalism and strict adherence to the principle of State Sovereignty in the air somewhat militate against effective adoption of the scheme just outlined. With modifications, however, this policy might be feasible in the British Empire, provided the North Atlantic services are in operation. The main objection to the scheme on a European basis is that free commercial competition is necessary between rival national and international air lines, as well as between the inventors, designers, and manufacturers in different countries. This difficulty would be relatively unimportant in an Empire company, which would still meet with competition from the great air transport-operating countries. Nor is there a very valid argument against the plan on the question of monopoly, as all companies within the Empire would be eligible for the establishment of secondary regional companies. With the Empire Air Scheme in operation, overhead expenses, uniformity of mail handling, and general administration would all be improved.

To turn to more specific prospects for the future in regard to State control, the most significant feature will be the growth of internal airways in the United Kingdom. A survey of Great Britain has been undertaken by the Aerodrome Advisory

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(16) The Problem of the Air Op. cit. p. 24.

Board and by the Air Ministry "to consider and report upon measures for the development of Civil Aviation in the United Kingdom" (17) One of the main reasons for this move is to prevent the municipalities doing nothing in the way of airport development or the alternative, namely competing uneconomically. The Report which is soon to be published will probably recommend the establishment of a few main arterial routes. It is likely that a mileage of 2,000 would constitute the maximum that as small a country could maintain. The Federation of British Industries and the Associated Chambers of Commerce are taking an increasingly active part in aviation matters on behalf of industrial and commercial interests, and this impetus, coupled with the activities of the Post Office Department, will certainly bring results in the way of new air services. The Postmaster General has stated that a full year tonnage of internal air mails in excess of the total Imperial and foreign air despatches can soon be expected. (18) The justification for further Governmental grants to Civil Aviation is based in some quarters on the fact that a large outlay would repay aviation for the cost of the tax on petrol which it has been paying for several years. In 1934 this tax came to about £45,000, and the sum will increase every year. That amount, considered as the annual sinking fund and interest on a 20 years' loan at 3½%, represents a capital sum of approximately £650,000. Since most Governments have considered aviation as an infant industry, whose development was

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(17) Aeroplane, March 11, 1936, p. 313.

(18) Ibid, February 13,1935, p. 192.

vital to the country, it is contended that Civil Aviation should never have been taxed on the same basis as road transport, a healthy industry.

Throughout the Empire there are other requirements as necessary as financial assistance, namely technical knowledge and experience. Aeronautical engineers and pilots are at a premium and experts in traffic and accountancy methods are in great demand. Government departments and financial houses which are considering the investment value of air services, are realizing more and more that the details involved in aerial transportation necessitate long training, and that it is essential for experienced airway executives rather than financiers to control the industry. For this reason there will be in the future a tendency to mergers, absorptions and re-organizations, and individual enterprise will tend to decline in favour of the formation of large companies. Due to the magnitude of the task accompanying complete establishment of an air system, Governments will for many years be called upon for subventions and support; ultimately, however, State control, but not State assistance, will be withdrawn, and civil aviation will be forced, and will succeed, to "fly by itself".

In the constitutent nations of the British Commonwealth, expansion will be along the lines of feeder and trunk routes, with an inevitable disequilibrium for many years between aerial and other transport units. Firstly there will be a period when these new services will operate exclusively in territory where no other form of transport exists, as in parts of Canada at

present, but eventually encroachment on the domain of established rail, water and highway transportation will begin. Gradually, each unit will adjust itself to a new quota of passengers and freight traffic; then and only then, will the final solution of transportation problems be attained.

APPENDIX A

Regular Air Transport Services of the Empire as at December 31, 1934

	Miles Flown	Passengers	Mails (Tons)	Goods (Tons)
United Kingdom	4,560,000	135,100	251.00	1,172.00
Canada	5,169,550	103,531	279.04	6,446.00
Australia	1,312,503	13,379	20.00	64.55
South Africa	314,952	1,852	7.46	33.46
South-West Africa	85,005	135	2.50	1.97
India	346,771	757	21.33	9.87
Southern Rhodesia	264,785	1,925	0.68	3.06
Kenya	195,850	1,158	3.78	0.49 (1)

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(1) Compiled from pp. 138, 139, Report on the Progress of Civil Aviation, 1934.

APPENDIX B

Summary of Regular Air Services in the British Empire.

Miles of Routes in operation during 1934 as compared with 1933.

