



THE ROYAL BANK OF CANADA

HEAD OFFICE, MONTREAL

May, 1946

JUST as man's cultural age is divided into periods according to the tools he used, and the ages of life on earth are sectioned off according to the kind of creatures living, so man's scientific development might be analyzed according to his progress in transportation. After the simple "on foot" age, there came the water, wind and wood era, when sailing vessels and stage coaches were the highest development in transportation. Then followed the coal and iron period, when the nineteenth century saw origination of steam railways and steamships. The age we are now in might be called that of electricity, petroleum and alloys, since it has produced the automobile, the electric railway, and the airplane.

Flying has passed the guessing stage, and is being applied to transportation in ways that are wonderful, and sometimes terrible. When anyone thinks of airplane travel he automatically associates it with speed. From an average rate of 10 miles an hour on the best mail coach routes in England in the 1830's to the present-day commonplace of nearly 300 miles an hour and the rocket type ship's 600 miles an hour, is a long jump in little more than a century. It is the more astonishing because for thousands of years before the nineteenth century there had been little improvement; Julius Caesar could send a courier about as fast as Napoleon. Today's world is so closely knit that businessmen cannot afford not to travel by air if they are to retain their competitive advantage and discharge their affairs in the way demanded by a speed-conscious society. As a speaker said recently: "Fifty years ago we were lucky if we made the horse-and-buggy trip from the suburbs to Montreal's waterfront in an hour and a half; today we feel we are losing time if we miss one section of a revolving door."

Consider what 300-miles-an-hour schedules criss-crossing the globe will mean. Halifax to Montreal in 2 hours; Montreal to Toronto in 1 hour; Toronto to Winnipeg in 4 hours; Winnipeg to Regina in 1 hour; Regina to Victoria in 3 hours. Between lunch one day and breakfast the next, a traveller could fly from Montreal's Dorval airport to any capital in Europe. And now there are being built in England jet-propelled airliners designed to cross the Atlantic in five hours. This will mean, allowing for the difference between Montreal and Greenwich time, that the

traveller will arrive in Montreal at the same clock-time he left England. But laying aside these terrific speeds for the time being, it is interesting to take account of the practical benefits given business through the airplanes at present in commercial use. A good illustration is at hand in South America. If someone from the branch of The Royal Bank of Canada at Lima, capital of Peru, wished to visit a customer 600 miles away at Iquitos, a town and river port on the Upper Amazon, his only route until a few years ago was a month's trip through the Panama Canal, around the top of South America, and up the Amazon. A new road across the Andes and through jungle to the river enabled the trip to be made overland in a week. By airplane the journey takes three hours.

Before considering Canada's place in the aviation picture, and how she can best take advantage of her position and facilities, it might be well to glance backward at her interest and achievements in flying. Canada Year Book refers to W. R. Turnbull as the "father of aeronautical research in Canada." He set up the first wind tunnel in Canada at Rothesay, N.B., in 1902, discovered the laws of the centre of pressure movement on aerofoils, and made deductions from these laws which explained the longitudinal stability of airplanes. He also propounded the static laws of air propellers, and evolved and developed the controllable-pitch propeller. At the same time, Dr. Alexander Graham Bell was experimenting with kites and air-screws at his summer home in Baddeck, Cape Breton Island. The "Aerial Experiment Association," formed in 1907, consisted of Dr. Bell, J. A. D. McCurdy, and F. W. Baldwin, two young Canadian engineering graduates, Glen Curtiss, a motor-cycle engine builder from New York State, and Lieut. T. E. Selfridge, on leave from the United States Army. On February 23, 1909, McCurdy's airplane, the Silver Dart, flew for half a mile at a speed of 40 miles an hour. The craft was an advance on any aircraft previously flown, having a three-wheel undercarriage, tapered wings, and aileron controls. Only 10 years elapsed until successful flights were made for forest protection and survey work in Quebec, and in 1924 the first regular freight and passenger air transport service was inaugurated to meet the needs of mining developments at Rouyn. A nightly mail service was started between Winnipeg and Edmonton in 1930,

only to be suspended by the government in 1932 for reasons of economy. By 1938 there were 16 separate transportation companies licensed for commercial operation, using 244 commercial aircraft. As everyone knows, Canada has built a world reputation as an efficient operator of civil air services; she contributed extensively to combat air services and the training of air and ground crew. Some of the most spectacular commercial flying feats in the world have been performed by Canada's "bush pilots," who taught the world a great deal about carrying air cargo and battling tough country.

