

Personnel . . .

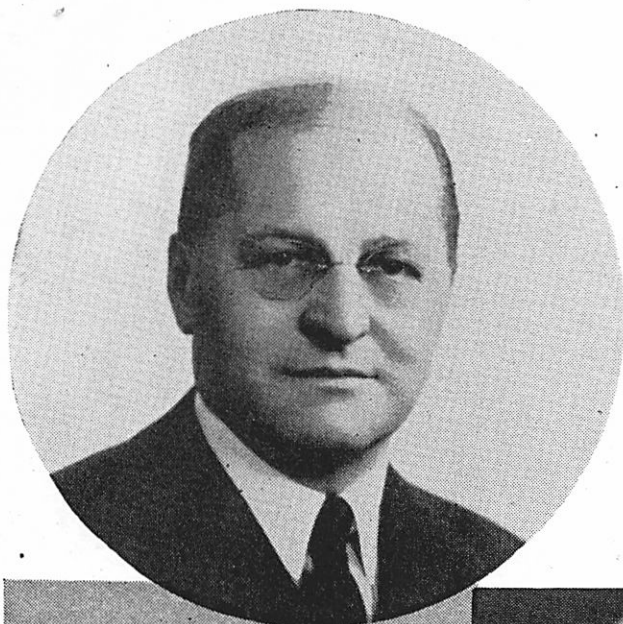
These Are the Men Who Have
Charted TCA's Course. Their
Hands Are on the Controls. Their
Eyes Are Focused on Far
Horizons

AT THE CONTROLS of TCA, the executives appearing on these pages are guiding the airline during its exciting years of expansion. Following are brief biographical notes.

J. J. Symington, C.M.G., K.C.—President—For the past 10 years Mr. Symington has served TCA effectively and without salary. He was appointed a director in 1937 and has been its president since 1941. He

has announced his retirement from the office. Vice-president English has been named interim president until a successor is announced. Besides guiding TCA, Mr. Symington has achieved distinction in international aviation as a leading figure in ICAO and IATA.

W. F. English—Vice-president, Operations—A veteran transportation executive, Mr. English directed his talents skyward when he joined TCA in its first year after long experience with the CNR. Serving initially under the late P. G. Johnston, Mr. English was made assistant vice-president in 1941. In 1945 he succeeded O. T. Larson as operational vice-president.



H. J. SYMINGTON,
C.M.G., K.C.
President



H. C. COTTERELL
Director
Research, Economic Control



W. F. ENGLISH
Vice-President
Operations



E. H. MONCRIEFF
Director
Personnel, Organization



F. T. WOOD
Director
Facilities, Supply



J. H. TUDHOPE
General Manager
Operations



G. R. MCGREGOR
General Manager
Traffic



W. W. FOWLER
Asst. Gen. Mgr.
Operations



J. T. BAIN
Director
Engineering, Maintenance



A. M. SUTHERLAND
Director
Maintenance, Overhaul



J. T. DYMENT
Director
Engineering



B. A. RAWSON
Director
Flight Development



H. W. SEAGRIM
Director
Flight Control

A. C. McKim—Vice-president, Administration — Born in Montreal, Anson Couttes McKim attended McGill University, graduating from the School of Commerce in 1924. He returned to McGill to receive his Arts degree in 1927 and in 1929 obtained his MBA at the Harvard Business School.

In 1929 he joined Canadian Industries Limited and subsequently became assistant general manager of the cellulose products group. In 1940, on loan to the Canadian Government, he became assistant to Rt. Hon. Arthur Purvis, Director-General of the British Purchasing Commission. A year later he was transferred to the Dept. of Munitions and Supply in Washington as Assistant to the Director-General of the Washington office. In 1942 he became Deputy United Kingdom representative for the Canadian Dept. of Munitions and Supply.

He was a member of the Canadian delegation to the first Interim Assembly of the Provisional International Civil Aviation Organization held in Montreal in 1946. Prior to joining TCA, he was Canadian representative on the ICAO council.

Howard C. Cotterell — Director of Research, Economic Control — Born Revelstoke, B.C.; was employed with CPR before entry into TCA's traffic department in 1933. Served as Winnipeg district traffic manager prior to enlistment in RCAF in 1939. Attained rank of squadron leader. Returned

to TCA in 1944 as research and development assistant to the vice-president. Subsequently appointed to present position.

E. H. Moncrieff — Director of Personnel, Organization Control — Joined TCA with distinguished war record, preceded by RCAF activity as early as 1933. Commanded stations in Canada prior to overseas posting. Awarded AFC for work at No. 12 SFTS, Brandon. Organized and commanded Army Co-op. Squadron in Surrey, England, later commanded RCAF fighter reconnaissance squadrons, was awarded OBE, twice mention in dispatches. Appointed to present position in 1946.

F. T. Wood — Director of Facilities, Supply Control — With TCA since

1937, after long service with CNR. Served in office of vice-president. Appointed administrative assistant to v.p. 1943, promoted to present position in 1946.

J. H. Tudhope—General Manager, Operations — Identified for more than 20 years with development of civil aviation in Canada. Winner of McKee trophy. With Royal Flying Corps in first war. Awarded Military Cross and Bar. In 1920 joined RCAF and participated in service flying. Was OC of the government air stations at Dartmouth and Vancouver. Was one of the first officers of the Civil Aviation Branch of the Dept. of Transport and did much pioneering

(Continued on page 52)



A. C. McKIM
Vice-President
Administration



D. R. MACLAREN
Director
Passenger Service



S. S. STEVENS
Director
Communications, Electronics



J. H. SANDGATHE
Director
Training



E. T. HOWE
Director
Cargo, Service



F. I. YOUNG
Operations Manager
Central Region



E. W. STULL
Operations Manager
Western Region



T. F. K. EDMISON
Operations Manager
Eastern Region



F. M. MCGREGOR
Operations Manager
Trans-Atlantic Service



W. J. DALBY
Western Region
Traffic Manager



W. R. CAMPBELL
Central Region
Traffic Manager



J. G. MAXWELL
Eastern Region
Traffic Manager

TCA HISTORICAL HIGHLIGHTS

1937

- Apr. 10**—Trans-Canada Air Lines incorporated by Act of Parliament.
May 11—First Board of Directors Meeting.
July 7—Survey flight left Vancouver.
Sept. 1—First commercial operation began between Vancouver and Seattle. Equipment consisted of 2 Lockheed Electras and 1 Stearman.

1938

- Mar. 6**—First class mail carried Winnipeg-Vancouver.
Apr. 1—Night flying inaugurated in Western Canada.
Aug. 15—Experimental flights commenced Winnipeg-East.
Oct. 1—Regular air mail service Winnipeg-Vancouver and Lethbridge-Edmonton.
Dec. 1—Air mail service extended to Montreal and Toronto.

1939

- Feb. 1**—Calgary included in Alberta route.
Mar. 1—Regular air mail and air express service established between Montreal and Vancouver on a night schedule.
Apr. 1—Passenger service inaugurated Montreal-Vancouver and Lethbridge-Edmonton.

1940

- Feb. 15**—Passenger service began between Montreal-Moncton.
Apr. 14—Second daily transcontinental schedule.
Aug. 1—Passenger service Toronto-London-Windsor.

1941

- Apr. 15**—Temporary service began between Moncton-Summerside-Charlottetown (until December 6).
Apr. 15—Service extended from Moncton to Halifax.
May 10—Toronto-New York service inaugurated.
May 11—Vancouver-Seattle service discontinued.

1942

- May 1**—Newfoundland service inaugurated.

1943

- June 6**—Service extended to Victoria.
July 22—Trans-Atlantic service inaugurated.

1944

- July 1**—Halifax-Sydney service inaugurated.

1945

- Feb. 1**—Third daily transcontinental schedule.
May 10—Authorization for alternate "bad-weather" route through

the U. S. via Minneapolis and Milwaukee.

1946

- Apr. 1**—Fourth daily transcontinental schedule.
July 1—Toronto-Chicago service inaugurated.
Aug. 1—Toronto-Cleveland service inaugurated.
Sept. 1—Trans-Atlantic service put on daily basis.
Sept. 16—Trans-Atlantic service extended to London, England.
Sept. 16—Lakehead-Duluth service inaugurated.
Nov. 1—Victoria-Seattle service inaugurated.
Nov. 1—Vancouver-Victoria service increased to eight flights daily.

1947

- Apr. 1**—Halifax-Yarmouth-Boston service inaugurated.
Apr. 15—North Star aircraft introduced on trans-Atlantic routes.
July 1—Great Lakes route inaugurated via Fort William-Port Arthur and Sault Ste. Marie.
July 1—Winnipeg-Saskatoon-Edmonton service inaugurated.
July 1—Regina-Swift Current-Medicine Hat-Calgary service inaugurated.
July 1—Toronto-North Bay-Porquis-Kapuskasing service inaugurated.
Oct. 1—Shannon, Ireland, became trans-Atlantic port-of-call.

of all available routes through the Rockies. It was largely as a result of his findings that the TCA route was run through the Crow's Nest Pass. In 1938 he became vice-president and manager of the first aviation insurance group in Canada. In 1943 was appointed TCA operations manager and moved to present post in 1946.

G. R. McGregor — General Traffic Manager — With Bell Telephone for almost 20 years. Joined Kingston Flying Club. Won Webster Trophy as outstanding amateur pilot in Canada for 1935, 1936, 1938. Went overseas with 401 Squadron RCAF. Served with distinction in Battle of Britain and subsequently as Director of Staff at RCAF Headquarters Overseas. Later commanded RCAF Wing "A" at Anchorage, Alaska, before being posted back overseas. Was decorated three times. Appointed TCA Traffic Manager in 1946.

W. W. Fowler — Asst. Gen. Mgr., Operations — Born in Sackville, N.B. Began aviation career with International Airways, later amalgamated with Canadian Airways. Became District Superintendent of the latter company, directing operations in the Maritimes. Joined TCA as pilot in 1937. With the extension of TCA operations into the Maritime provinces he was appointed, in 1942, Operations Superintendent of the Atlantic Division with headquarters at Moncton. In 1943 he became Assistant Operations Manager for the system with headquarters at Winnipeg and in 1946 was appointed to present position.

J. T. Bain, Director of Engineering and Maintenance — Born in Edinburgh, Scotland. Entered RAF Engineering College at Cranwell 1920. In 1929 became chief engineer of Hillman's Airway, first nonsubsidized commercial airline in Great Britain. In a similar capacity he was associat-

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Personnel

(Continued from page 39)

work in establishment of commercial and civil flying. Served as Supt. of Airways. Made a complete air survey



Unloading a TCA cargoliner. Cargo carrying is a new and promising enterprise for the airline.

The NEWS OF CANADIAN AVIATION

COMMERCIAL MILITARY CIVIL

VOLUME 21

TORONTO, CANADA, MARCH, 1948

No. 3

Expect Large Order for Chipmunks

Negotiations Under Way at Toronto for Substantial Quantity of Canadian Trainers

FIRST PRODUCTION BEAVER DELIVERED

A contract for a substantial number of deHavilland Chipmunk trainers, to be built for an export market, is at present being negotiated by The deHavilland Aircraft of Canada and an unnamed buyer at Toronto.

We are unable to state the exact number ordered at this time. However, the quantity is sufficient to indicate that the Canadian-designed-and-built ab initio trainer has established itself in the highly competitive field of modern training aircraft.

Powered by a 140-hp Gypsy Major engine, the Chipmunk has a maximum speed of 143 mph, cruising speed of 124 mph and an economical cruising consumption of 6.4 gal./hr.

Remarkably sturdy and nimble in aerobatics, the Chipmunk also has many other improvements over previous aircraft of its category.

Close on the heels of the

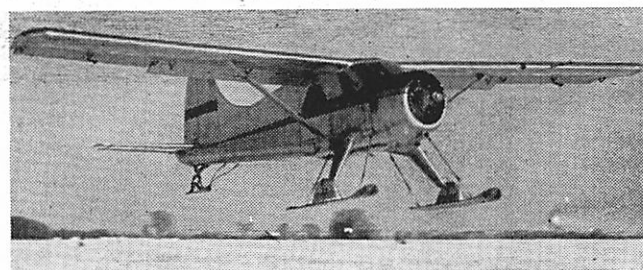
Chipmunk negotiations comes word that the first production model of the deHavilland Beaver, another all-Canadian aircraft, has been delivered to the Ontario Provincial Air Services.

The Beaver now fully approved by the Dept. of Transport is out of the experimental category after having passed its ski tests in one day. Designed to meet the rigid requirements of Canadian bush flying, by Canadian engineers, the Beaver has lived up to the most optimistic expectations.

Completion of the first production model marks the initial step toward a production goal of four a day. With confirmed orders for 16 Beavers already on hand, 12 of which are scheduled for Ontario's Provincial Air Services, the deHavilland company expects to reach the four-a-day target early in April.



DE HAVILLAND CHIPMUNK



BEAVER APPROVED FOR SKIS

Having passed its ski test trials in one day, the de Havilland Beaver is now fully approved by the DOT. Production is under way at the company's Toronto plant to fill orders for the Beaver.

McGregor New TCA President



GORDON R. MCGREGOR

Gordon R. McGregor, a combat flier in the Second Great War, is the new president of Trans-Canada Air Lines, succeeding H. J. Symington, who relinquished the post last November.

Announcement of the appointment was made recently following a meeting of the board of directors of the CNR and TCA. Mr. McGregor was also made a member of the board of directors of TCA succeeding J. A. Wilson, retired.

The first combat pilot of World War II to become president of an airline, Mr. McGregor joined TCA in 1945 after a distinguished war

career with the RCAF. He was appointed general traffic manager, with system jurisdiction including overseas service, in Jan., 1946. Since that time he has been widely acclaimed for his contribution to the study of traffic problems confronting the air transport industry.

In the autumn of 1947 he was appointed chairman of the International Air Transport Conference held at Petropolis, Brazil. He was also chairman of the IATA conferences there, and his chairmanship included the meeting of the first conference area which covers the western hemisphere and of the joint conference covering the world.

From 1923, until the outbreak of war in 1939, Mr. McGregor was a member of the staff of the Bell Telephone Co.

While living in Kingston he became interested in avia-

tion and joined the Kingston Flying Club in 1932. Three years later he won the Webster Trophy and repeated the achievement in 1936 and 1938. A year before the outbreak of the war, he joined No. 115 Auxiliary Squadron, RCAF, and in 1939 he left his position as district manager of the Bell Telephone Co., at Montreal to go on active service.

Flight Lieutenant McGregor was one of the historic "few" who staved off defeat during the crucial Battle of Britain. He ran up a record of five and a half Nazi aircraft destroyed, seven probables and eight damaged.

He retired from the air force as a Group Captain and his decorations included; Distinguished Flying Cross, Order of the British Empire, Order of the Orange Nassau (Holland), Croix de Guerre (France), and the War Cross (Czechoslovakia).

North Star Slander

IT IS unfortunate that the reputation of the North Star aircraft has been victimized in a political newspaper controversy. As we go to press, the Globe and Mail of Toronto has published a "news report" from Montreal with no more substantial justification than, "Local aviation circles are abuzz with rumors that . . ." The writer then proceeds to suggest that: 1. Canadair contemplates ending North Star production and converting "for other industrial operations." 2. The company is in the business of "converting Douglas DC-4 transports into Canadian-built Stars." 3. Purchases of the aircraft abroad "did not materialize . . . because, according to aviation men, the ships have no sales appeal."

The ethics of pegging a story of this kind on such an unsubstantial basis as "local aviation authorities" and "aviation men" are unworthy of the Globe and Mail.

On the first point, H. Oliver West, Canadair president, states quite emphatically: "We are in the aircraft business to stay." Also that, "We are anticipating substantial orders for the Canadair Four."