	1933	1934
United Kingdom	11,670	13,750
Canada	4,920	5,030
Australia (including New Guinea)	7,380	12,050
Union of South Africa	1,180	1,180
South West Africa	780	780
India	4,980	6,820
Southern Rhodesia	690	1,200
Fiji	600	-
Kenya	470	550
	32,670	41,360

Light Aeroplane Clubs

	Govt. Assisted		No Assistance		Total	
	1933	1934	1933	1934	1933	1934
United Kingdom	18	30	42	33	60	63
Canada	23	22	4	2	27	24
Australia	6	6	1	2	7	8
New Zealand	17	17	10	1	27	18
Union of South Africa	-	-	3	2	3	2
Irish Free State	-	-	1	2	1	2
India	7	7	4	1	11	8
Kenya	1	1	-	-	1	1
Federated Malay States	1	1	-	-	1	1
Straits Settlements	1	2	-	-	1	2
	74	86	65	43	139	129

(2)

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(2) Air Annual of the British Empire, 1935-36, p. 80.

APPENDIX C

IMPERIAL AIRWAYS

Traffic Statistics of European Services, including London-Egypt.

Period	Aircraft Miles	Pass. Miles	Ton Miles Goods Freight	Goods Mails	Pass.	Total	Av. Local (Tons)
1934 Total	760,300	10,375,000	134,300	7,800	926,000	1,068,400	1.4
London-Egypt							
1934	220,800	3,235,000	76,900	188,900	318,400	584,200	2.7
Egypt-India-Singapore							
1934	671,300	2,912,000	63,400	274,900	286,600	624,900	.9
Egypt-South Africa							
1934	658,900	5,889,000	103,900	191,400	579,600	874,900	1.3
Regular Routes							
1934	2,315,100	22,411,000	378,500	663,000	2,110,900	3,152,400	1.4

(3)

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(3) Ibid p. 59

APPENDIX D

Scheduled Air Services to and from India

Air Mails to India

	Imperial Airways To India lb.	Transit Mails	K.L.M. From Europe lb.	K.L.M. From the East lb.	Air France From the East lb.	Air France From the East lb.	Total lb.
1929 9 months	21,967	16	-	-	-	-	21,983
1930 "	39,364	359	96	-	-	-	39,819
1931 "	45,632	840	1,047	no record	318	no record	47,837
1932 "	45,111	1,766	3,216	1,366	458	79	51,996
1933 "	55,195	4,128	4,731	1,319	834	268	66,475
1934							
March Quarter	14,875	3,064	1,234	849	225	138	20,385
June "	14,431	3,498	1,084	899	237	144	20,293
Sept. "	15,593	4,291	1,169	1,137	221	146	22,917
Dec. "	20,536	8,485	1,490	1,569	253	160	32,493
Total for 1934	65,795	19,338	4,977	4,454	936	588	96,088

Air Mails from India

	From India	Trans. Mails	To the East	To the East	Total
1929 9 months	20,171	485	-	-	20,656
1930 "	34,015	2,561	-	-	36,576
1931 "	40,474	2,592	-	-	43,066
1932 "	42,407	4,299	117	14	46,837
1933 "	54,178	5,976	1,460	424	62,038
1934					
March Quarter	16,118	3,048	132	95	19,393
June "	15,086	3,354	108	123	18,671
Sept. "	16,925	3,774	123	225	21,047
Dec. "	18,624	6,538	112	251	25,525
Total for 1934	66,753	16,714	475	694	84,626 (4)

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(4) Ibid, p. 78

APPENDIX E

Statement of Weight of Mail Carried over Canadian Air Routes in operation during Calendar Year 1934.

Service	Weight lbs.
Amos-Siscoe	33,674
Atlin-Telegraph Creek	1,309
Cameron Bay- Coppermine	2,915
Kenora-Red Lake	6,394
Sioux Lookout-Red Lake	1,701
Sioux Lookout-Casummit Lake	2,861
Winnipeg-Diana	10,340
Charlottetown-Magdalen Islands	13,154
Fort Chipewyan- Fond du Lac	837
Fort McMurray- Aklavik	60,551
Fort Resolution-Cameron Bay-Camsell River	15,171
Havre St. Pierre-Port Menier	5,754
Lac du Bonnet - Bissett	56,579
Leamington-Pelee Island	16,537
Moncton-Charlottetown	132,885
Montreal - Albany	58,131
Montreal - Rimouski	31,547
Peace River - North Vermilion	11,943
Prince Albert- Ile a la Crosse	12,953
Prince Albert - Lac la Rouge	7,191
Quebec - Sept. Iles	35,620 (5)

(5) Air Ministry - Reserve of Commercial Information, Series No. 6, No. 1 - January-March, 1935.