Long distance transportation has just begun its growth. On December 1, 1938 the daily transcontinental air service from Montreal to Vancouver commenced. Halifax and Victoria are not to be blamed if they protest that this was not a true "transcontinental service," but that is the name given it. The country is so large that an airplane service which at least halves travel time between points is certain of popularity. It is being borne in upon people that distance is only relative to the speed of transportation. Business can be done in a fraction of the time it took a few years ago. Deliveries can be made quickly.

In 1931 the Privy Council handed down the decision that the Dominion Government has control over all matters pertaining to civil aviation and aerial navigation in Canada. The essentials of a federal civil aviation programme are said to be: a national airport plan, technical aids and navigation devices, pilot training and aviation education. As to policy, there are two aspects: domestic and international. The government announced in March 1944, through the Minister of Munitions and Supply, that Trans-Canada Air Lines, set up by the government as a national operating company in 1937, would be given the task of operating all domestic trunk air lines, and all international lines. He added that steps would be taken to ensure that the control of any civil air transport company was divorced from association with any surface transport company. This policy did not meet with universal approval, the criticism being summarized by a leading newspaper in this way: "A country whose principal need is transport, and with a high proportion of aviation experience, is now restricted to a choice between TCA and a few minor charter services."

Air travel has raised many new problems for international solution, as well as pointing up some old worries. Before development of the airplane, Mercator's map was all right. It did exaggerate the size of some countries, Greenland, for instance, but it was a good enough map for surface navigators. An air map is quite different. In the centre of the air map showing the northern hemisphere there is a dot indicating the north pole. Scattered over the circle are smaller dots representing cities. Reykjavik is a dot about an inch from Montreal, Moscow is another point an inch beyond, and another inch takes one to Aden. Winnipeg is an inch from Nome, and two inches from Tokyo. No boundary lines on the air map say "This is Canada," or "This is Iceland," or "This is Japan." If a man wished to leave Toronto for a flying visit to

South Africa, he might be tempted by the Mercator map to go by way of Miami, Natal, (in Brazil,) trans-Atlantic to West Africa, and thence south, but the air map shows that his shorter route is by way of Montreal, Labrador, and Europe.

Over-water flying has become a commonplace. Nothing can dim the lustre of the triumph of Bleriot, hobbling on crutches to his tiny monoplane in which he was to fly from Calais to Dover, but his successors have brought London to the suburbs of Canada. As Sir Roy Dobson puts it: "You take off from London, and before you know what has happened you have slipped off the edge of the island, and about seventeen hours later you find yourself in Toronto." It was in the same year that Alcock and Brown flew the first airplane across the Atlantic that the first international line started its schedule. Now the great circle route that cuts Montreal, the Straits of Belle Isle, Northern Ireland and London stretches on to Paris and points south, and if airplanes left tracks the route would be well worn.

Need for a northeast staging route was suggested to Canada by the United Kingdom in 1941. Before the end of that year Goose Bay field was in use, and upon completion of the Greenland and Iceland fields by the United States, a staging route was available for comparatively short-range aircraft. Estimates of possible traffic vary widely, but all are optimistic. An English source suggests five departures from London for North America daily, with three more starting on the continent, carrying an average of 600 passengers per day in each direction.

Very little had been done in development of the North Pacific great circle route to the Far East until the war brought imperative needs. Today's airway is very good, at least as far as the Bering Sea, and it is likely to gain greater eminence as people come to realize that from the North American mid-continent it brings Shanghai 4,300 miles nearer than by the Hawaii-Manila route flown before the war. The north-west staging route was built, developed and put into operation by Canada before Japan entered the war and subsequently improved with the co-operation of United States army engineers and workmen.

It will be noted, in glancing at the air map of the northern hemisphere, that Canada is not so much at the top of the world as in the middle of it, speaking in an air sense. This does not mean air success is automatically Canada's destiny. When faced with the problem of estimating the probability that two plus two will equal four, the estimator is on safe ground, because all the factors are known. But given the factors "good aircraft plus low rates," for instance, no such certain results can be expected, since these are not all of the factors. There must be taken into account the political and economic states of the countries concerned, employment, the trend of industry and business, government factors such as taxation, and the competing appeals of other routes, means of transportation and destinations. Even political unrest in distant countries may affect the probabilities, by imparting a sense of danger or uncertainty. Govern-

ment policies have their impact, as well as the enthusiasm and good sense with which both government and operators seek new business, and their efficiency in it.