The reflections on the North Star and, by implication, the Canadair Four, are so manifestly unfair that it should hardly be necessary to refute them for our readers.

These aircraft were developed from the basic DC-4 design. But so was the DC-6. The Canadair products have abundant sales appeal as we can testify from personal observation, not to mention the evidence of many airline pilots who have flown these aircraft. As the Globe should know, currency difficulties have been the real reason for the delays in overseas sales of the Canadair Four. It is too bad that the newspaper, in its apparent anxiety to drop a political bombshell, did not bother to check the facts.

(Above Editorial Comment Continued from Page 23)

MISCELLANEOUS

INSTRUMENTS: REPAIRS AND CALIBRATION. We operate under authority of D.O.T. as certified overhaul depot. Your enquiries are invited on any repair or replacement problem. Large stock of reconditioned instruments. Specialists in watch or clock repairs. Larry & Ted Eberts, 282 Laird Dr. N., Leaside, Ontario.

SOLID-SCALE AUTOMOBILE CONTEST. First prize \$25.00. Send \$1.00 for plans to Rene Charette, 213 Besserer St., Ottawa, Ontario. Send model to same address not later than May 25th.

HANGAR SPACE FOR RENT COLUMN

TORONTO HANGAR SPACE! At Barker Airport—new concrete block hangar—shortest trip from business district—airport now extensively drained—reasonable storage rates. Leavens Bros. Air Services Ltd., Barker Airport, Toronto. ORchard 1186.

EMPIRE AIR NAVIGATION SCHOOL, an ex-instructor at this school. Holds First Class Civil Navigator's License and Fellowship of the Royal Meteorological Society. Has comprehensive knowledge and experience of modern navigational methods. Lately employed as specialist on aircraft instruments and compasses. Requires position, flying or ground, in which experience would be an asset. Location unimportant. Box 360, Canadian Aviation, 481 University Ave., Toronto 2, Ont.

The D.O.T. is Sympathetic

THE significance of airborne radio as an aid to navigation and traffic control as well as a channel of vital weather information is beyond dispute. Having made this assumption, we have stated the case, in recent issues of Canadian Aviation, for simplification of the radio operator's license. Our plea for revision of the present rules has been based on the claim that:

a. The preliminary requirements should be simplified or eliminated. (They now include: birth certificate, letters of reference, photographs, and a Declaration of Secrecy.)

b. The actual examination for the Radiotelephone Operator's Restricted Certificate should be redesigned to the requirements of aviation. (It is now based on marine procedure and has little relation to aircraft radio operation.)

Such simplification as we have suggested has been achieved in the United States, even though that country, like Canada, is a signatory to the International Telecommunication Convention, 1932.

As some of our readers have urged in letters endorsing this editorial stand, the ideal solution would be to authorize the Civil Aviation inspector to endorse the pilot's license for use of radio. There could be an oral or written quiz based on radio procedure as specified in Air Regulations.

We have received assurance from the responsible authorities in the Dept. of Transport that the above arguments as stated in Canadian Aviation editorials and in letters from our readers have been noted and are receiving sympathetic consideration. We feel it only fair, therefore, to reserve further comment on this subject for a reasonable interval. It is our hope that in the meantime the department will be able to proceed from sympathetic consideration to action.

Ronald Keith

Editor

POSITION WANTED

LICENSED PUBLIC TRANSPORT PILOT, age 25, single with 2,000 hours experience most on twins, seeks position either with company or individual. If business experience an asset can also furnish highest references in this connection. Box 358, Canadian Aviation, 481 University Ave., Toronto 2, Ont.

FLIGHT INSTRUCTOR. Air Engineer or Bush Pilot. 4,000 hours "certified." Hold radio certificate. Will go anywhere if expenses paid and accommodation can be had for wife. Box 355, Canadian Aviation, 481 University Ave., Toronto 2, Ont.

TRANSPORT PILOT, radio operators' license, 1,800 hours, 1,000 as captain on RCAF Transport Command, completed TCA pilot training, 200 hours bush on floats and skis, clear record, age 25, married, live anywhere, prefer bush work, will take anything, at present unemployed. Box 365, Canadian Aviation, 481 University Ave., Toronto 2, Ont.

EX-R.C.A.F. COMMERCIAL PILOT—Flying instructor—age 27, 1,500 hours single and twin. Bush flying experience. Will go anywhere immediately. References. Box 251, Canadian Aviation, 481 University Ave., Toronto 2, Ont.

A & C AIR ENGINEER OR PILOT—4,000 hours certified time logged—half total time, float flying. Radio, Pilot and A & C tickets in good standing. 18 years' experience. Will go anywhere if expenses paid. Desires permanent position where living accommodation can be located for wife. Box 345, Canadian Aviation, 481 University Ave., Toronto 2, Ont.

Meteor Said World's Fastest Trainer

The Gloster Meteor VII Trainer, claimed to be the world's fastest training aircraft, made its first flight recently in Britain.

A dual control version of the Meteor fighter, the new trainer is designed to bridge the gap between the piston-engined advanced trainer and the operational jet-propelled fighter.

Fitted with Rolls-Royce Derwent engines, the Meteor VII has a maximum speed of 580 mph and an initial rate of climb of 8,000 fpm.

CPA Takes Over Old Mackenzie Routes

Licenses covering routes formerly operated by Mackenzie Air Services have been cancelled and appropriate licenses issued to Canadian Pacific Airlines as a result of a review of licenses by the Air Transport Board pursuant to the Aeronautics Act.

The issue of the licenses to CPA was condition precedent to the purchase of the properties and assets of the Mackenzie Air Services by the Canadian Pacific Railway.

Use Falcons to Stop Flocking of Birds

Experiments with peregrine falcons to discourage birds from flocking on airfields have provided some useful information to Britain's Royal Air Force—sufficient to justify a continuation on a larger scale next autumn when the mating season is over. In 1947 there were 17 accidents to RAF aircraft in Europe caused by impact with birds.

TCA Annual Report Shows Deficit

Despite an increase of 19% in operating revenue over 1946, Trans-Canada Air Lines in 1947 had an operating deficit of \$1,499,145.

After payment of \$261,897 interest on capital, the deficit for 1947 totaled \$1,761,042.

Total operating revenue was \$15,297,346. All departments contributed to the increase, with passenger revenue up 30% over 1946, cargo revenue up 47% and mail revenue up one per cent.

The increased revenue, however, could not offset the mounting expenses, according to the company's annual report. Payroll charges, for example, increased by \$1,347,908, and materials by \$1,128,541.

A number of improvements were inaugurated during 1947 in the airline's service. North American routes were extended by 1,248 miles, and a 34% increase in carrying capacity was realized through service extension and the use of larger aircraft. Besides increasing its passenger-carrying capacity, an air cargo service, which in 1948 will handle commodities in volume at low cargo rates, was prepared.

The year saw Fort William and Sault Ste. Marie provided with main airline service, the flying time between Toronto and Winnipeg reduced, the opening of a direct line between Winnipeg and Edmonton, and the inclusion of Medicine Hat and Swift Current on a daily transcontinental schedule.

Mamba-Powered RAF Trainer



Avro Athena Mk. 1

The prototype of the new Avro Athena three-seat trainer, powered by an Armstrong Siddeley Mamba prop-jet engine successfully completed its initial test flight in Britain recently.

Of all-metal construction, the aircraft is designed for advanced training and conforms to the latest RAF "all-weather" specifications. Cockpit instrumentation is claimed extremely comprehensive, and one of the most interesting features is the additional

amber-tinted front screen, which is raised or lowered by compressed air.

In addition to its function as a training aircraft for the new prop-jet engines, the Athena is fully equipped for such other roles as gunnery training, photography, bombing and glider towing. It has a maximum speed of 287 mph, and cruises at 253 mph. Rate of climb is 2,630 fpm. Service ceiling is 34,800 ft. and the range is two and a half hours with normal tankage.

North Star on TCA Domestic Runs Early

Trans-Canada Air Lines switched to North Star aircraft on its coast-to-coast flights on June 1, a month ahead of the proposed date of introduction.

Improvement of supply of the company's \$15,000,000 order for 20 North Stars, built by Canadair Ltd., is the reason for the step-up in operations. The North Star will completely transform the airline's service, increasing each plane capacity from 21 to 40 passengers and substantially reducing the flying time.

New RCAF Book to Aid Arctic Flyers

A handbook for Arctic flyers, known officially as the "RCAF Directory of Hinterland Aerodromes," is being compiled at Air Force Headquarters, Ottawa, and will be issued to Air Force photographic crews before they leave for their northern bases this summer.

The handbook will be in six volumes, covering areas from British Columbia to Labrador, and as far north as the Arctic archipelago. It will contain information on 450 air and water bases in those areas. The information is not limit-

ed to aerodrome data, but contains hints on survival in summer and winter, advice on weather conditions, a study of native habits and even some gen about edible plants supplied by the botanical division of the Dept. of Mines and Resources.

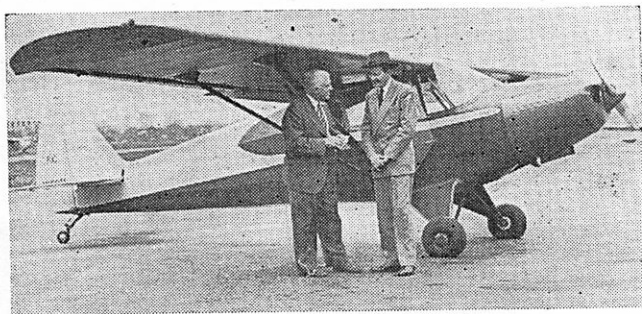
Although the handbook has been compiled primarily for RCAF research and rescue organization and for Air Force photographic crews, it will be available to flying clubs and other civilian bodies.

Increase Forestry Patrols in B. C.

Aerial patrol of forests in British Columbia will be increased this year by the provincial government. The forest branch will have six aircraft on call for fire spotting and for transporting crews to sudden outbreaks.

Contract for supplying forestry aircraft has been let to Central B. C. Airways of Vancouver and Prince George, forestry officials announced. This company, which gave the service in 1947, was the only bidder on the tenders called by the department.

Two of the aircraft will be stationed in the Prince George area, two at Kamloops, one at Castlegar and one at Cranbrook.



Piper Delivers First PA-14 Family Cruiser

Shown above (left) delivering the first Family Cruiser to be sold by the Piper Aircraft Corp., is W. T. Piper, president of the company. They expect that this four-place machine will prove popular to flying enthusiasts for its utility and low price, \$3,825 FAF Lock Haven, Pennsylvania.

First 85 HP. Champion in Canada



Aeronca 7DC

The first Aeronca 7DC (85 hp) Champion to come to Canada was delivered recently to the owner, Don Davidson of Brandon, Man., by Brandon Air Services Ltd.

The new Champion will re-

place Mr. Davidson's 65-hp craft, which last winter helped him bag over six hundred coyotes and foxes in the southwestern section of Manitoba.

Crosswind Gear on DC-3 Proves Successful

Climaxing a year's development on a much-praised new aviation safety device, the Civil Aeronautics Administration and Goodyear Aircraft Corp. demonstrated recently the successful installation of cross-wind landing wheels on a DC-3 type transport plane.

The DC-3 cross-wind wheels are similar to those offered as optional equipment on Cessna and Stinson light planes, except the DC-3 casting mechanism is within the hub of a 17.00-16 wheel rather than a 6.00-6 wheel.

O. W. Loudenslager, Goodyear engineer in charge of the cross-wind gear, said the light plane device needed 25 degrees of caster to provide enough yaw angle while the DC-3 wheel required only 15 degrees, the latter modification being practical because of the DC-3's faster landing speed and additional weight.

The DC-3 equipped with swiveled wheels has landed in cross-winds of as high as 40 to 45 mph with perfect safety and control, according to Art Chapman, Goodyear test pilot.

TCA Bermuda-Montreal In Four Hours 35 Min.

A Trans-Canada Air Lines North Star recently landed at Montreal Airport four hours, 35 minutes, after leaving Kindley Field, Bermuda, thus completing the double inaugural flight of the new direct Bermuda service from Montreal and Toronto.

On board the big pressurized airliner were two federal

Cabinet ministers, Hon. Lionel Chevrier, Minister of Transport, and Hon. Ernest Bertrand, Postmaster-General. They were accompanied by Dr. Edward Warner, president of the International Civil Aviation Organization; Gordon R. McGregor, president of Trans-Canada Air Lines; R. C. Vaughan, chairman and president, Canadian National Railways and Steamships; Federal Government and civic officials; and top executives of TCA.

During their stay on the South Atlantic Island, the party were the official guests of the Bermuda Government.

Association Discusses Aircrew Selection

Canadian scientists and doctors, long prominent in aviation research and medicine will be hosts this year to members of the Aero Medical Association, at their convention, in Toronto, on June 16, 17 and 18. At the convention, the latest developments in aviation medicine will be discussed by members from South Africa, South America, Mexico, the United Kingdom, the United States and Canada.

One of the main topics of discussion will be aircrew selection. Modern development in aviation has produced the problem of selecting suitable aircrew for fast- and high-flying aircraft. In Canada this means, primarily the very careful selection of pilots and navigators for the RCAF and airlines.

For the RCAF, the selection of aircrew is done at the RCAF's Institute of Aviation Medicine in Toronto, and to

the Institute come all new recruits for aircrew. Here there are statistics on aircrew selection and training, complete, from the early days of the British Commonwealth Air Training Plan. With this knowledge a series of tests have been devised, in an attempt to predict, before a man flies if he will be successful in aircrew training.

TCA Airmail Volume Reaches Capacity

The volume of air mail in Canada has apparently reached a ceiling under existing arrangements.

The annual report of Trans-Canada Air Lines for 1947 states:

Air mail volume was almost unchanged in 1947, with the company flying 1,232,237 ton miles as compared with 1,210,716 in 1946. There was some growth of this traffic toward the end of the year, but not enough to approach the airline's capacity for mail transport.

Discuss Future of Hamilton Airport

The future of Hamilton, Ontario's, civic airport is under consideration by the city's Airport Committee.

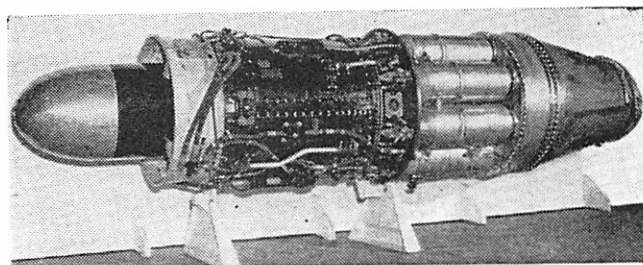
The committee will decide whether the franchise given to the airport company will be renewed when its 25 years duration is up, or whether the franchise is to be bought out by the city at some future date before it is expired.

TCA to Solicit All Kinds of Freight

Trans-Canada Air Lines is making a drive to obtain cargo of almost every kind except coal and grain, President G. R. McGregor told the Commons railway committee recently.

He said that by mid-summer TCA might be carrying ordinary first-class mail. Negotiations are "near culmination."

More Powerful G-E Jet Engine



General Electric TG-190

Claimed to be America's most powerful aircraft jet engine now in production, General Electric's torpedo-shaped TG-190 which is capable of producing approximately 10,000 horsepower at the top speed of the new planes being built for its application, was announced recently by the U. S. Air Force and the company's Aircraft Gas Turbine Divisions.

Known as the Air Force J-47A, the new engine is a development of the company's axial-flow TG-180 (J-35) jet engine, which is the power plant of 10 different types of military jet-propelled fighters and bombers.

Although having approximately the same frame size as the TG-180, the TG-190 has many design improvements, a greater thrust rating, and is substantially the

same weight as the former unit. Compared with the slightly more than 4,000 pounds thrust developed by the TG-180, the new engine has 25 per cent more power, according to the Air Force.