APPENDIX F

Regular Air Services

Route Mileage and Miles Flown throughout the World.

	Route Mileage (approx)	Miles Flown (Partly estimated)
1919	3,200	1,022,000
1920	9,700	2,969,000
1921	12,400	5,831,000
1922	16,000	5,666,000
1923	16,100	6,570,000
1924	20,300	8,764,000
1925	34,000	13,011,000
1926	47,500	16,824,000
1927	54,700	22,242,000
1928	90,700	34,005,000
1929	125,800	53,379,000
1930	156,800	69,505,000
1931	185,000	83,500,000
1932	190,200	90,372,000
1933	200,300	100,580,000
1934	223,100	103,432,000 (6)

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(6) Report on Progress of Civil Aviation, 1934, p. 137.

APPENDIX G

Unsubsidized Services in Great Britain as at June 7th, 1935.

Aberdeen Airways Ltd. Aberdeen-Glasgow; Aberdeen-Wick-Thurso-Kirkwall; Aberdeen-Newcastle-Hull-London.

Atlantic Coast Air Services Ltd. Cardiff-Barnstaple-Lundy Is.

Blackpool and West Coast Air Services Ltd. Manchester-Blackpool-Isle of Man; Liverpool-Blackpool-Isle of Man; Liverpool-Isle of Man; Liverpool-Isle of Man-Belfast-Campbeltown; Liverpool-Isle of Man-Carlisle; Liverpool-Manchester.

Cobham Air Routes, Ltd. Croydon-Portsmouth-Bournemouth-Guernsey.

Commercial Air Hire Ltd. Croydon-Heston.

Crilly Airways, Ltd. Bristol-Leicester-Norwich; Nottingham-Leicester-Northampton; Leicester-Skegness; Nottingham-Skegness.

Guernsey Airways Ltd. Jersey-Guernsey.

Highland Airways Ltd. Inverness-Wick-Kirkwall; Aberdeen-Wick-Kirkwall.

Hillman's Airways Ltd. Essex Air Port-Paris; Essex-Liverpool-Belfast-Glasgow; Essex-Thanet-Ostend; Essex-Brussels-Ostend; Hull-Manchester-Liverpool.

Jersey Airways Ltd. Heston-Jersey; Westhampton-Jersey.

North Eastern Airways Ltd. Heston-Leeds-Newcastle-Edinburgh.

Northern and Scottish Airways Ltd. Glasgow-Campbeltown-Islay; Glasgow-Isle of Man.

Portsmouth, Southern and Isle of Wight Aviation, Ltd. Portsmouth-Ryde; Heston-Ryde-Shanklin-Bournemouth; Southampton-Ryde-Shanklin; Portsmouth-Shanklin; Brighton-Ryde-Shanklin.

Provincial Airways Ltd. Croydon-Southampton-Plymouth-Newquay; Hull-Nottingham-Leicester-Southampton-Plymouth.

Railway Air Services Ltd. Croydon-Birmingham-Manchester-Liverpool-Belfast-Glasgow; Manchester-Liverpool-Blackpool-Isle of Man; Nottingham-Birmingham-Cardiff-Banbury-Plymouth; Liverpool-Birmingham-Bristol-Southampton-Portsmouth-Brighton; Southampton-Cowes-Sandown.

Southend-on-Sea Flying Services Ltd. Southend-Rochester.

Spartan Air Lines, Ltd. Heston-Bonbridge-Cowes; Heston-Sandown.

United Airways, Ltd. Heston-Blackpool-Isle of Man-Carlisle.

Western Airways, Ltd. Cardiff-Bristol; Bristol-Bournemouth.(7)

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(7) Supplied by the Air Ministry, London.

BIBLIOGRAPHY

A. Books

Brittain, Sir Harry, K.B.E. By Air. Hutchison, London.

Bryan, Leslie A. Aerial Transportation, The Anderson Press, Winfield, Kansas, 1925.

David, Paul T. The Economics of Air Mail Transportation. The Brookings Institution, 1934.