It would be well, therefore, for Canadians seeking to see their country prosper in the air transport business to take nothing for granted. Given geographical position; materials, factories and skilled men and women to build planes; natural resources and manufactured goods with which to trade; and many thousands of young men trained in all aspects of flying; there remain as needs to place and keep Canada in the lead of aviation development, imaginative initiative and sustained effort.

The Dominion's potential position among the world's aviation leaders has been recognized. When the Chicago International Conference on Civil Aviation created the first inclusive international organization to establish air navigation standards and procedures, it selected Canada as the seat of the Provisional International Civil Aviation Organization. (This organization is usually referred to as PICAQ, pronounced pee-kay-o.) Strong efforts should be made by Dominion, provincial, civic, and other bodies, and by citizens generally, to make Montreal so acceptable to the 500 delegates meeting there this month that they will vote to make this Canadian metropolis the permanent seat of the organization.

PICAQ has great potentialities, and Canada will wish to have her full share in framing and executing the policies. Already this organization has produced an impressive number of technical standards, authorized regional route conferences, and laid the groundwork for an international code of flying technique which will increase efficiency and reduce hazards.

Some physical factors in air transportation are not always given due weight by persons discussing development. The airplane is more sensitive than railways or road transport to the combined tonnage of fuel, load, and its own weight, all of which it must lift from the ground. Air travel is more affected by weather conditions than is any other form of transport, though technical advances, particularly in radio and meteorological analysis, are helping to overcome this handicap. The airplane is flexible in the air, but not on the ground. An invisible leash, of a length varying with the type of aircraft, ties it to an airport. Air transport cannot have a multiplicity of stops. As the length of interim flights within a long journey decrease, so does the relative overall time increase, and it is in the saving of time between departure and destination that passengers are interested, not in great speed between intermediate landings. Taking off requires more fuel than does sustained flight, but even in the air, say experts, power requirements vary as the cube of the speed. This means that to increase the cruising speed of a given airplane from 150 to 300 miles an hour, to make up for time lost in landings, would mean generating eight times the power required at the lower speed.

All of these variables encourage strenuous competition as country after country and airline after airline take the lead temporarily in mastering one or

another. In many instances, air transport has been supported by governments in order to enhance national prestige and war potential, and has not been governed by commercial considerations. When one country subsidizes its airlines, it is difficult for other countries to refrain, and subsidized competition, carried to extreme, is an international irritant. Domestically, subsidies are criticized because they compel a large body of taxpayers to give special assistance to a comparatively small body of users of air transport.

Air travel rates, like air travel time, are being reduced. In 1929 there was one departure a day from Montreal to New York, at \$50, taking 4 hours at an average speed of 83 miles an hour; in 1946 there are eleven departures a day at \$23, taking 2½ hours, an average of 130 miles an hour, including two intermediate stops of 15 minutes. The rate is down from 15 cents a mile to 7 cents a mile. Dr. J. Parker Van Zandt, of the Brookings Institution, who has much of interest and value to say on the subject of aviation, declares: "That a three-cent level of fares on a self-supporting basis can be reached in due time by progressive stages, appears incontestable." What effect this would have, as one in a galaxy of favourable features, may well be imagined, particularly if accompanied by a comparable reduction in freight and mail rates. It will be recalled that it was the revolution in travel costs accompanying railways into western Canada that made it possible to grow wheat there and to market it economically in Europe. Adequate transportation at popular rates encourages the full utilization of special local advantages such as climate, soil, traditional skill, the production of goods where they can be produced most economically, and, generally, the use of the resources of each district for the benefit of all districts.

There is an unprecedented number of persons in Canada with aviation skills and interests. More than 120,000 men and women have been employed in aircraft manufacturing. A quarter million men voluntarily entered the Royal Canadian Air Force, of whom 73,000 graduated as air crew. Thousands of schoolboys have learned the fundamentals of aeronautics. Yet the future of airplane plants, as in all countries, is obscure. As remarked previously, one characteristic of the airplane in transport activity is its carrying capacity when measured in ton-miles or passenger-miles. A relatively small number of efficient airplanes can establish an impressive transportation record. The hope that plastic planes could be stamped out like cookies has been abandoned, and, in fact, that kind of production is not warranted by present circumstances. There were, and this is surprising, only 22,729 civil aircraft registered in the whole world in 1938, and of these only 2,388, or 11 per cent, were in scheduled operation. It has been calculated that some 600 airplanes carrying 36 passengers each, operating 3,500 hours yearly with a 65 per cent load factor, could (theoretically) handle all the United States Pullman travel of 1940 and still have space for cargo and mail. Van Zandt estimates that all air traffic can be carried in 1,500 airplanes, while a survey by the Curtiss-Wright Corporation takes an even dimmer

view, estimating a world total three years after the war of 1,454 commercial airplanes. In addition, of course, there will be thousands of aircraft in use for business and recreation. It was reported in the press a month ago that Canada's surplus of training planes had been sold to flying clubs throughout the country. So far as prospective cost goes, there is no reason why many thousands of airplanes should not be operated privately in Canada within a few years.