Future development of the TG-190 jet, according to engineers, promises to increase its rating to 6,000 pounds thrust.

Following completion of the military-required type-testing in the factory, the TG-190 now has been installed as the power plant of the North American F-86A, an Air Force fighter revealed as having a speed of "over 650 miles an hour."

As in the case of the TG-180, the TG-190 has been installed in the bomb bay of the Boeing Superfortress for flight testing under altitude conditions.

*Big Aircraft Through
Service Booms TCA
Business. Western Cities
in Top Revenue Group*



A TCA North Star comes in with flaps and wheels down.

North Star Main Line Service Gets Big Reception in West

INTRODUCTION of the four-engined 40-passenger North Star aircraft to the mainline routes of Trans-Canada Air Lines has served to shrink the vast expanses of western Canada. It has brought Winnipeg within four-and-a-half hours of Toronto. It has meant that western Canada is less than seven hours across.

When the big planes went into service, appreciation of the traveling public was reflected immediately in passenger traffic figures. June traffic showed a 70% increase over the corresponding 1947 figures and since then the North Stars have been flying with a near-100% load factor.

Influence of the inauguration of non-stop North Star service on the main line was notable in the traffic returns for the first seven months of this year, even though in effect for only the last two months of the period.

Ton-miles of passengers and cargo for the entire system jumped to 14,873,961 up to the end of July in 1948, from a total 10,546,538 in 1947. This was an increase of 41%. Corresponding figures for the Western Region were 5,192,079 for 1948 and 3,184,569 for 1947 (to end of July), an increase of 63%.

Comparing the same seven-month periods, it is interesting to note that passengers boarded increased from 110,383 to 130,316 (18.1%); Mail poundage was up 40%, from 603,086 to 845,622; Express increased 43%, from 162,886 lb. to 232,211 lb. There was no cargo service in early 1947.

Cargo carried during the first seven months of this year amounted to 807,682 lb.

The fact that western Canada has taken to airline travel with considerable enthusiasm is evidenced by the fact that four western cities place in the top six for Canada in terms of ticket sales.

For the six months to the end of June 1948, the standing is as follows: Toronto \$1,424,225; Vancouver, \$943,057; Montreal, \$670,128; Winnipeg, \$483,981; Edmonton, \$321,048; and Calgary, \$338,977.

It is not to be assumed, however, that all is perfect peace and contentment in the west. Currently, the Chamber of Commerce and leading citizens of Edmonton are campaigning for a direct airline service to Vancouver. At the same time, Calgary residents are convinced that they instead of Lethbridge should be on the mainline route to the coast.

The North Star aircraft has met with an excellent reception. Its speed and comfort have been powerful selling features in the west. Some of the more experienced passengers have compared its noise level unfavorably with the DC-3 but still prefer the bigger aircraft. In the meantime, TCA is working on further modifications to make the North Star cabin quieter.

Since introduction of four-engined North Stars to TCA mainline service, passenger traffic has boomed. Photo at right catches North Star over Winnipeg.



—*Courtesy The Acroplane.*

MAY

CANADIAN AVIATION

1951

Jet Trainers from U. S. In \$300 Million Plan

A number of two-seat jet trainers may be part of a \$300 millions 1951-52 Canadian defense purchasing program in the United States, according to reports from Ottawa. Speaking in New York, Hon. Brooke Claxton, defense minister, said firm orders placed in the U. S. by Canada for the last nine months of 1950 amounted to \$159 millions.

Aircraft and accessory purchases in the U. S. over the coming year will be in the neighborhood of \$100 millions. It is considered probable that a trainer version of an Amer-

ican jet fighter might be purchased in sufficient quantity to fill the gap until quantity production of the CF-100 has been achieved. Presumably a dual-control CF-100 will be produced at a later date.

North American Aviation and Lockheed have been mentioned as suppliers of a jet trainer to Canada. Lockheed has a trainer development of the F-80. Known as the T-33 (TO-2), it is powered with a J33-A-23 jet of 5,200 lb. ST. Maximum speed is over 600 mph.

RCAF Orders Beeches For Training Plan

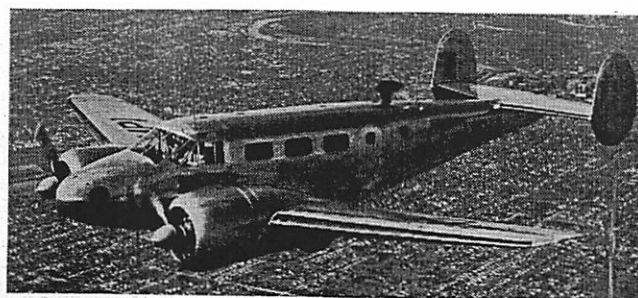
The Royal Canadian Air Force has signed a contract with the Beech Aircraft Corporation, Wichita, Kansas, which will provide Beechcraft twin-engine airplanes (D18S) for pilot training, navigation training and short-range communications work of the RCAF.

While the exact numbers of aircraft and total dollar amount of the contract have not been revealed, a "substantial number" of the planes have been purchased. First deliveries of the twin-engine Beechcrafts to the RCAF are scheduled to begin in May.

The planes are for navigation training, completely fitted with astrodomes, plotting tables, and other navigational aids and instruments; for the pilot training; and for transport. For navigation purposes the new Beechcrafts will supplement Dakotas now used in this RCAF program.

The Beechcraft Model D18S is powered by two 450-horsepower Pratt and Whitney engines, carries seven-to-nine persons, has a top speed in excess of 230 mph and a maximum range of 1420 miles.

During World War II, Beechcraft production lines turned out a total of 7,000 military versions of this twin-engine Beechcraft. Military and commercial versions of this plane are now in operation in 17 countries of the world serving in varied training and transport capacities.



BEECH FOR RCAF—A quantity of Beechcraft 18S trainers and transports, as shown above, have been ordered by the RCAF.

Defense Contracts To Be Dispersed

The distribution of defense contracts to small enterprises across the country will concern a special advisory council to operate with the recently created Dept. of Defense Production at Ottawa, according to a Government announcement. Its purpose will be to help small plants to get into the picture by showing sub-contractors where to farm out their work.

Absolve Curtiss-Reid In "Pilgrim" Crash

The French board of inquiry investigating the crash of the Canadian Pilgrim, DC 4 airliner operated by Curtiss-Reid Flying Service, has issued a preliminary report that it had discovered no evidence that the company or the aircraft were responsible for the disaster. The airliner crashed in the French Alps on Nov. 13.

Canadian Car Tools For Harvard Output

Tooling for Harvard manufacture is in progress at Montreal, pending transfer to the Fort William plant of Canadian Car & Foundry Co. Ltd., according to a statement

by J. T. Asquith, vice-pres. and general manager of the company. It was indicated that production rate would reach 25 trainers a month, with at least 1,000 planes on the order.

Burnelli Loadmaster Gets U. S. Evaluation

Prospect that the Canadian-built Burnelli Loadmaster might be purchased by the U. S. military services was seen in reports that the aircraft is in the United States on a demonstration tour.

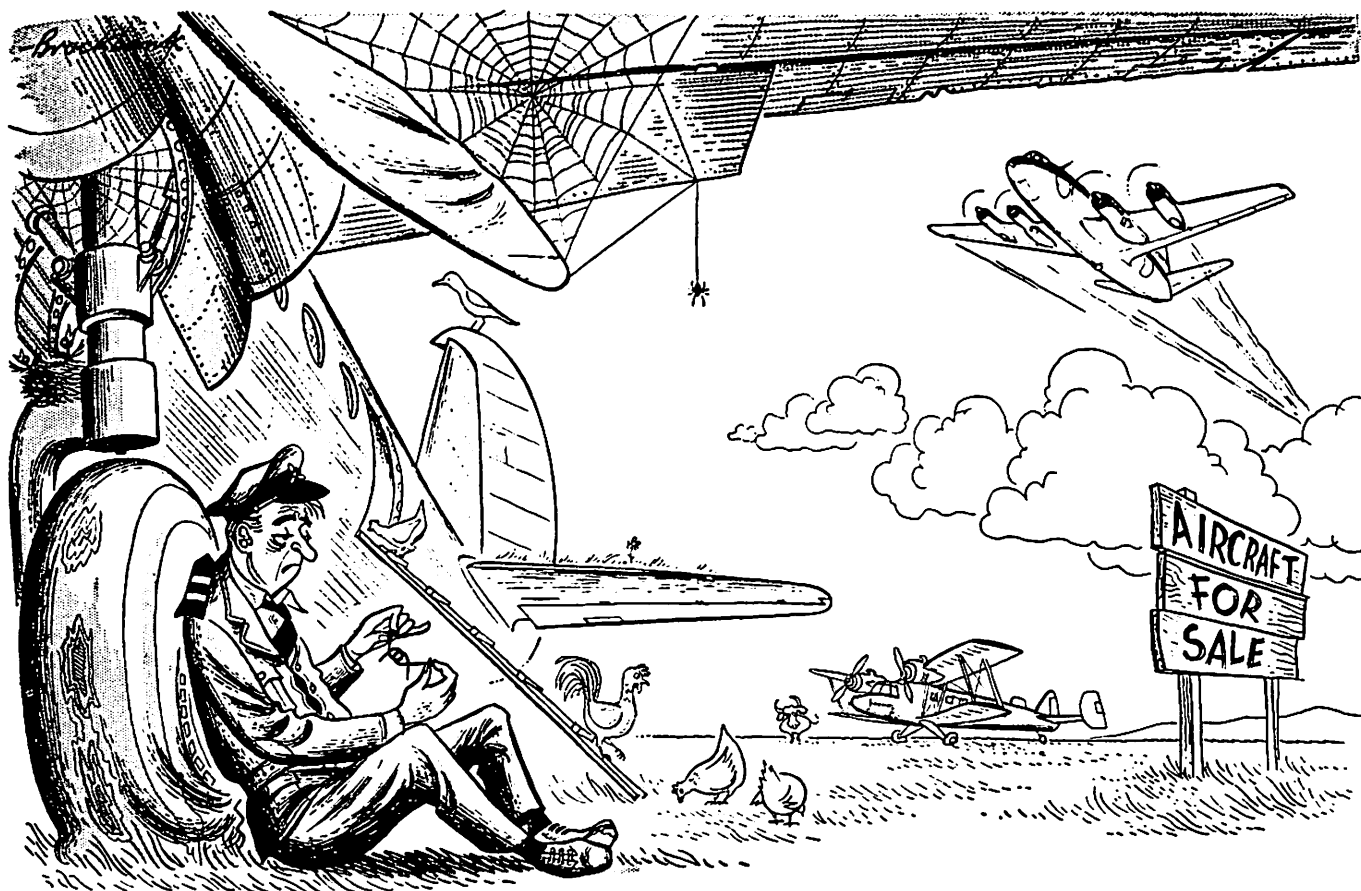
The Burnelli freighter features an airfoil-shaped fuselage, unusually large loading doors on either side, and a spacious interior. Based on the design by Vincent Burnelli, long an exponent of the airfoil-fuselage principle, the aircraft was engineered and built by Canadian Car & Foundry Co. Ltd.

It is being flown on its current demonstration tour by Clyde Pangborn, famous pioneer pilot. It is being evaluated by the USAF and the Airborne Division of the U. S. Army.

TCA to Look at Jets In Four Years

It will be "at least four years" before Trans-Canada Air Lines will acquire jet or turboprop airliners, according to a statement of President Gordon McGregor, speaking at Calgary. There is still four years' depreciation life in the North Stars, but after that time, "we should be able to form a reasonable decision on turboprop or jet aircraft," he said.

Stuart Graham, formerly supt. of air regulations in the Dept. of Transport, will head a four-man technical assistance mission being sent to Ethiopia by the International Civil Aviation Organization.



The Airline Operator who missed his TURBOPROPORTUNITY

To-day is no time to think about turboprops, it's the time to act. The Vickers Viscount is more than "in the air"—a fleet is in production for British European Airways. The Viscount's turn of speed and greater comfort only begin the story, for its operating advantages at medium and short ranges are equally compelling.

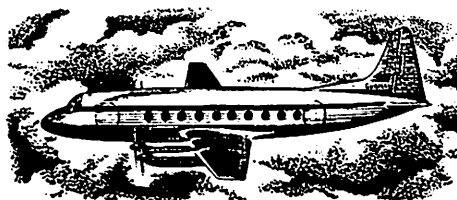
FOUR ENGINE SAFETY

The Viscount can take off on three of its four Rolls-Royce "Dart" engines and fly, or "stack" on two. These turboprops run so smoothly that serviceability on all counts—engine, airframe and accessories—is exceptional. Moreover, they run on kerosene fuel.

THE PASSENGERS' CHOICE OF AIRLINER

All the fare-paying passengers so far carried in the Viscount have remarked on its freedom from vibration and its quietness, and on the lack of fatigue at the end of their flight. Pilots say the same and also praise its all-round docility in the air.

That's not all—but enough to make it clear that to-day no major airline dare overlook the Viscount's proven performance.



VICKERS-ARMSTRONGS LIMITED, AIRCRAFT DIVISION, WEYBRIDGE, SURREY, ENGLAND



Broader Wings for TCA

THE SUPER CONSTELLATION

PROSPECTIVE purchase of five Lockheed Super Constellations, representing a capital outlay of \$7.5 millions, is regarded by the Canadian airline as the next logical step in a continuing expansion program. The Super Connie, or 1049C, is a much bigger aircraft than the North Star (a 50,000-lb. increase in all-up weight), with boosted earning capacity on the ocean runs. Furthermore, it is designed for conversion to propeller turbine engines without significant modification. In fact, the Wright Com-

Top of page—Heavier than the North Star by 50,000 lb., the Super Constellation will add to TCA's Trans-Atlantic capacity.

pound power plants in the Lockheed 1049C derive 20% additional shaft horsepower by diverting exhaust gas through turbines.

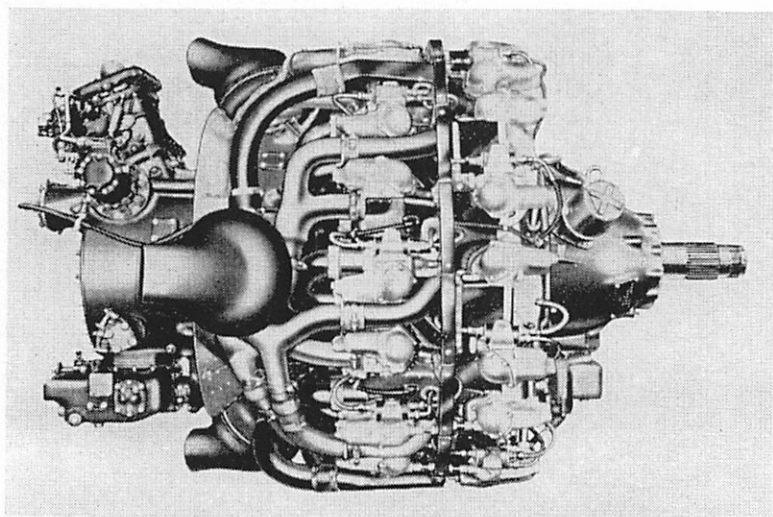
When the Super Connies are delivered late in 1953 and put into operation, probably early 1954, the North Stars now plying the Atlantic and Caribbean routes will be assigned to the domestic services which even now are short on flying equipment.

In the meantime three Canadair Fours, similar to North Stars, are to be purchased by TCA from Canadian Pacific Airlines (total price \$2 millions). These probably will be flying TCA domestic routes early next year. Thus, eventually, TCA will have 23 North Stars, in addition to 27 DC-3's on domestic operations, plus five Super Constellations on the overseas services.