Dodd, Paul A. Financial Policies in the Aviation Industry, University of Pennsylvania Thesis, Philadelphia 1933.

Frankel, S.H. The Railway Policy of South Africa, Hortors,Ltd. Johannesburg, 1928.

Grey, C.G. (Editor) Jane's All the World Aircraft, 1935

Groves, Brig. Gen. P.R.C. Behind the Smoke Screen. Faber and Faber, Ltd., London, 1933.

Leacock, Stephen, The Economic Aspect of Aviation. Printed for the Royal Society of Canada.

Nayler, J.L. and Ower, E. Aviation of to-day. Frederick Warne and Co. Ltd., London and New York, 1930.

Nelles, J.G. The Economic and Commercial Aspects of Aviation in Canada. McGill University Thesis, 1932.

Page, Victor. Modern Aircraft. Norman W. Henley Publishing Co,. New York, 1928.

Rollit, J.B. Transportation as a National Problem, McGill University Thesis, 1934.

Salt, A.E.W. Imperial Air Routes, John Murray, London, 1930.

Tombs, L.C. International Organization in European Air Transport, Columbia University Press, 1936.

B Year Books

Air Annual of the British Empire, 1935-1936. Sir Isaac Pitman and Son Ltd., London and Toronto, 1936.

Aircraft Year Book for 1934, The. Published by the Aeronautical Chamber of Commerce of America, Inc.

Australia, Official Year Book of the Commonwealth of, No. 16, 1923; No. 27, 1934. Commonwealth Bureau of Census and Statistics, Canberra.

Canada Year Book, The. 1934-35. Dominion Bureau of Statistics, Ottawa.

Indian Year Book, The. 1928, 1932, 1934-35, 1935-36. Published by Bennett, Coleman and Co. Ltd., Bombay and Calcutta.

New Zealand Official Year Book, 1935. Census and Statistics Office of the Dominion of New Zealand.

South Africa, Official Year Book of the Union of. No. 16, 1933-34. Union Office of Census and Statistics.

C Booklets

Air Ministry, United Kingdom. Report on the Progress of Civil Aviation, 1934. H.M. Stationery Office, 1935.

Burchall, Lt. Col. H. Organization of Air Routes. Imperial Airways, 1934.

Humphery, G. E. Woods. British Air Mails. Times Publishing Co. Ltd., London, 1934.
Imperial Airways, Yesterday, To-day and Tomorrow Imperial Airways, 1934. The Political Aspects of the Operation of International Air Routes. Imperial Airways, 1934.

Imperial Airways Ltd. The Speed of British Commercial Aircraft, 1934.

League of Nations Union, The. London. The Problem of the Air, 1935

Report on Civil Aviation in Australia, 1933, 1934. Issued by the Controller of Civil Aviation.

Report of the Air Board, 1920, 1921, 1922. Department of National Defence, Canada.

Report on Civil Aviation, 1923, 1924, 1926, 1927, 1928 (unpublished), 1934, 1935. Dept. of Nat. Def., Canada.

Transport and Communication Bulletin, No. 25. Commonwealth Government Printer, Canberra, 1935.

United States Department of Commerce. Civil Aeronautics in the United States. Aeronautics Bulletin No. 1 U.S. Government Printing Office, Washington, 1935.

D. PERIODICALS

Aeroplane, The. (Weekly) Edited by C.G.Grey. Various issues, 1930-1936. Temple Press, Ltd., London.

Aviation (monthly) August, November, 1934. McGraw-Hill Publishing Co. Inc., New York.

Canadian Aviation. (monthly) Published by the Canadian Flying Clubs Association, Ottawa.

Engineering Journal, The (monthly) February, 1935. The Engineering Institute of Canada, Montreal.

Flight. (Weekly) Various issues, 1919-1936. Official Organ of the Royal Aero Club of the United Kingdom.

Fortune. (Monthly) April,1936. New York.

Imperial Airways Gazette. (Monthly) February, March, 1935.

Interdependence, Vol. 12, Nos. 2, 3, 1935. Quarterly Journal of the League of Nations Society in Canada.

Literary Digest, The. (Weekly) June 9, 1934. New York.

South African Journal of Economics, June 1933. Quarterly Journal of the Economic Society of South Africa.

South African Railways and Harbours Magazine. (Monthly), November, December, 1935.