Public airports are a most important part of the aviation set-up. The number of airplanes that can be handled will be affected by the state of the weather, and total potential use is not dictated by landing strips, but by space in the air above the airport. There are 280 land airports in Canada. New terms have been reached, the press reported in February, whereby certain wartime airports may be leased from the government by municipalities and other bodies for five years at \$1 a year. Many bases built as war necessities will be of little commercial use, but what the air force did in laying out international routes will aid in the rapid development of world-wide transport, that is, if the airports are kept up to date. Aircraft and airport design are closely related, the type of aircraft dictating the kind and quality of airport needed, while the size and facilities of the airport limit the aircraft which may use it. This is complicated by the fact that since the life of an expensive airport should be long, the speedy evolution in aircraft design demands a far-sighted determination of what the airfield plans shall be. Only five years ago New York was severely criticised for investing \$40 million in LaGuardia Field; just recently ex-Mayor LaGuardia stood at one end of the new \$200 million Idlewild airfield and remarked: "Can anyone tell me just where we're going?" This field, when completed, will be able to handle 8,600 giant passenger and freight transports daily, on a peak basis of 180 planes in and 180 out in an hour.

Among the difficulties to be ironed out by international conference and agreement is that of sovereignty. Some countries refused, in the past, to permit airlines to cross the air space above their territory, necessitating costly detours. Others refused landing rights. If international air trade is to develop for the good of all nations, it cannot be by hard and persistent bilateral bargaining. That ends in a confusion of duplicating airlines, futile and uneconomic, and worse than that, in international jealousies and envies. Co-operation in spirit and in practice will prevent political considerations from obstructing the development of aviation, and aviation from chafing international relations. If narrow nationalistic aims can be submerged in a general world attempt to eliminate the obstructive fences built around states, and if a working system can be built out of the wartime structure of the United Nations, then aviation will prosper.

This brings back consideration of the work of PICAQ, an organization whose activities surpass in significance those of almost any other of the inter-

national organizations. Optimists say to leave things alone, and order will come out of chaos. It is the job of PICAQ to endeavour to introduce the order before chaos has a chance to envelop aviation. In this task, Canada has taken a leading part. As far back as St. Patrick's Day, 1944, there was presented to the House of Commons a draft convention for the establishment of an international authority to deal with civil air matters. At the Chicago conference it was made clear that Canada did not propose international ownership of airlines, but international regulation by an international authority. There was a great and important area of agreement among the delegates. All nations agreed to work out an international air technical code covering air-worthiness of craft, qualifications of airmen, rules of the "road", procedures in tariffs, weather reporting, communications and search and rescue. Most important, practically all the nations represented at Chicago subscribed to plans permitting the airplanes of any nation to fly over the territory of the others without special permission, and to land for non-commercial purposes. Still other freedoms — the right to carry passengers, freight and mail from the country of origin to any place in the world, and back to the country of origin from any place in the world; the right to pick up passengers, freight and mail in a foreign country, for conveyance to another foreign country; and the right to pick up passengers, freight and mail in a foreign country for delivery to another point in the same country — these remain under discussion. Canada Year Book remarks: "Canada has signed the air transit agreement to assist in opening up the airways of the world, but has not signed the five freedoms agreement, thus retaining full control over all rights to pick up and set down traffic in Canada."

Having come so far on the way toward international accord, it may turn out to be impossible to secure unanimity, but it should be practicable to achieve satisfactory community of opinion on the fundamentals. Few nations would approve outside control of their internal aviation affairs (in fact, the idea was rejected at the 1932 disarmament conference) but, on the other hand, no nation can acquiesce in unregulated use of its air and facilities by either its own or other nationals. These regulations should, in the interests of safety and efficiency, be alike in all countries, insofar as they are concerned with navigation aids, airport techniques, and similar affairs.

The whole world is now much smaller, measured by travel time, than were Upper and Lower Canada at the time of Confederation, 79 years ago. Air travel and radio are making the world into a neighbourhood. There are closer contacts between political leaders, businessmen, educators, and scientists. Whether, in addition to making nations neighbours, the development of air travel shall also make them friends, is a question for the people and their leaders, outside the scope of practical aviation.