Route Analysis—A study of the Super Constellation as applied to the TCA North Atlantic route reveals some impressive statistics. Assuming average wind conditions in summer, the 1049C will carry a payload of 16,000 lb. Montreal-Prestwick-London, to include 48 passengers with baggage plus 4,670 lb. of cargo. Block speed will be 258 m.p.h. Fuel consumption, 24,300 lb. Altitude, 10,000 ft. Block time, 11 hrs. 35 min.

While a new venture, the Super Constellation, as delivered to TCA will by no means be an orphan. Some 140 of these big airliners powered with Wright compound engines are on order. Taking into account military requirements in the U. S. and elsewhere, some 5,000 compound engines are already on order.

One of the largest single Super Constellation orders has been placed with Lockheed by Eastern Air Lines. EAL



Four of the Wright Turbo-Compound engines are used. Output of each is 3,250 h.p.

has ordered 30 of the type. Air France has ordered 10 Super Connies. Other airlines on the list are: Royal Dutch Airlines (KLM), nine; Pakistan Airways, three. The commercial backlog of orders for the Super Constellation has topped \$100 millions, Lockheed reports. The military orders exceed this amount.

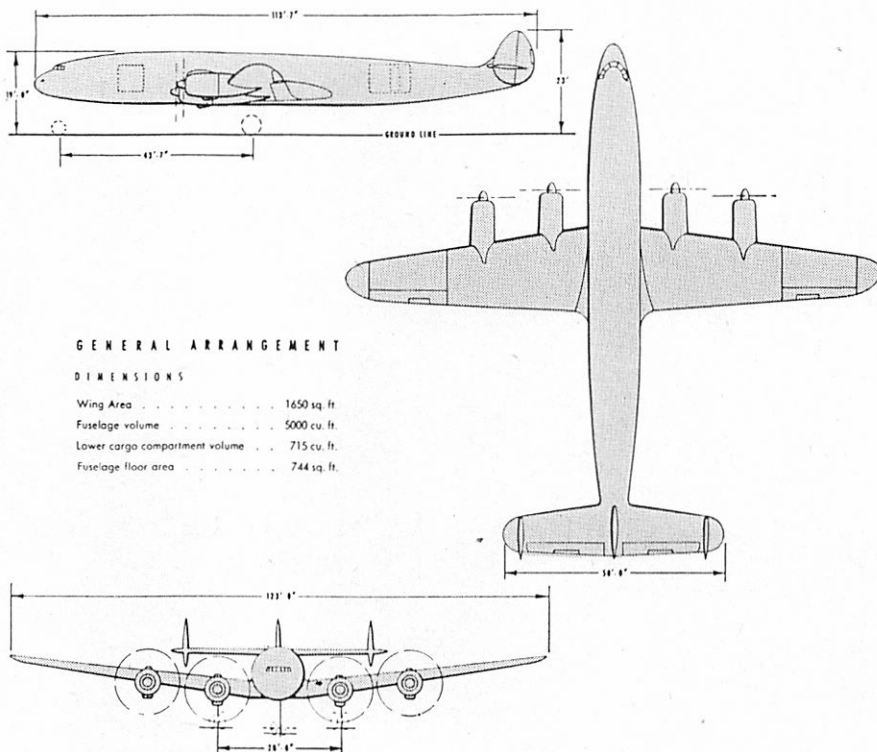
Top Capacity: 74 Seats

Capacity payload of the Super Constellation is 16,000 lb. Passenger utilization of this capacity on the Atlantic service will be limited by the plan to use two compartments of "siesta" or lounge seats and one compartment of sleeper-conversion seats as well as a standard-seat section in the aircraft. This plan allows for 48 passenger seats, although high-density seating would accommodate up to 74 seats.

Present all-up weight of the Super Connie (1049C) is 130,000 lb. This, however, is a structural rather than a performance limitation and the manufacturer has indicated the probability that an additional 1,000 lb. may be added to the gross weight, a factor which would not change the flight characteristics. Most of this extra allowance would be in the form of payload.

The 1049C is designed for ultimate conversion to prop. turbine engines but it is not anticipated that commercially proven gas turbines of the required power will be available for a number of years.

The substantial cargo capacity of the new airliner will be a boon to



TCA's air cargo department. Cargo volume available is 728 cu. ft. With a full complement of passengers there will be about 3,090 lb. of cargo payload available for advance sale.

Quieter Operation

The exhaust turbine feature of the Wright compound engines will mean

a much quieter operation from the passenger viewpoint than current types. The Super Connie will be a marked improvement over the present North Star in this respect.

Cabin Layout — In the TCA Super Constellation there will be twin lavatories at the propeller plane with eight

(Continued on page 64)

G. R. MCGREGOR, TCA PRESIDENT:

Since this is the first major order for new equipment placed by TCA since 1947, and since the total expenditure involved exceeds \$10 millions, this event marks another most important milestone in the history of the growth of the airline.

Until comparatively recently it was the hope of management that the purchase of the North Star type aircraft presently operated by Canadian Pacific Airlines would meet our equipment requirements for a sufficiently long period to make it possible for us to order, with confidence and assurance of reliable and economical operation, aircraft having one or other of the new forms of turbine power.

Two completely different trends made necessary a change in that program.

In the first place, the continued strong growth of traffic steadily advanced the date upon which additional equipment would be required.

Secondly, the tremendous demands now being made by governments on the aircraft and engine industries for both the design and manufacture of military types has very noticeably retarded the development of turbine power plants suitable for airline use.

While fully appreciating the need of an airline to keep its equipment "up-to-date," TCA must not gamble with very large sums of money by placing orders for aircraft involving the use of power plants which have yet to prove themselves both as to reliability, economy and range.

The unhappily long interval between the ordering and delivery

of large aircraft, coupled with the policy already referred to, imposed on the company the requirement that it make a purchase of piston engined aircraft, with the size of the purchase aimed at bridging the gap between 1954 and the full development and delivery of turbine powered equipment.

Thus narrowed down to basic type, the problem became one of selection between the Douglas DC6-B and the Lockheed Super Constellation, powered with the new Wright 3350-C compound engine.

Very detailed technical and economic comparison studies were made and it is perhaps not surprising that the larger and heavier aircraft, the Super Constellation, was favored by these comparisons, due almost entirely to the fact that the planned use of the aircraft in question was on the company's longest overwater routes.

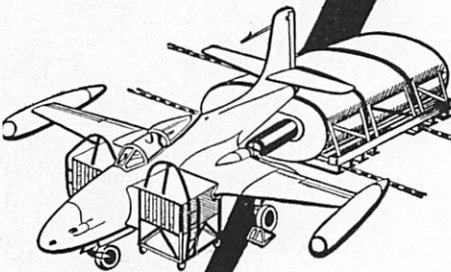
With new and imposing aircraft destined to join the company's fleet in 1953 it would perhaps be only human for TCA people to begin to regard the North Star as honorable but elderly servants whose retirement is in sight.

This is most definitely not the case. The North Stars have just completed three years of their planned service life of seven years. Today they are successfully achieving more hours per day of useful work than any other aircraft type in scheduled service. They are doing an excellent job for Canada and for TCA and will, I hope and expect, continue to do so for several years to come. In that belief, work will be continued on the noise reduction program which, if successfully completed, will eliminate the only serious fault in a great airplane.

INDUSTRIAL SOUND CONTROL

Quiets Noise of JET AND RECIPROCATING ENGINE TEST CELLS

PUT AN END TO . . .
ANNOYANCE, COMPLAINTS,
THREATS OF LEGAL ACTION



Industrial Sound Control Jet Aircraft Mufflers and Panels cut the roar of jets to the level of neighborhood noises.

ISC MUFFLERS ELIMINATE EXCESSIVE WATER CONSUMPTION

ISC engineering can quiet your aviation manufacturing operations . . . in the test-cell . . . on the airstrip. ISC installations are proving their effectiveness in aircraft engine and plane plants everywhere!

WRITE, WIRE, OR PHONE FOR
FURTHER INFORMATION.

Industrial Sound Control, Inc.

45 GRANBY STREET
HARTFORD, CONN.

2119 SEPULVEDA BLVD. LOS ANGELES, CALIF.



An increase in visibility of 85 per cent is claimed for windows in the "Super Connie."

Super Connie

(Continued from page 27)

lounge seats forward of this area. The crew quarters, including two crew bunks, will be still further forward.

The forward cabin, extending from the lavatories to the buffet and coat rack (adjacent to the cabin door) will contain 24 lounge seats and a lounge area with eight seats, or eight berth-

able seats (two uppers and two lowers). Behind the galley will be the aft cabin with eight seats, with a coat room and twin lavatories in the rear.

The turbo compound engine, which was developed by Wright Aeronautical for the U. S. Navy's long-range patrol planes, is an 18-cylinder piston engine with three small turbines which are driven by the exhaust gas. In this way the total power of the engine at the propeller shaft has been

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We have as complete stock of AN parts, electric wire, aircraft bearings, aircraft switches, aircraft engine and flight instruments, etc. as are available.

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increased about 20% with no increase in fuel consumption.

Dimensions and Characteristics

Weights

Max. Take-off gross (lb.)	130,000
Max. landing wt. (lb.)	105,000
Max. zero fuel wt.	100,000
Max. fuel capacity (Imp. gal.)	5,470

Dimensions

Wing span (ft.)	123
Over-all length (ft.)	113.6
Over-all height (ft.)	24 ft. 9 in.
Wing area (sq. ft.)	1,650
Aspect ratio	9.17
Flap area (sq. ft.)	295.4
Track main gear (ft.)	28

Engines

Wright R-3350 -C18DAI

Turbo-Cyclone

Take-off bhp/engine 3,250

Meto Power—Low Blower, bhp 2,650

—High Blower, bhp 2,450

Max. cruise power—Low, bhp

(72.5% Meto) 1,910

—High, bhp

(73.5% Meto) 1,800

Specific Consumption (lb./hp./hr.)

At Meto power—Low blower 0.636

—High blower 0.620

At max. cruise power—Low .. 0.427

—High .. 0.430

Performance feet

Distance to clear 50 ft. 4,300

CAA take-off distance 5,700

Stop dist. from 50 ft. (ldg. wt.) 3,020

CAA landing distance (ldg. wt.) 5,040

Rates of Climb

(Meto power and sea level)

ft./min.

4 engines, max. T.O. gross wt. 1,195

3 engines, max. T.O. gross wt. 580

2 engines, max. ldg. wt. 300

Average climb to—10,000 ft. 910

—15,000 ft. 833

—20,000 ft. 690

Wing loading at T.O. (lb./sq. ft.) 78.8

Power loading at T.O. (lb./bhp.) 10.0

CORRECTION

Elastic Stop Nut Corp. of America, manufacturer of more than 3,000 different types and sizes of Elastic Stop Nuts, as well as the Rollpin, the new self-locking industrial fastener, wishes to point out that while MacDonald Bros. Aircraft Ltd. of Vancouver, Winnipeg and Ottawa has served as distributor of Elastic Stop Nuts for many years, the Rollpin has not been officially released either in Canada or the United States for jobber distribution.

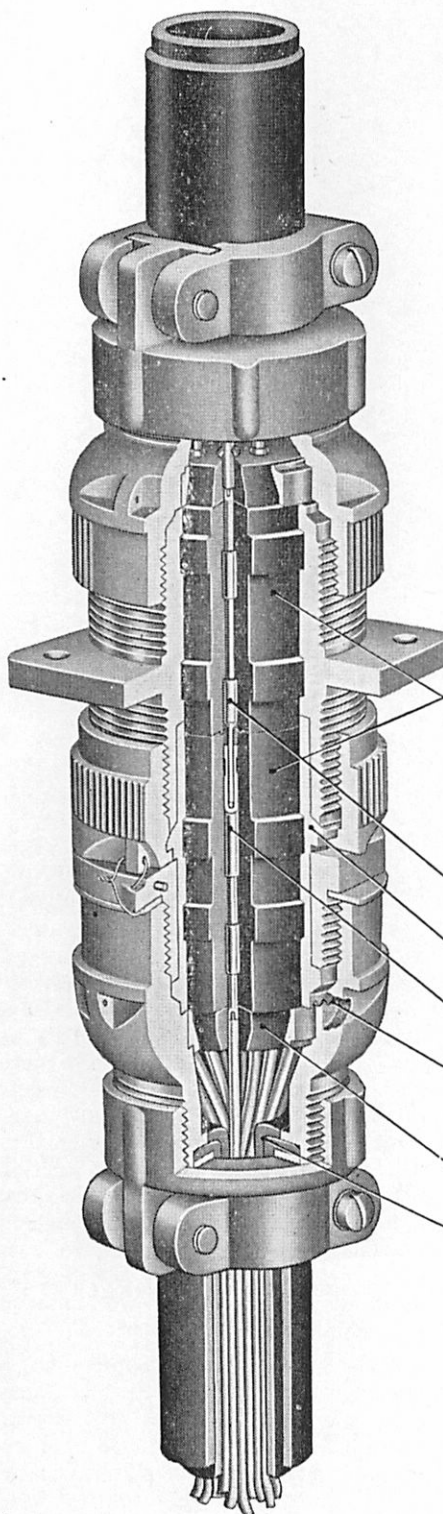
The advertisement on page 60 of the September issue of Canadian Aviation, inserted through error by the publication, indicated that this was not the case.

A. J. Campbell & Co. Ltd., 1440 St. Catherine St. W., Montreal, represents ESNA in Canada as sole sales agents for Rollpins and Elastic Stop Nuts for ESNA—the self-locking stop nuts, with the characteristic red elastic collar.

Here's why those in the know

—demand

CANNON PLUGS



Here's another example of the meticulous care Cannon Electric uses in building connectors for highly specialized, tough jobs. This AN-"M" type connector is moisture-proof, vibration-proof and pressurized. Radio shielding is provided and every threaded part is drilled for safety wiring.

No corners are cut—nothing is overlooked to assure you outstanding performance. This connector is designed for aircraft use but there are more than 18,000 different Cannon Plugs made with the same care to serve the exacting needs of many industries. If you are looking for real value, regardless of the field you work in, your best bet is Cannon.

Molded Polychloreprene inserts 75-80 shore hardness provide pressure-proofing of both pin and socket contacts. Have high dielectric strength under wide range of temperatures and at extreme altitudes. Mated fittings will not show more than 10 microamperes dielectric leakage and will not arc when subjected to 7500v dc at room temperature.

Pin Contacts machined from solid brass, silver-plated. Solder cup hand-tinned.

Machined ball-in-cone joints provide radio shielding and improve vibration resistance.

Socket contacts machined from solid copper alloy with new Cannon design, silver-plated.

Matching serrations in end bell and shell make practical wrench-tightening from one side of the installation without putting strain on contacts or wires.

Polychloreprene grommets make moisture-proof seal over soldered connections.

Concentric rubber bushings under pressure of cable clamp provide snug, moisture-proof wire entry. Eliminate usual strain on outer wires. Provision is made for grounding lug.

Engineering bulletins describing each of the many basic types of connectors are available. We will gladly send you any of these if you will simply describe your connector requirements.

CANNON ELECTRIC Limited

2451 DANFORTH AVENUE, TORONTO

Montreal Office - Trans-Atlantic Bldg., Montreal Airport, Dorval, P.Q.

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page 68)

IL IN VISCOUNT AND
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VIKING
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VIKING
VISCOUNT

Viscount Impressions

By CAPT. R. J. BAKER

Technical Assistant to the
Director of Engineering,
Trans-Canada Airlines

THE Vickers Viscount has been under study by TCA for some time, as it represents a new and promising era of airline development and operation. We have all been following with much concern its development and specifications.

The prototype of the 700 series was flown through control, system and certification tests by the Vickers-Armstrongs Co. and has been on loan to British European Airways for route trial and training purposes. We were interested in examining the aircraft further, and through the courtesy of BEA I was privileged to take part in some of these trials and proving flights of the prototype.

Climbing aboard for the first flight, I was impressed with the excellent workmanship of the cabin interior, especially since this was the prototype experimental aircraft.