E. NEWSPAPERS

Cape Argus, Capetown, May 24th, 1935.

Johannesburg Star, December 28th, 1911.

London Times, December 21st, 1934.

Montreal Star, January 31st, 1936.

New York Times, February 10th, 1934.

Observer, London, February 9th, 1936.

Statesman, Delhi, August 28th, 1934.

F. MISCELLANEOUS

Annual Report of the Executive Secretary of the Canadian Flying Clubs Association, 1935.

British Air Ministry. Resume of Commercial Information, Series 6, No. 1, No. 2, 1935.

Indian Aircraft Rules, 1920. Government of India.

Indian Liaison Letter, No. 64, July to December, 1934. Government of India.

Information Bulletin, International Air Traffic Association, No. 21. The Hague.

Letters from:

Acting Premier of Tasmania.

Deputy Director of Civil Aviation in India.

Deputy Director of Civil Aviation, United Kingdom.

Director of Civil Aviation, South Africa.

Ministry for Industry and Commerce, Irish Free State.

Report of Conference of Commonwealth and State Ministers, Melbourne, 1934. Commonwealth Government Printer, Canberra.

Statutory Rules. 1921, No. 33; 1927, No. 118. Australian Ministry of State for Defence.

Statutes of Canada, 1919. Chapter 11. King's Printer, Ottawa.

White Paper. Cmd. No. 1811, February 23rd, 1923. Great Britain.

IMPERIAL AIRWAYS' AND OTHER IMPERIAL AIR ROUTES 1934

ENGLAND – INDIA – AUSTRALIA

COUNTRIES SERVED		TIME TAKEN FROM LONDON BY AIR	APPROXIMATE TIME SAVED OVER OTHER TRANSPORT	APPROXIMATE DISTANCE FROM LONDON BY AIR (miles)
		days	days	
EGYPT	Alexandria	2½	2	2.308
PALESTINE	Gaza	2¾	2	2.584
SYRIA	*Haifa*		2 - 4	
	Jerusalem		2 - 4	
	Beirut		1 - 2	
IRAQ	Baghdad	3½	3½	3.187
	Basra	3¾	3 - 4	3.465
PERSIA	*Bushire*		1 - 4	
BAHREIN	Bahrein	4½	5 - 9	3.805
INDIA	Karachi	5¼	10¼	4.880
	Bombay	5½	8	5.380
	Calcutta	6½	9½	6.386
	Delhi	5¾	11¾	5.356
	Madras	5¾	9	6.200
	Rangoon	7	12	7.041
CEYLON	*Colombo*		7 - 8	
STRAITS SETTLEMENTS AND MALAY STATES	Singapore	8½	13½	8.393
NORTH BORNEO			9 - 10	
BRUNEI AND SARAWAK				
HONG KONG (Via Singapore)			5 - 18	
CHINA (Via Singapore)			5 - 18 for Canton	
PHILLIPINE ISLANDS			4 - 16	
SIAM	Bangkok	7½	16	7.405
NETHERLANDS EAST INDIES	Batavia	9	13	8.983
AUSTRALIA	Brisbane	12½	20	12.754
	Melbourne	13	17	13.219
	Sydney	13	18	13.129
	Perth	13	13	13.149
	Adelaide	14	15	13.489
	Hobart	14	19	13.584
NEW ZEALAND	*Auckland Wellington*		12 - 23	
FIJI ISLANDS *NEW CALEDONIA* *NEW GUINEA* *PAPUA* *SOLOMON ISLANDS*				

The time taken and saved depends on the steamship sailings from Australia

NOTE: The places printed in italics are not directly served by air.

ENGLAND – SOUTH AFRICA

COUNTRIES SERVED		TIME TAKEN FROM LONDON BY AIR	APPROXIMATE TIME SAVED OVER OTHER TRANSPORT	APPROXIMATE DISTANCE FROM LONDON BY AIR (miles)
		days	days	
EGYPT	Alexandria	2½	2	2.308
SUDAN	Khartoum	3½	5½	3.517
UGANDA	Entebbe	5	10 - 21	4.611
KENYA	Kisumu	5¼		4.785
	Nairobi	5½		4.945
TANGANYIKA	Moshi	5¾		4.995
	Dodoma	6	11 - 23	5.317
	Mombasa	5¾		5.220
	Dar es Salaam	6		5.370
ZANZIBAR	Zanzibar	6	8 - 21	5.415
MAURITIUS			1 - 10	
N. RHODESIA	Broken Hill	7	14	6.116
S. RHODESIA	Salisbury	7½	11 - 12	6.416
	Bulawayo	7¾		6.642
NYASALAND	Blantyre	8¼	10 - 13	6.716
SOUTH AFRICA	Johannesburg	8¼	9¾	7.094
	Kimberley	9	9	7.366
	Cape Town	9½	7½	7.904
S. W. AFRICA	Windhoek	9¾	about 10	8.145
BELGIAN CONGO	Elizabethville	7¼	12 - 15	6.296
PORTUGUESE EAST AFRICA			7 - 13	
MADAGASCAR		9	About 3 weeks	7.830