Sitting back in the cabin, one notes particularly the excellent visibility through the large windows, all of which are removable from the inside. Vickers have endeavored to make any openings or cut-outs in the fuselage elliptical, or as close to it as possible, to maintain even stresses around the frame. The cabin interior is only slightly smaller than the North Star, this prototype model being arranged with 40 seats.

Engine starting is extremely smooth and unaccompanied by the medley of noises, reports and spontaneous explosions usually associated with piston engines. In fact, from the cabin, one has to look at the propellers turning over to realize the engine is running at all.

Take-off is smooth, with somewhat of the jet aircraft impression of sailing into the air. The rate of climb is quite rapid after take-off, and one

engine inoperative performance very good. For take-off, in addition to the 1,400 shaft horsepower to the propellers, the engines also give about 365 pounds each of jet thrust from the tailpipe.

Engine handling is relatively simple, since on the Dart engine the propeller control is connected through the engine controls and all is automatic to maintain the desired engine speed. This is normally 13,600 revolutions per minute in climb and 13,300 in cruise flight.

The aircraft handling characteristics in flight are excellent. Control is quite conventional, combining light control forces with positive response. The aircraft is stable on all axes, yet responds readily with an excellent degree of "feel." It is the type of aircraft a pilot feels happy with right from the start of handling it in the air.

The stall characteristics are good, with stall warning in the form of tail buffeting as the stall is approached, and normal recovery. Approach for landing is conventional, with normal control of airspeed, engines and flaps. On settling on the landing gear, the propeller blades automatically move to what is termed a "ground fine" pitch; that is, the propeller blades assume an extremely flat angle, designed this way to enable easier engine starting and proper engine operation.



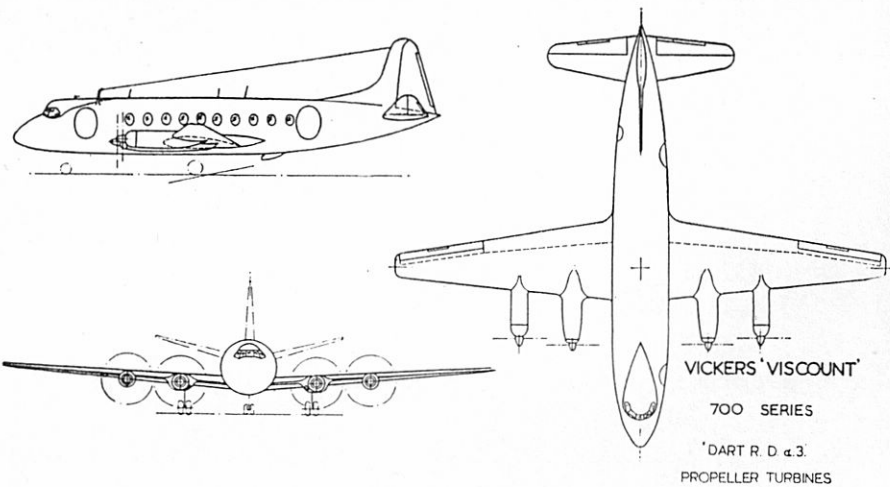
CAPTAIN BAKER

ing temperature. The high drag resistance of the flat blade results in a braking effect which is quite marked, feeling somewhat as propeller reversing does on piston engine aircraft. The deceleration is definitely noticeable and there is little need for the use of brakes after landing.

The Viscount is not a particularly fast airplane as we think of aircraft speed today. At the altitudes and powers at which TCA will be operating them, the average true airspeed would be around 300 m.p.h. This is considered adequate at the present time for our short range intercity operation.

A feature of the aircraft is the relatively high operating cabin pressure differential of 6.5 lb. per square inch. This means that at a flight altitude of 20,000 feet the cabin can be at 3,000 feet. This is advantageous operationally, for it

(Continued on page 73)



324,700
28,700

410,582

25,000

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30,000

30,492

17,249

225,575

86,715
969,880
78,750

274,235

241,292

42,932

52,425

66,700

62,250

10,579

27,806

12,319

631,200

327,600

241,292

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The NEWS

JUNE

CANADIAN AVIATION

1953

ORENDA-SABRE BEATS RECORD

Jacqueline Cochran regained the women's air speed title May 18 when she broke a closed-course testing record at Muroc Field in California in a Canadian-built F-86 Sabre jet powered by an Orenda engine.

Employed as a "flight consultant" by Canadair since last November, Miss Cochran was clocked at 652 miles an hour on the 100-kilometre course. She became the first woman to fly faster than sound, presumably in a dive.

The previous record on the course, set by Col. S. J. Ascani, of the USAF, was 635 miles an hour. The fastest any woman had flown before was the 540

mph record held by Jacqueline Auriol, daughter-in-law of the President of France.

Miss Cochran has been flying since 1932 and in four Bendix air races against men she came in first once, second once and third twice. She is a member of the French Legion of Honor and is a lieutenant - colonel in the USAF Reserve, holding the U. S. Distinguished Service Medal, awarded for her work in training women aviators in the last war. Before the U. S. A. entered the war, she organized the Transport Auxiliary, a group of women pilots who flew bombers to Britain from the U. S. A.

Viscount Tests Successful

Satisfaction over the six weeks of successful winter service trials in Canada of the prototype Vickers Viscount has been expressed by Trans-Canada Air Lines, which has purchased 15 of the turbo-prop transports. The trials included 113 hrs. 30 min. flying time.

The airplane with its crew of 15 Vickers technical experts, arrived in Montreal February 16 after completing the first trans-Atlantic crossing of a turbine-propeller airplane. A group of TCA engineers joined the Vickers group on trials at Winnipeg and Fort Churchill on Hudson Bay. After extensive testing under low temperature conditions the Viscount returned to Montreal for icing trials. It arrived in England April 5.

TCA also expressed special pleasure "with the close co-operation between the British manufacturers in supporting each other's commitments for the over-all good of the Viscount."

National Air Show

The National Air Show, originally planned for this month, will be held in Toronto on September 19.

Many facilities erected for the purposes of the Canadian

National Exhibition will be left at the disposal of the air show and the armed services static exhibit will remain.

A more ambitious flying display will be put on than last year, including a squadron of CF-100s and the first public showing of the RCAF de Havilland Comet.

RCAF Purchases Aircraft Abroad

Canada's postwar program of importing aircraft from the U. S. and U. K. to re-equip squadrons of the RCAF and RCN (Air) appears to be nearing completion.

The largest aircraft ordered abroad are the two de Havilland Comets purchased in England for use as high speed transports and navigation trainers. Both of these have been accepted by the air force in England, but are remaining in Europe until the crews have obtained experience.

American - made Fairchild Packets continue to be ferried north by Canadian pilots. These twin-engined medium transport are replacing veteran Dakotas on army parachute corps operations. The complete number is expected to



NEW SABRE JET—Successful first flight of the F-86H, fifth and latest in North America's series of swept-wing Sabre jet fighters, has been announced by the USAF. Company test pilot, Joe Lynch, formerly of Columbus, Ga., said the new Sabre leaped into the air on its first take off "like it had been kicked in the pants."

STOP-THE-PRESS NEWS

Greenaway Wins McKee Trophy

S/L Keith Greenaway, seconded from the RCAF to the Defense Research Board, has won this year's McKee Trophy for meritorious service in the advancement of Canadian aviation.

Last year's winner of the

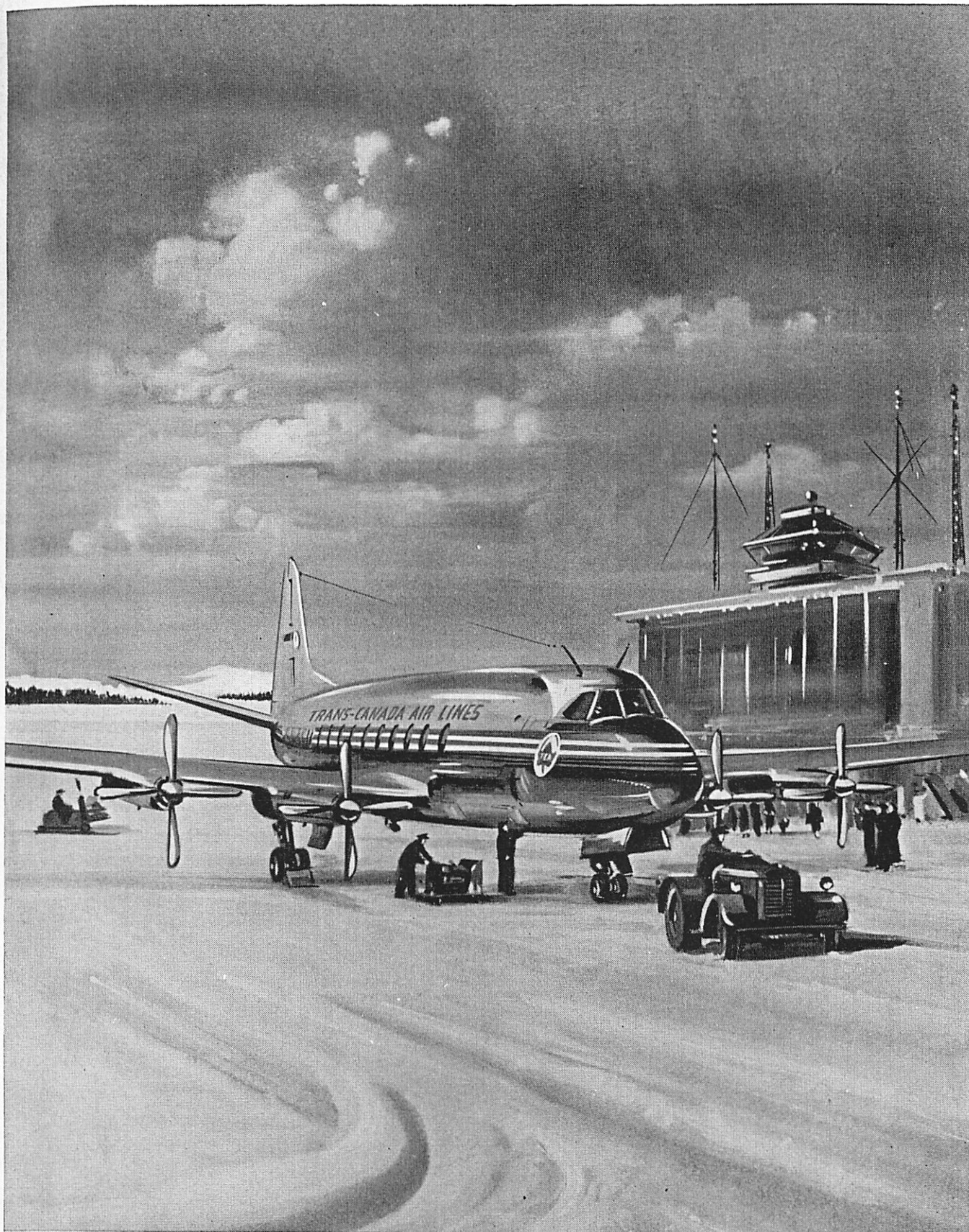
Fairchild Thurlow award, the western World's most prized navigational distinction, he perfected the twilight computer for the RCAF and RAF which enables pilots to fly accurate courses in the difficult Arctic twilight. He also wrote a text on Arctic navigation adopted by the RCAF and used by the USAF and RAF. His versatility is evident in his winning of the presidents' prize last year of the Royal Meteorological Society (Canadian Branch) for his paper, "Experiences with Arctic Flying Weather."

awaiting a few Hawker Sea Furies from the U. K.

The time-honored Noorduyn Norseman, designed and built for operations in Canada's northland, has been pensioned off by the RCAF.

This sturdy little monoplane saw service for almost two decades and although commercial models still are in use, the Norseman is bowing out of uniform.

The few remaining Norsemen which the RCAF own are reported being dismantled and crated. Likely they will be sold as surplus equipment.



CANADIAN AVIATION SEPT 1953

VICKERS VISCOUNT

FOUR ROLLS-ROYCE DART PROPELLER-TURBINE ENGINES



Trans-Canada Air Lines are to introduce the Viscount on their inter-city services towards the end of 1954. It will then become the first turbine-engined airliner to operate in North America.

OA208

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FLYING CLUBS



Monthly Report

By GEORGE HURREN
Secretary-Manager
Royal Canadian Flying Club Association

A Quick Picture

The 37 members of the Royal Canadian Flying Clubs Association during the 12-month period Dec. 1, 1952, to Nov. 30, 1953, graduated 976 private pilots on the approved course, for an increase of 25.45% over the previous year. They graduated 159 commercial pilots on the approved commercial course, for an increase of 3.92% over 1952 and in addition have trained over 300 ex-Air Force pilots to commercial license during the year. They flew, in total, close to 78,000 hours on 176 aircraft, for a flying increase of 13.21% over 1952, and an average utilization of 441 hours per aircraft.

Taking into account all types of accidents from a scraped wing-tip to complete write-offs, the accident ratio has been improved to one accident for every 1,950 hours, and the number of accidents were reduced by 40% as compared with the previous year.

Meanwhile flying hours increased by 13.21%.

The ratio of one to 1,950 hours represents one accident for approximately every 195,000 miles of travel. We wonder how many car drivers travel that distance without at least one minor if not a serious accident and, of course, one must also remember that a large percentage of each of those 1,950 hours were flown by student pilots on solo flights while under training for license.

Of the 37 member clubs two, namely Hawkesbury and Saskatoon, have been inoperative during the year. All of the remaining 35 are licensed to provide the approved private pilots' course; 25 are licensed to provide the approved commercial pilots' course; and 14 of these conducted an absolutely accident-free operation during which time they flew 18,953 hours.

The contribution that these non-profit clubs are making to Canadian aviation cannot be overstated.

TCA Super-Connies For Domestic Routes

Trans-Canada Air Lines have announced that 63-passenger super-Constellation aircraft will be introduced on their Montreal-Vancouver route next autumn.

Eight of the aircraft are being built for TCA at Burbank, California, by Lockheed Aircraft. The first are to be delivered in a couple of months to be used on TCA's trans-Atlantic flights next summer.

Others will be used on the daily flights between Montreal and Vancouver. They will supplement the existing service in North Star aircraft. Gradually these North Stars will be converted to cargo-carriers and coach-type passenger carriers.

The Constellations, with cruising speeds of 300 miles an hour, will make the trans-

continental flight in about 11 hours, compared with the 13 hours it now takes in North Stars.

One Constellation will operate between Montreal and Vancouver via Toronto, Winnipeg and Calgary; a second will fly Montreal, Toronto, Winnipeg, Edmonton and Vancouver.

Besides 63 passengers, the new aircraft will have space for two tons of freight, mail and baggage.

RCAF Units Change

RCAF auxiliary units in Calgary and Winnipeg have been transferred from the control of Tactical Air Command, with headquarters in Edmonton, to Air Defense Command, with headquarters at St. Hubert, near Montreal.

RCN Plan for F2S1

The Royal Canadian Navy are seriously considering having a small twin-engined sub-hunter, the Grumman F2S1, built in Canada. The plane is seen as ideal for the job either from the new Bonaventure carrier under construction or from shore-based stations.

RCN requirements have been stated as for 250, some of which would be turned over to other NATO countries under Mutual Aid. The contract for such production, totaling some \$100 millions, would be split between de Havilland Aircraft of Canada and Canadian Car & Foundry Ltd.

The RCN is also arranging to purchase about 30 McDonnell F2H3 Banshee jet fighters and parts from the U.S. Navy for \$10 millions. These twin-engine all-weather jet fighters will replace the RCN's carrier-borne prop-driven Hawker Sea Furies. There are now two squadrons of about 12 planes each.

TCA Air Freight

The Canadian Air Transport Board has approved a reduction in TCA air freight charges across Canada. The new rates, cutting present tolls, by as much as 50 per cent in some cases, were expected to become effective January 1.

TCA approved rates are said to be roughly the same for air freight as CPA mentioned in its application as prospective rates for its air freight route across the country.

The tolls generally would be between 25 and 30 cents per ton-mile—that is, for a ton of cargo flown a mile—as compared with the current figure of between 35 and 37 cents per ton-mile.

The lowered charges—which do not take in faster-moving air express—will apply both to new planes that TCA is getting for air freight only and to cargo carried in passenger planes on the current "space available" basis.

RCAF Association

The 1954 annual convention of the RCAF Association will be held in Ottawa May 17 and 18. The Association expects the convention to be attended by approximately 150 members, representing the 78 Wings and 15,000 total membership across Canada.

J. C. Gray of Ottawa has been appointed as Dominion Secretary of the Association.



"Chuck" Tremblay

The appointment of C. E. Tremblay, as Manager of the Aviation Department of the Canadian Marconi Company has been announced.

"Chuck" Tremblay will head up a department whose purpose is to fill a requirement of the aviation industry for specialized aviation electronic sales, engineering, repair and overhaul facilities.



Dr. S. G. Hooker

Dr. S. G. Hooker has been appointed to the Board of The Bristol Aeroplane Company of Canada Limited. Dr. Hooker, a member of the Board of The Bristol Aeroplane Company Limited, England, since 1952, joined the British company in 1949 and was appointed Chief Engineer of its Engine Division in 1951. Since 1940, Dr. Hooker has been engaged in the design and development of gas turbines for aircraft and is considered one of the foremost authorities in the world in this field.



THE delivery of the first of eight Super Constellations to Trans-Canada Air Lines and their approaching operation on trans-Atlantic and transcontinental routes mark a new era for both the airline and the aircraft.

When the \$2-million aircraft goes into service on Canadian domestic routes this fall, it will cut the present flight time between Montreal and Vancouver of 12 hours to 10 hours. Sixty-three passengers will be carried in a two-by-two seating configuration. The Atlantic service of the TCA-type aircraft will be the first when both first-class and tourist-class passengers are carried on the same aircraft. Nine passengers will occupy the luxury quarters and 54 will fly in the two and three seating configuration in the main cabin.

TCA decided to purchase the aircraft three years ago at a time when it had the best range of any aircraft available. Since that time the DC7 has come out, an aircraft which with the same engines is slightly faster, some 10 mph, but TCA does not consider it able to perform trans-Atlantic duties. The Super Constella-

tion should be able to fly all east-bound TCA flights nonstop and most of the westbound flights as well. The North Stars now in service will be used on domestic routes. Originally it was planned to use Super Constellations on the Caribbean service, but now it has been decided to continue using North Stars.

TCA is the seventh air carrier to get Super Constellations. KLM, Air France, Pakistan and Eastern are now all operating this type with turbo-compound engines; TWA with C18CB1 engines (noncompound); and Eastern with C18CA1 engines. Qantas, LAV, Air India, Avianca, Cubana, Seaboard & Western, Iberia, Varig, Northwest, Thai Airways, Luftag in Germany and T.A.P. in Portugal are awaiting Super Constellations on delivery and TWA also has turbo-compound models on order.

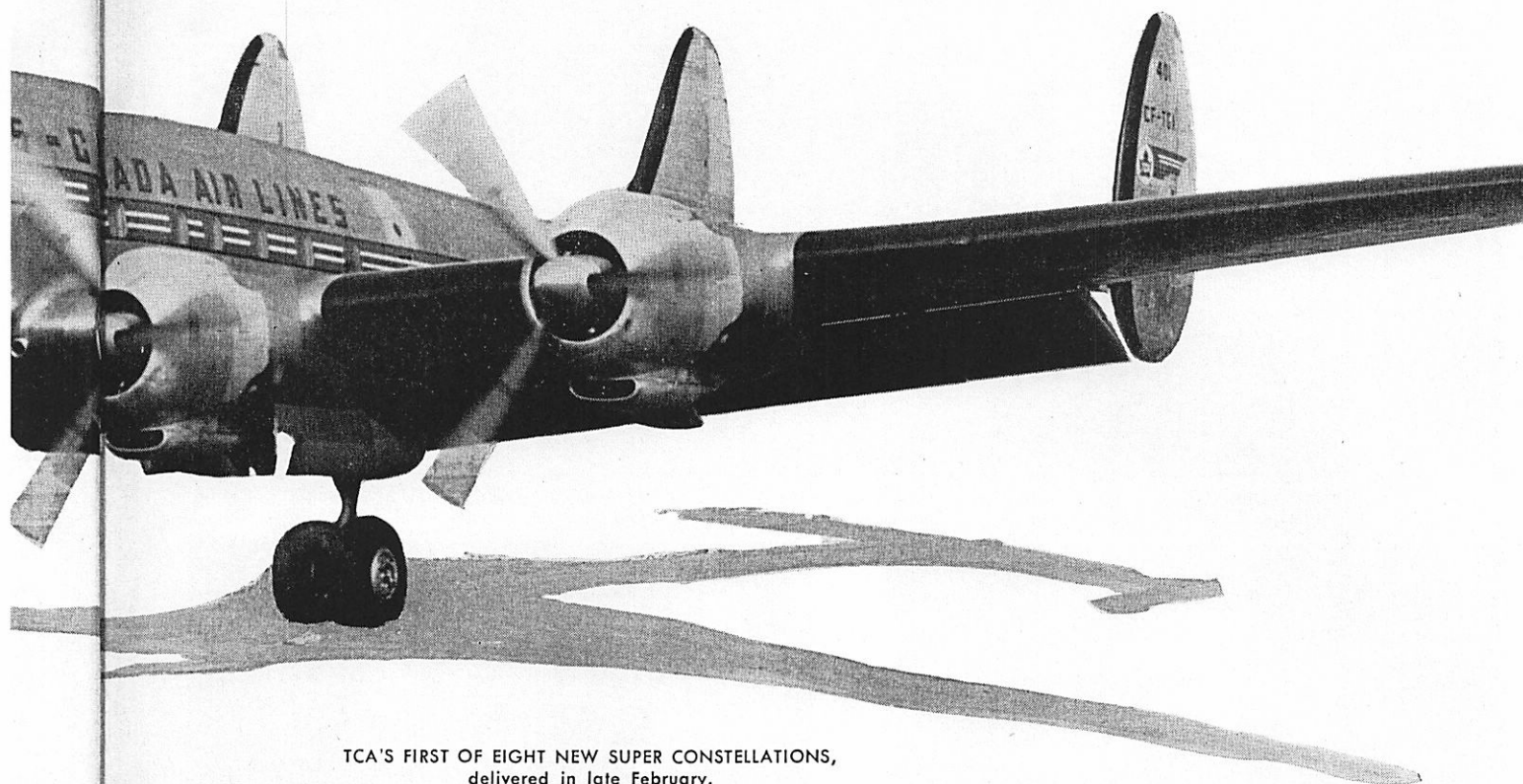
Recently Air India reordered Super Constellations, regarded as a significant development because Air India is awaiting Comets as well as Supercons—and could have reordered jets instead of compounds.

The TCA view is that they will be

ultimately flying the North Atlantic on straight jets but at the moment they do not know whether it might be in 1958 or 1965 because the development picture is not yet clear. They believe the Super Constellation will be the last piston-engined aircraft they will buy. How long they will use them depends on how quickly they can get jets to do the job required and the success they have with their Viscounts whose delivery will start this September about the time delivery for the Super-Constellations stop. TCA are counting on depreciating their Super Constellations in seven years.

The present engines are four Wright Turbo Compound power plants (a piston type with auxiliary exhaust turbine), which will give the plane a speed of 350 miles per hour plus. The plane has been designed so that it can take 450-m.p.h. turboprop power in the future—when those engines become available.

TCA's Super Constellations are



TCA'S FIRST OF EIGHT NEW SUPER CONSTELLATIONS,
delivered in late February.

'S NEW SUPER CONSTELLATIONS

closer to those of KLM than those of any other airline, having the same galley. The decorative scheme, however, is Canadian. A new arrangement for super-chlorinated water which will supply pure water at all times has been devised for the TCA aircraft. TCA also has its own radio and flight instruments which have been standardized with those in its North Stars and Viscounts. For the first time in TCA aircraft, a flight engineer will be carried in the Super Constellation, a CAA requirement. TCA does not favor the use of this "extra" crew member, being in favor of such simple flight operations as those they devised for the North Star.

TCA are now making arrangement for refueling the new-type aircraft across Canada, as a different fuel is used. Special ground equipment such as passenger stands and power units of greater capacity are being obtained. These latter will also be used for the Viscounts.

Maintenance for the Super Con-

stellations will be carried out at Montreal with instrument overhaul done at Winnipeg and running and minor repairs at Toronto. Although Toronto is probably TCA's biggest traffic centre the airline believes it should keep its routing and maintenance separate.

Thirty crews are being trained on the Super Constellations at Montreal Airport and in addition there is a large maintenance training program. Teachers for these special courses were sent down to the Lockheed plant in Burbank, California, for three months pre-instruction. In addition there are several Lockheed instructors on the job at Montreal.

In all some 350 employees are receiving a curriculum of maintenance and engineering subjects. The 23 technical specialists assigned to the task of creating a working force to handle the Super Constellation aircraft on the ground, in the hangar, and in the air, were recruited from the ranks of the airline's 3,000 overhaul and maintenance person-

nel. It is also the function of the group to acquaint the pilots with the internal layout and external servicing procedures. In the maintenance field, a cross section of the TCA overhaul and maintenance personnel forms the student body, and is attending the training centre for a period of five weeks.

A general "back to school" atmosphere prevails in the annex to TCA's Overhaul base where the university-in-overalls is located, in spite of a pointblank refusal by instructor to use the terms students or school.

"They are all mature men," says Walt Bailey, supervisor of training and publications, "and collectively both instructors and attendees represent a complete library of aviation know-how accumulated over many years."

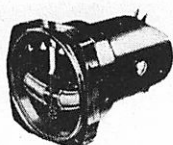
The instructional cadre of the "college" includes four prairie-born lecturers, Harold Campbell, of Meadow Lake, Saskatchewan; Harold Thorenton of Winnipeg, Manitoba;

(Continued on page 66)

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of our flight group with the Airways Engineering branch at Dorval.

Over Denver we contacted Regina, Winnipeg, Toronto and other TCA stations. The weather looked good at Montreal with a weak system in the Detroit area.

The aircraft was now holding a steady 340 but the wind continued across the route giving little or no help.

Passing through cloud near Windsor we were interested to find that the static pattern on the windshield formed an entirely new design compared to that on other TCA aircraft.

The lights of Toronto glowed up through the overcast as we passed overhead and prepared to request clearance for descent as soon as we reached Stirling. The ground speed was now approaching 360 as the wind reared slightly on our tail and it was essential to start the downhill run well back of Ottawa so as to cross there at 11,000 ft. or below.

We swung in over Dorval seven hours and fifty-five minutes after leaving Burbank having gained no appreciable help from the winds. Subsequent flight times should be below seven hours with a normal westerly flow.

The aircraft performed beautifully throughout the run which leads us to believe she will serve the country well on the trans-Atlantic and domestic routes when the next weeks of training and preparation are over.

SUPER CONSTELLATIONS

(Continued from page 27)



Boyd Moore of Winnipeg, Manitoba; and George M. Fellows of Calgary, Alberta. Now established as specialists on electronics, hydraulics, aircraft plumbing, airframes, and power plants, they recently returned from the United States and an intensive period of training with the various manufacturers.

The training staff was selected by

TCA for their ability to impart this complex information to other employees. The modern airliner is such an intricate maze of cables and electronic devices it can be likened to a telephone exchange, transmitting instruction, at the will of the pilot, to every section of its 118 feet length. A Super Constellation requires 27 miles of cable, and although the commercial liner does not operate solely on either direct or alternating current, it can nevertheless generate enough power to illuminate a small village.

A second airline college will be formed in Winnipeg for the conversion of ground crews to the turbo-propeller Viscounts, and to further the present training on the North Star and DC-3's, now serving inter-city, international and trans-continental routes.

In addition to the 16 instructors in the maintenance field, a group of seven flight engineers are members of the staff at Dorval. These instructors will train other flight engineers, and when required, fly the line on the Super Conny.

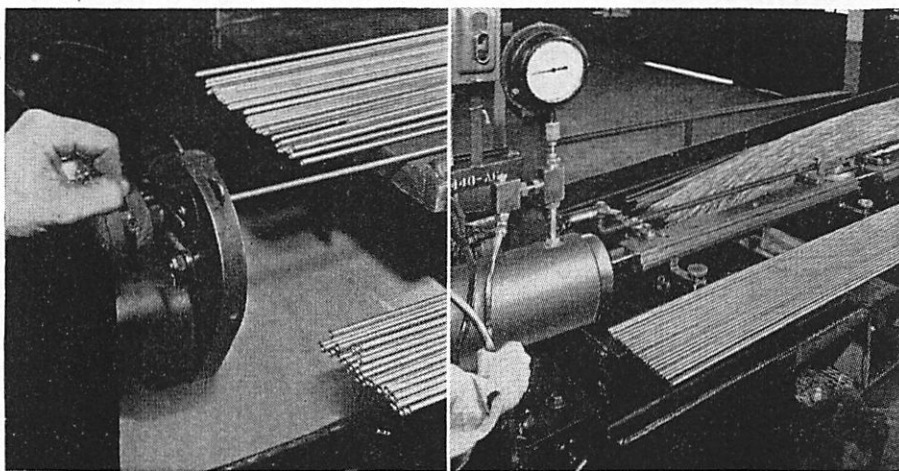
Pilots assigned to fly the new aircraft also attend the college for a period of three weeks before commencing flight training. It will be the function of the training group to acquaint the pilots with the internal layout and external servicing procedures.

"The day is long past," is the philosophy of the instructors, "when a pilot was only expected to concentrate on the mechanics of flying and navigation. An airline Captain and First Officer of today is steeped intimately in all functions of the aircraft's radio equipment, airframe, instrumentation, and power plants. Highly skilled professionals, the aircrews are kept abreast of the latest developments by the instructors of TCA's training staff."

The curriculum at the airline maintenance man's college covers 16 separate phases of instruction on aircraft electrical installations, controls, air conditioning, radio, engines, propellers, airframes, and electronic navigation aids.

"One glance at the list of subjects," commented Walt Bailey, "proves that the Super Conny and similar modern aircraft are through-going airborne communities, complete with light, heat, air conditioning and plumbing. Nothing is lacking to ensure the reliability of the aircraft, and comfort of the passenger."

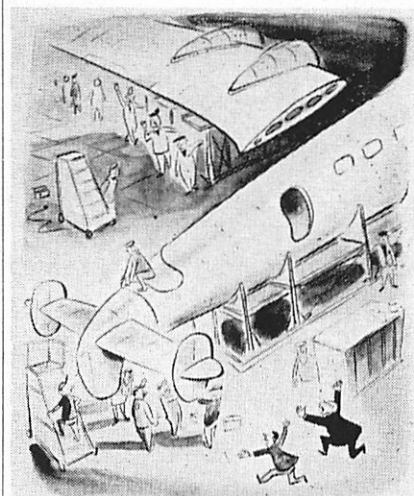
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The trans-Atlantic version of TCA's Super Constellation will be flown by a crew of seven—pilot and co-pilot, flight engineer (directly behind the co-pilot), radio operator, (whose equipment is set up on the port side of the crew's quarters) and three flight attendants. Special seats in the flight deck are provided for off-duty members of the crew.