NOTE: The places printed in italics are not directly served by air.

Ground Facilities

- *Aerodrome used as stopping place*
- *Seaplane station used as stopping place*
- *Aerodrome proposed*
- *Seaplane station proposed*
- *Luminous beacon at aerodrome*
- *Aeronautical radio station*
- *Aeronautical radio station with D/F*
- *Meteorological station at aerodrome* M

Note: *Where more than one of the above facilities are available the various symbols are combined e.g. denotes that the aerodrome is equipped with luminous beacon, radio station with D/F and meteorological station.*

REFERENCE

Air Routes

- *Routes operated by Imperial Airways Ltd.*
- *Proposed routes to be operated by Imperial Airways Ltd.*
- *Routes operated by Imperial Airways Ltd. in conjunction with Indian Trans-Continental Airways Ltd.*
- *Routes operated by Qantas Empire Airways Ltd.**
- *Routes operated by Rhodesian and Nyasaland Airways Ltd.**
- *Routes operated by Wilson Airways Ltd.**
- *Routes operated by Irawaddy Flotilla and Airways Ltd.***
- *Routes operated by other Imperial Companies*
- *Proposed routes to be operated by other Imperial Companies*
- *Rail connections*

*Companies in which Imperial Airways Ltd. have a financial interest

**Operated by Imperial Airways' technical personnel

O.R. 516.

Printed at W.O. 1535.

AIR SERVICES OF THE BRITISH ISLES, 1934.

SCALE. 1 : 1,774,080. 28 ENGLISH MILES TO 1 INCH

Geographical Miles. 60-1 Degree of Latitude.

English Miles. 69·1-1 Degree of Latitude.

KEY

British Air Routes operated during 1934.

" proposed Routes

Foreign Air Routes

KIRKWALL
WICK
STORNOWAY
INVERNESS
ABERDEEN
EDINBURGH
RENFREW
BOWMORE
CAMPBELTOWN
BELFAST
NEWCASTLE
CARLISLE
CASTLETOWN
BLACKPOOL
LEEDS
HULL
MANCHESTER
LIVERPOOL
SKEGNESS
NOTTINGHAM
LEICESTER
BIRMINGHAM
STAPLEFORD
SOUTHEND
HESTON
CROYDON
ROCHESTER
CARDIFF
BRISTOL
LUNDY ISLAND
BARNSTAPLE
SOUTHAMPTON
COWES
PORTSMOUTH
RYDE
BOURNEMOUTH
SHANKLIN
SHOREHAM
HALDON
PLYMOUTH
LERWICK
N. RONALDSAY
WESTRAY
SANDAY
STRONSAY
KIRKWALL
To WICK
To Amsterdam
To Amsterdam & Berlin
To Ostend & Brussels
To Brussels & Cologne
To Jersey
To Deauville
To Dieppe
To Paris
BERCK