The forward Tourist Class passenger compartment is next in line. Seating 15 people, it, like the main

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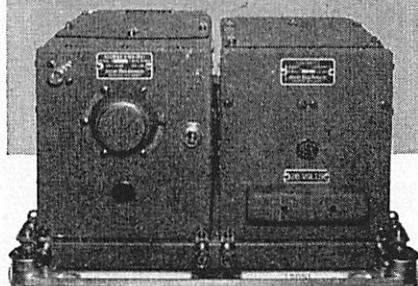
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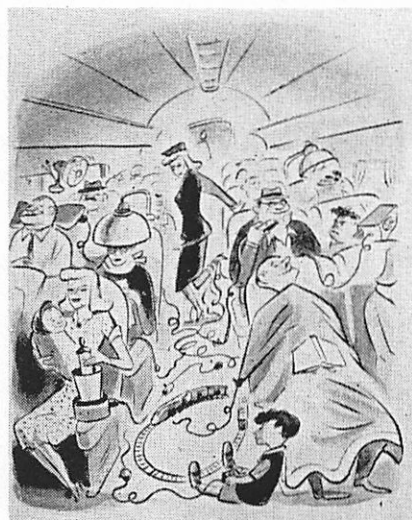
tourist compartment in the midsection, is tastefully decorated in rose, beige, warm browns and greens. Tourist Class passengers will fly at economy fares, with a slight extra charge for beverages. Tourist washrooms are situated between this forward cabin and the main tourist cabin which seats 39 passengers, for a total tourist accommodation of 54. Seats in the tourist cabins are arranged in one row of three-abreast on the starboard side and one row of two-abreast seats on the port side.

The First Class compartments are next, through a partition decorated with Canada's emblem, the Maple Leaf, set in two plastic panels. Passengers traveling First Class pay regular fares which include meals and beverages. The First Class lounge is decorated in greys, browns and a touch of green, and curving map murals create a lounge-like atmosphere. Club chairs are available in the lounge for the use of First Class passengers in addition to their regular seats.

Separating these two luxury cabins are the main entrance and the galley. Behind the aft section of the First Class accommodation are cloakrooms and private washrooms.

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the Super Constellation has greater maximum width than that of any other airline transport flying today.



Spaciousness also extends for a greater length in the fuselage and allows the operator extreme flexibility in the selection of interior arrangement.

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cabin altitude can be maintained while flying at 20,000 feet.

In the design, careful consideration was given to all facilities for passenger comfort. The systems controlling the amount of air in the

cabin and the amount of cabin heating and cooling were not just adapted but redesigned to accommodate adequately the increased passenger capacity.

To contribute ideas accumulated

in 20 years of making famous ships and trains both luxurious and livable, Lockheed called in Henry Dreyfuss, New York and Pasadena industrial designer.

Dreyfuss and Lockheed engineers set out to create an interior that would bespeak security, serenity and privacy.

Lockheed management complicated the task by insisting that the finished product be convertible quickly from luxury to coach, and back again, and have a wide choice of floor plans.

Designers made seats, cabin partitions, galley and coat closets removable. Seats can be quickly replaced. Each set of chairs rests on concealed tracks running the full length of the plane, even under the galley.

By having several compartments, the forward, main or rear cabins as well as the lounge can be closed off. Thus a single plane could have first, second and third-class accommodations, a plan seriously considered by some world airlines.

In seeking a "comforts-of-home" atmosphere, Lockheed provided:

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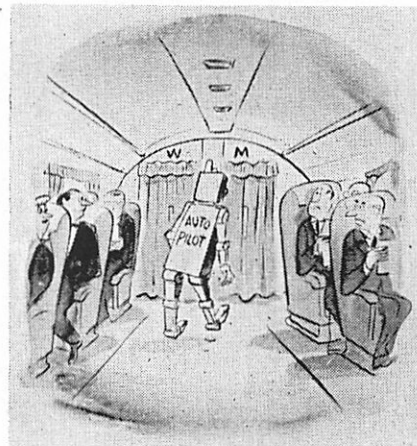
5. The home-like touch of walnut paneling between cabins, rich leathers as trim or over-all upholstery, heavy-textured seat fabrics, 56-oz. mohair wall-to-wall carpeting, and a sweeping flow of design, free of square corners.

6. Fine arts, mural maps by Richard Haines, nationally famous painter, of Santa Monica, Calif., and custom etchings in decorative screens and light shields by Emile Norman, originator of new sculpture techniques, of Big Sur, Calif.

7. Improved flight chairs throughout regular cabins, with wing-type headrest, removable center arm, real leather trim, two-tone upholstery, 38-degree recline in most models, 68-degree in some.

8. Hidden mechanical apparatus—

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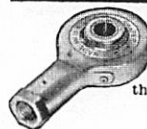
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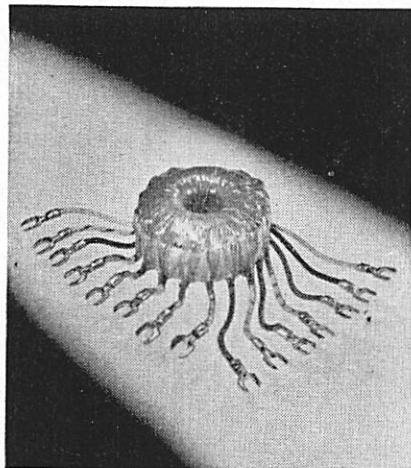
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Designed for a flight control system utilizing artificial "feel," our magnetic amplifier depends neither on fragile vacuum tubes nor delicate relays. It is simple, and when fixed in a thermosetting compound, impervious to shock. Also important, it is Airborne engineered for Airborne-actuated control systems.

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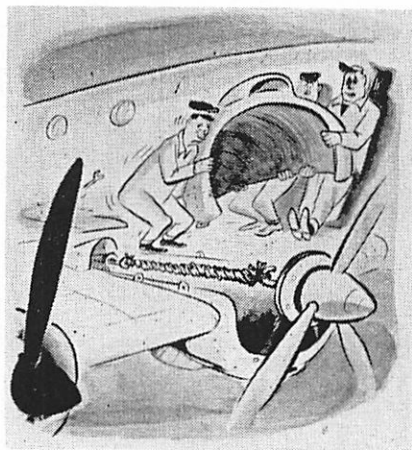
lighting from main cabin fixtures 18 in. square and from 4-in., starlike lounge lamps.

Numerous subtleties entered into



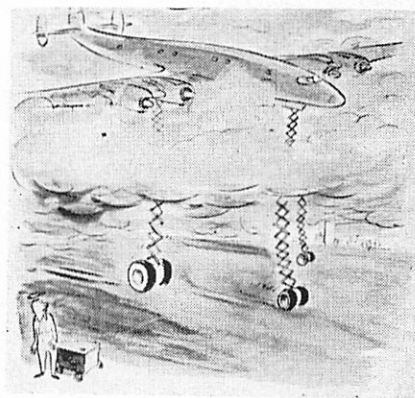
the design. Ceiling and wall linings are largely seamless, as are carpets, to look more solid. Passengers enter via a main entry vestibule with a broad-striped carpet which "leads people right in." The gaily decorated lounge, one of the passenger's first sights, adds to the "cheerful welcome." Window curtains slide on concealed rods with the touch of one finger.

The galley, which will include an 11-cu.-ft. refrigerator and small bar, can be concealed by a decorative pull-down curtain, hiding any clutter of foods and utensils. It is located opposite the main entrance.

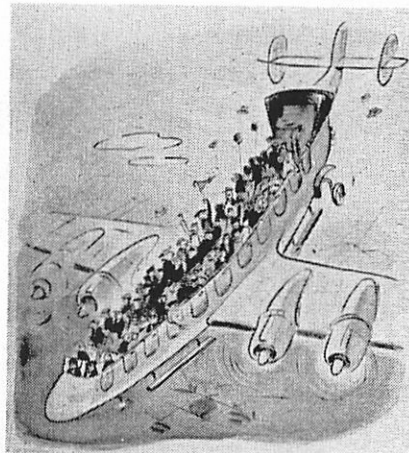


Exterior configuration and power plant installations are identical on the passenger and cargo versions of the Super Constellation, but the interior of each type was designed specifically for its purpose. The capabilities of the aircraft as a cargo transport (which might be its ultimate fate with TCA) reflect the desires of the world's cargo operators — for its features were established as the result of a study of design requirements.

As a swift all-cargo transport, the Super Constellation provides 5,715



cu. ft. of cargo volume, 5,000 cu. ft. of which are in the main cabin, and 715 cu. ft. in the lower cargo compartments. The all-metal floor in this version has a capacity of 300 lb. per square ft. Cargo doors can be located at each end of the fuselage to facilitate loading. Facilities are provided for pilot, co-pilot, flight engineer and radio operator. If required, a navigator station can be installed.



The following are the comparative statistics of the Super Constellation and the North Star:

Super Constellation

Wing Span:	123 ft.
Over-all Length:	113 ft. 6 in.
Over-all Height:	24 ft. 9 in.
Gross Weight:	130,000 lb.
Landing Weight:	105,000 lb.
Fuel Capacity:	5,470 Imp. Gals.
Range at 10,000 ft.:	4,360 miles

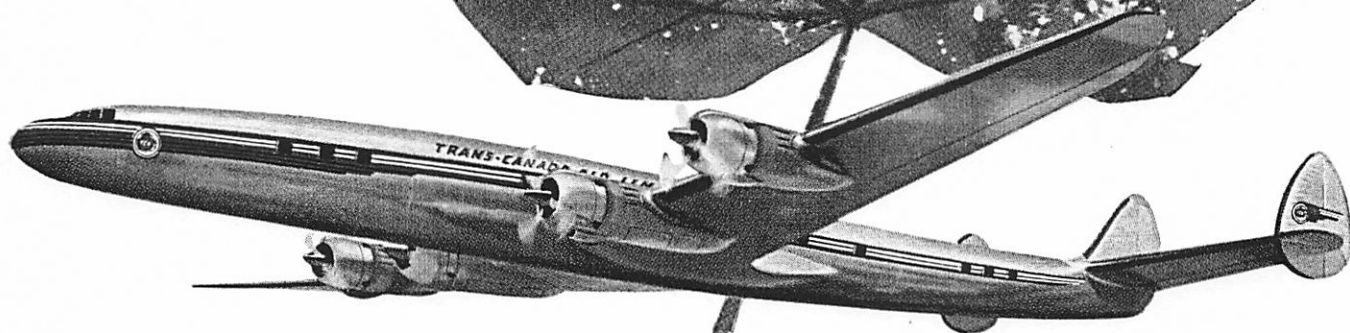
Additional Super Constellation

Statistics:

Take-off hp.:	3,250
Cruising hp.:	1,765
Cruising Speed	
at 15,000 ft.:	302 mph.
Rate of Climb:	1,140 ft. per min.

North Star

Wing Span:	117 ft. 6 in.
Over-all Length:	93 ft. 5 in.
Over-all Height:	27 ft. 6 in.
Gross Weight:	80,200 lb.
Landing Weight:	68,000 lb.
Fuel Capacity:	3,220 Imp. Gals.
Range at 10,000 ft.:	3,385 miles

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Going to Europe? You'll get there quicker, in greater luxury and relaxation, if you fly on a new Trans-Canada Air Lines SUPER Constellation—the biggest, fastest, most dependable airliner in transatlantic service.

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takeoff. Each SUPER Constellation, with four turbo-compound engines, has more power than *two* big Diesel locomotives. And SUPER Constellations are specially designed for long-range non-stop flying.

It costs no more to fly on the finest—Trans-Canada Air Lines' big, luxurious new SUPER Constellations.

*Fly with Confidence**Fly the Finest**Fly Super Constellation***LOCKHEED**



CANADIAN AVIATION WRITERS are now holding regular monthly meetings at the Toronto and Montreal Press Clubs and the Ottawa Air Force mess. Over 80 Canadians are now members of the Aviation Writers Association. Pictured at a recent Toronto meeting are seated, left to right, A. F. MacDonald, DH Canada; Vic Koby, Financial Post; James Montagnes, Aviation Week; Ross Willmot, Canadian Aviation, newly elected vice-president of AWA; Cliff Stuart, Aeroplane Photo Supply; Fergus Cronin, Time (Canadian). Standing: Prof. Thos. Loudon, University of Toronto; Howard Gerring, Saturday Night Press; F/L Jack McQueen, RCAF PRO; Fred McClement, Toronto Star; Bob Redmayne, AITA; Eric McVeity, Imperial Oil; Bob Wilson, DH Canada; Ross Purves, Saturday Night Press; Claude Hergott, Shell Oil; and Carroll McLeod, Cockfield Brown.

WILLMOT IS ELECTED AWA VICE-PRESIDENT

A Canadian has been elected vice-president of the Aviation Writers Association of the U. S. A. and Canada. It is the first time in the body's 16 years history that a Canadian has been elected to executive office.

Ross Willmot, editor of Canadian Aviation, received the honor at AWA's annual meeting at Miami last month. Some 400 members of the body's total membership of over 700 attended.

The first Canadian member of the Association which he joined in 1947, Mr. Willmot has been Canadian regional director of the Association for the last year, a position he retains. This period saw the greatest growth in Canadian membership—from 20-odd to more than four times as many. Regular monthly meetings have been started in Toronto, Montreal and Ottawa.

The Canadian group are now making plans for a possible general meeting of AWA in Canada next year.

Mr. Willmot has been in aviation writing since the beginning of the last war when he was a reporter with the Toronto Telegram. After

service as a navigator with the RCAF he joined the Montreal Daily Star where he covered aviation for three years. While with the Department of External Affairs he wrote a short history of Canadian aviation specifically for the first visit of AWA to Canada. For three years he was public relations officer at Avro Canada, where he originated and edited Jet Age and Avro Canada News. He has written aviation for many publications and for the last two years has won a technical aviation writing award in the contest sponsored by AWA and AITA.

K. Pugsley
Manager,
CANADIAN AVIATION

Uplands "Crummy"

CBC Commentator John Fisher has described Ottawa's Uplands Airport facilities as "crummy," and said he believes Canada's air transportation setup is the most backward in the world.

Speaking before the Eastern Ontario development conference, recently, he urged the small towns to press the Government for more and better air transport facilities.

Cannon Electric

Cannon Electric (Canada) Limited, affiliate of Cannon Electric Company, Los Angeles, Cal., is erecting a modern, single-story plant of 20,000 sq.-ft. floor area on a two-acre site at 160 Bartley drive, Toronto. Expected to be completed by Oct. 1, the new building will be double the present premises on Danforth Avenue.

The company produces electric connectors for the aircraft, radio, industrial power and electronic industries. The increased space will allow for expansion into other lines and for the installation of new types of machinery. The firm, employing some 150 workers, operates its own die casting equipment.

J. E. Nickson

Appointment of J. E. Nickson to the newly established position of general traffic director of Trans-Canada Air Lines has been announced. Mr. Nickson was formerly director of traffic services.

Air Services Minister

A Canadian Minister of Air Services may be appointed shortly in a new Cabinet portfolio, it is reported. The present heavy Department of Transport may be split up under two ministers with the new minister directing such branches as construction of airports, telecommunications (government telephone, telegraph and oceanic cable lines), issuance of radio station licenses, radio interference problems, etc.



J. T. Dymont Honored

A fellowship in the Royal Aeronautical Society has been awarded to J. T. Dymont, Director of Engineering for Trans-Canada Air Lines. The F.R.Ae.S., is an honor bestowed each year on an aviation expert who has contributed to the technical development of air transportation.



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The Demand for a New Aviation Policy Continues

by The Editor

UNFORTUNATELY few in the industry as a whole have had the opportunity of following as we have the commendable series of a dozen-odd editorials in The Edmonton Journal on the need for a new Canadian aviation policy. We disagree with some of the viewpoints put forward but we heartily approve the putting of this material before the bar of public opinion. During the last year we have advocated the setting up of a Royal Commission on Aviation with the fullest public enquiry into some of the vexing problems facing the healthy development of flying. In general this is what The Edmonton Journal advocates as well.