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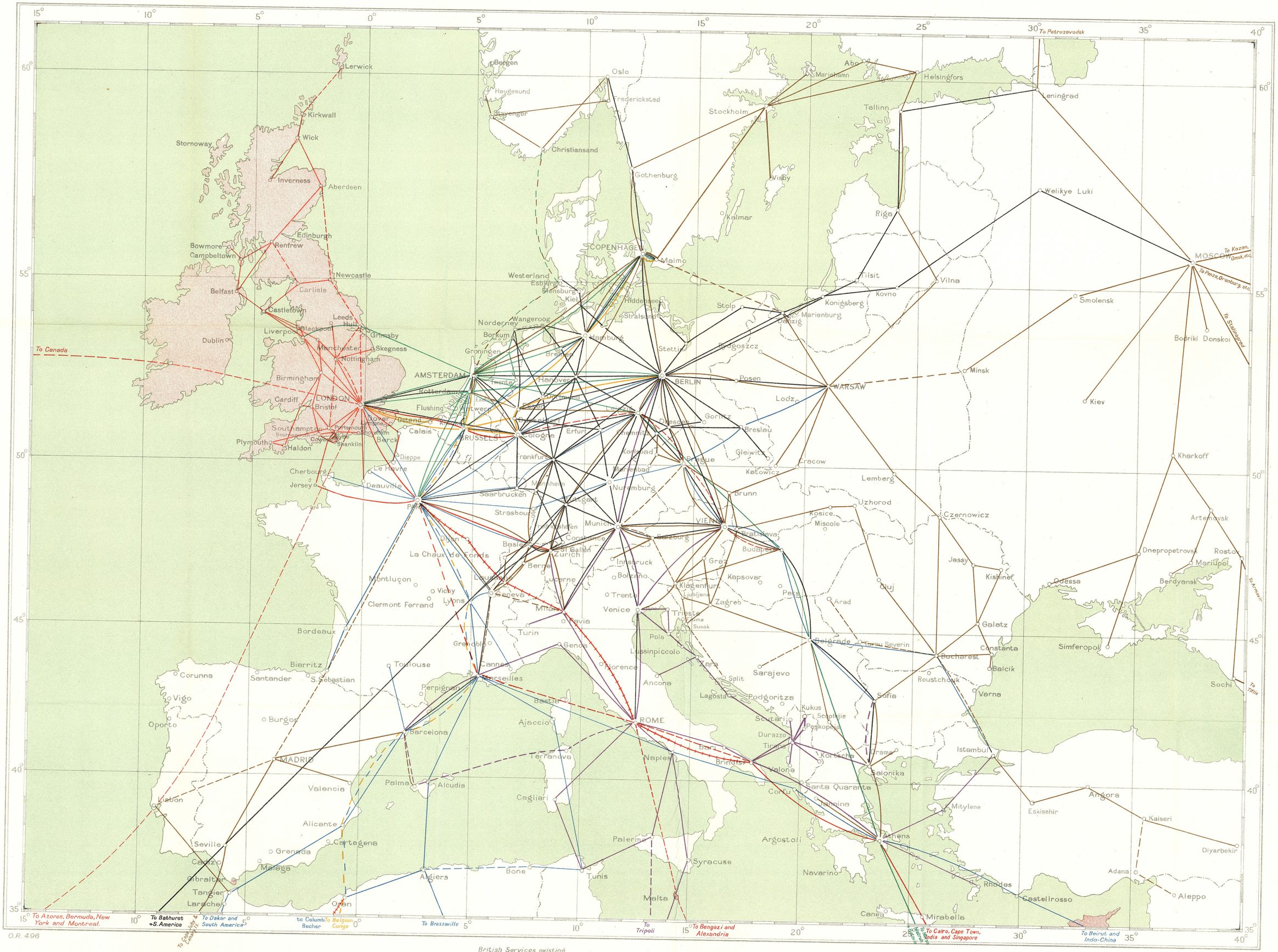
Printed at W.O. 1935.

G.P. 693.

EUROPEAN AIR ROUTES AND EXTENSIONS 1934.



O.R. 496

War Office 1935.

PRINCIPAL AIR ROUTES OF THE WORLD 1934

REFERENCE.

AIR LINES.

Operating ——
Proposed - - -
Rail Connections ·····

Afghan	Af.	Hungarian	H.
Argentine	Arg.	Indian	Ind.
Australian	Aust.	Italian	It.
Austrian	A.	Japanese	J.
Belgian	Bn.	Manchurian	Man.
Bolivian	Bol.	Mexican	Mex.
Brazilian	Braz.	New Zealand	N.Z.
British	Br.	Peruvian	Peru.
Canadian	C.	Polish	P.
Chilean	Chil.	Portuguese	Port.
Chinese	Ch.	Russian	R.
Columbian	Col.	S. African	S.A.
Czech	Cz.	Spanish	Sp.
Dutch	D.	Swedish	S.
Finnish	F.	Swiss	Swiss
French	Fr.	Turkish	T.
German	G.	United States	U.S.
		Venezuelian	Ven.

O.R. 501.

Ordnance Survey, 1926.
Printed at the War Office, 1935