THE newspaper makes the following recommendations:—

1. "The Federal Government should take the shackles off the Air Transport Board and have it make an immediate and thorough examination of the northern rate structure and northern commercial services, with a view to reducing the rates to more reasonable levels and securing improved services as practicable . . . If necessary, the ATB should be expanded. Its personnel ought to include experienced airline men and it should be independent and objective."

2. "Bush flying should be revitalized . . . It will grow, as it grew in the halcyon days of the thirties, provided that the northern airline rates are first reduced to reasonable levels so as to reduce the costs of operating bush craft and living farther north."

3. "Mail pay should be rationalized . . . Competitive mail contracts should be an objective of policy, to cut postal costs."

4. "The Government should undertake to reduce TCA's domestic passenger rates to more reasonable levels as rapidly as the current additions to equipment capacity will permit this carrier to satisfy increasing demand for space."

5. "The Government should establish a civilian-military pool of transport aircraft along American lines . . . Apart from development of commercial air transport thoroughly adequate to domestic demand and need for service and having additional capacity to expand Canadian competition in international markets, it involves first, the operation and maintenance by com-

mercial carriers, under contract, of military transport aircraft; second, the requirement that the carrier shall build up a Reserve Civil Air Fleet (RCAF), consisting of planes so modified that they are adaptable for military use within 48 hours."

6. "Government ownership of TCA and the Government domination of commercial air transport should be ended as soon as feasible. It is wrong in principle and bad in practice."

7. "Commercial air transport should be restored fully to free enterprise not only by putting TCA up for sale but also by permitting full (Canadian) competition—the best regulator of them all."

THE Journal goes on to advocate that "aviation policy should encourage enterprise and open up every avenue of opportunity" for "any Canadian who has the talent, training or money." The "great key to full scale development of depth in the north is air transport," the newspaper says. With this conclusion we heartily agree.

Because our next issue is concerned with the vital role the airplane has in building up the more remote yet exceedingly rich areas of this country, we believe it would offer an excellent starting point to carry on the public discussion promoted by The Journal on the need for a new aviation policy. We would like to get our readers' reaction to the points raised. On the basis of this industry-wide and Government reaction we would present our own particular recommendations.

THIS magazine has had considerable success in inducing the Government to have another look at its airport terminals on the basis of widespread unfavorable public opinion polled. By means of the press, we managed to get the result of this poll to a far greater audience than our own particular readership, influential though it is. We sincerely believe our aviation policy needs serious revamping by the Government and we believe most of our readers share our belief. If they individually and collectively would express themselves in our columns on the subject, we feel certain the Government would pay considerable attention.

TCA Converts North Stars

By B. L. Marsh

Canada's North Stars, which have weathered probably more bouquets and brickbats than any other plane produced in this country, are in for another facelifting — this time by Trans-Canada Air Lines.

An ambitious program boosting the four-engined planes into something of the workhorse category of still-flying DC3s and C47s is being undertaken by the airline which plans to convert three to cargo liners and the balance of its 22-plane fleet to carry 52 or 62 passengers. They now carry 48 and 56.

A TCA spokesman said in Montreal the freighters would be used on a Montreal-Vancouver daily service.

They will be able to carry about 18,000 pounds of cargo. Unlike most cargo planes, they will be pressurized and heated so they will be able to transport perishables and live cargo at higher than usual altitudes.

► **Six Freighters.** The three North Stars will give TCA six cargo planes. Three British-made Bristol Freighters went into schedule and charter service in December, 1953, over short-haul, high-density routes.

The line's 19 remaining North Stars are being converted to a 52 (four abreast) or 62 (five abreast) seating configuration. The former will be first class and the latter tourist.

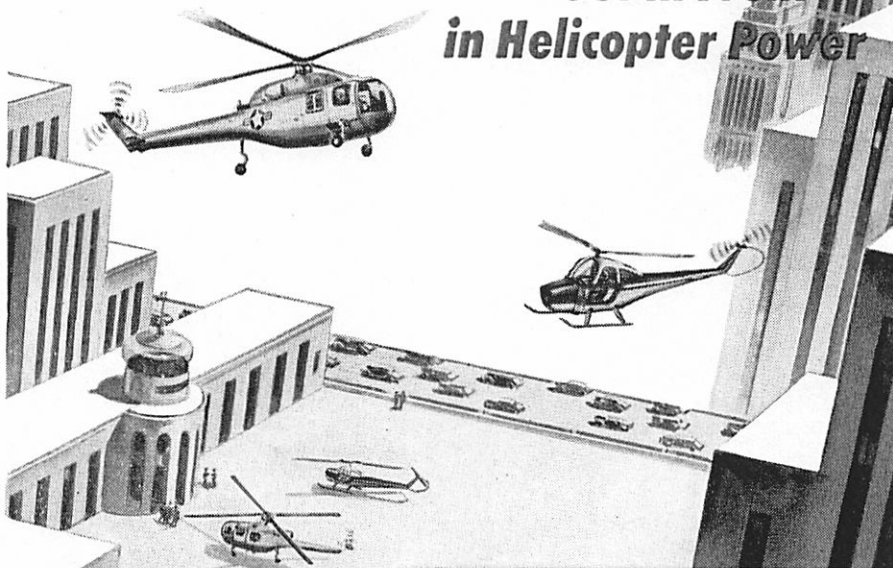
In both cases the seat spacing will remain at a 40-inch pitch — the front of each seat will be 40 inches from the seat behind it. A Trans-Canada spokesman said that is a larger spacing interval than in most tourist class aircraft.

Most of the conversion job consists of converting cargo compartments into passenger space by re-upholstering and removing bulkheads. According to TCA, it will not reduce the standard of comfort in the original aircraft.

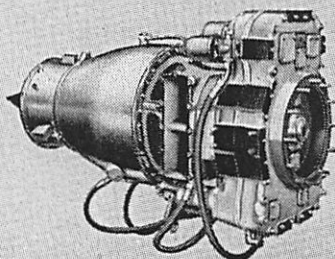
Trans-Canada Air Lines. ATB recently approved renewal of TCA's authority to conduct familiarization flights with DC-3 equipment. There is no restriction as to the number of flights made on weekdays, but the airline is limited to 10 flights per month, from each base, on Saturdays, Sundays and recognized holidays. These flights may be made from any base served by TCA on a scheduled basis.

CONTINENTAL...

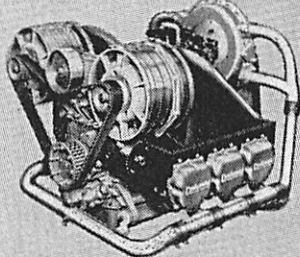
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CAE MODEL 220 SHAFT TURBINE—
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CMC MODEL F50470 SUPERCHARGED
AND FAN-COOLED
HELICOPTER ENGINE—
260 H.P.

New, modern helicopters are finding it increasingly beneficial to make use of the latest Continental developments for power production. Two examples of recently tested engines built around Continental power plants are shown. One—the Sikorsky XH-39 at left, above—employs the CAE Model 220 shaft turbine; the other—Cessna's CH-1 at right—uses CMC Model F50470 piston engine. Both are unique.

The XH-39—first helicopter with completely retractable landing gear—holds the world's record for helicopter altitude (24,500 ft.) and in addition, the world's record for helicopter speed (156.005 m.p.h.). The CH-1 features simplified design, using one-third fewer gears. Location of engine in the nose makes for ease of access, promotes efficient cooling, and frees the center of gravity behind the cockpit for use in disposable load.

Thus Continental supplies each type of power plant to suit the peculiar requirements of two widely different modern helicopter design concepts. Additional power plants engineered for their suitability for helicopters will be forthcoming from the Continental organization within the near future, and great things can be expected.

MEN WHO LOOK TO THE FUTURE LOOK
TO THE AIR FORCE RESERVE



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205 MARKET STREET, MUSKEGON, MICHIGAN.



A

The Trans-Canada Air Lines, Canadian Pacific Airlines route swap for the Mexico service was a major step in streamlining Canada's air services. It was done by the airlines concerned and will result in more efficient operations for both carriers and better Mexico City and domestic services for the public.

We would like to see the Canadian Government press forward with the same initiative in stepping down from its no-competition policy. The Canadian air transport industry has grown up. It should be allowed to make its own business gambles and risk its own capital.

Weigh Moscow against Geneva

Where do we stand after the Geneva conference at the Summit?

The Soviet Union has stated it is cutting down the size of its army. The U. S. has already done this over the last three years in an effort to conserve manpower and have machines take over from men.

Should Canada now cut down the size of its army, navy or air force? Should we stop the costly program of designing and producing special weapons such as the CF-105 supersonic fighter, the Canadair Britannia M-R, or Grumman CS2F-1?

Canada should formulate its foreign policy independent of the U. S. or Britain. But it must be remembered Canada has no nuclear-armed air power, we rely on the U. S. Strategic Air Command as our best "defensive" weapon.

Because we are tied to the U. S. in matters military Canadian Aviation presents an extract from USAF Chief of Staff Gen. Nathan F. Twining's recent appraisal as it appeared in Aviation Week. His views should be considered in the formulation of any new Canadian policy affecting our armed forces:

"No one has claimed that the Geneva meeting resulted in specific agreements on concrete questions.

"For years we have said that air power is peace power. This truth has been demonstrated, and no one can deny that the shadow of air power fell across the conference table at Geneva.

"The world welcomed the President's proposal to the Soviet Union to exchange facilities for aerial photography. This plan was aimed squarely against surprise attack. I sincerely believe this could be a key step toward peace.

"The President's outline for preventing surprise attack carried with it a sincerity and significance that made

Nothing sounded quite so illogical as Trade Minister Howe's recent Lethbridge off-the-cuff remarks protecting his no-competition policy stand. He said he felt the taxpayer should not be asked to back such an equipment race which would result from opening a trans-Canada route to CPA.

Nobody understands why the taxpayer should today be backing an expanding airline in the first place when private enterprise is only too willing to do it if given the chance.

a profound impact. His actions should be reassurance to all that he and this nation are champions of peace.

"While we seek better ways to safeguard peace, we are determined to maintain our strength until mutually dependable systems for reducing armaments have been worked out.

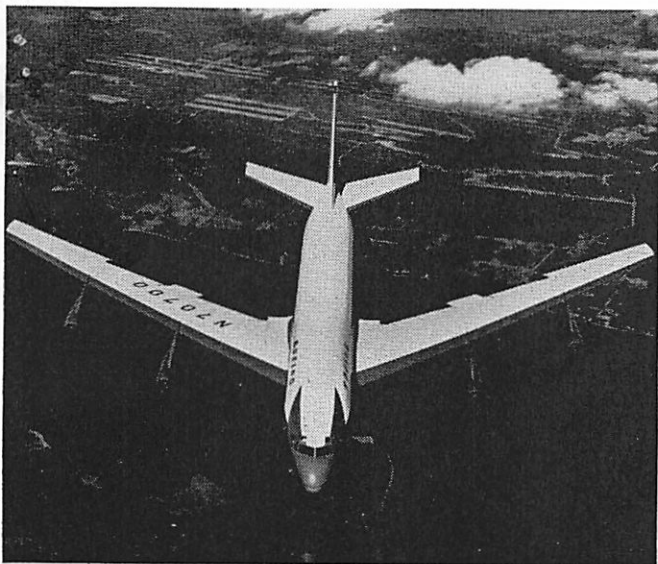
"For, while Geneva commanded attention in mid-July, the eyes of the world were drawn to Moscow in May when the Soviet Union paraded its military might for all to see.

"As they readied their air might to celebrate May Day, the rulers of the Soviet Union made a different but no less lasting impression on us. They showed all the world that they too had learned the air power lesson all too well. The intercontinental jet bombers, the medium jet bombers, and the supersonic fighters flying over Red Square were grim evidence of what many of us had already realized—that Soviet Russia had become a modern, powerful arsenal of air power.

"Just last week—only days after Geneva, the Soviets resumed testing of nuclear weapons. It is clear that Geneva must be weighed against Moscow. It is also clear that although air power has been the motivating force behind the quest for peace, it is a force we must keep if we are to have peace.

"If we should allow ourselves to become relatively weak in the air, our efforts to achieve a workable peace would no doubt fail.

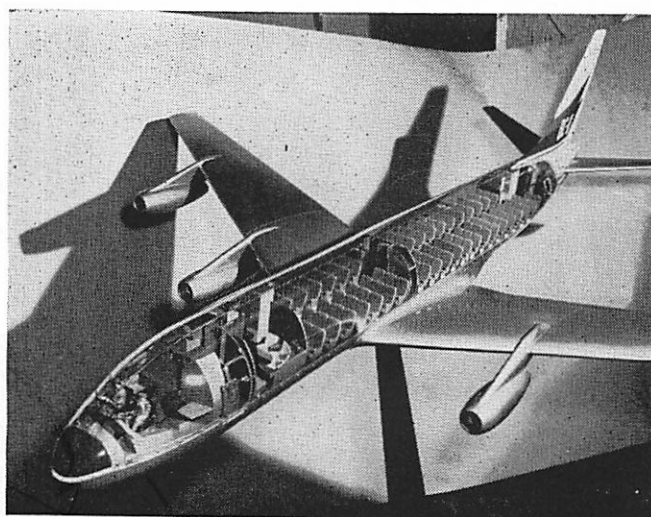
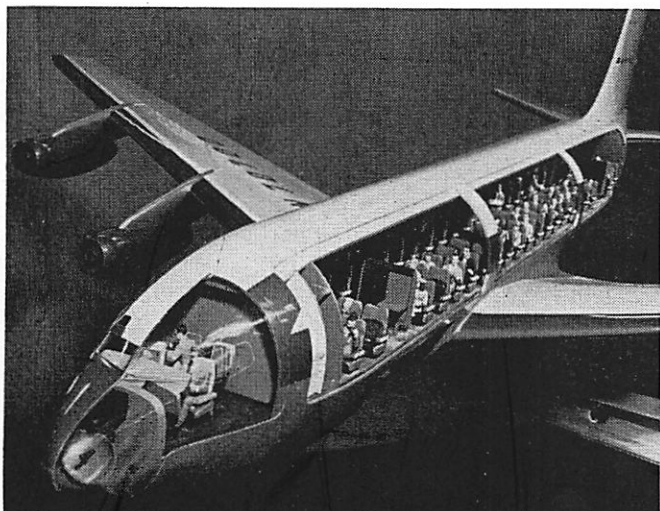
"In the meantime, while we weigh the hopes of Geneva let us also remember Moscow in May. Let us be sure that we more than match Communist air power. We know from bitter experience that Communist smiles can change to scowls and velvet can turn to steel. A very wise man once uttered this word of caution, 'You don't take your coat off everytime the sun shines in Moscow.'"



BOEING 707 PROTOTYPE. Airborne for some months is piling up test hours.



DOUGLAS DC-8. Still at the model stage, Douglas plans multiple flight-test craft.



NAME THEM? Similarities between the Boeing and Douglas models are obvious. The 707 model is on the left, the DC-8 on the right.

TCA's

JET

DECISION

Trans-Canada's long-term planning envisages a combination of pure jets and long-range turbo-props. Jet provisioning may see the airline pioneer the use of RR Conway by-pass engines in North America. Matter of moment is a firm decision on the aircraft itself.

Trans-Canada Air Lines' long-range equipment plans have advanced from the crystal-ball stage to the hard realities of placing orders.

It now looks as if TCA may take another step in pioneering British equipment in North America—based on Viscount experience—by possibly ordering U. S. jet airliners equipped with the British Rolls-Royce Conways.

Also, to fill long-range turbo-prop needs TCA may select the Vickers Vanguard powered by Rolls-Royce RB-109 turboprop engines.

Here's the present order picture:

- At time of writing, a decision is expected to be made within the next three weeks on the DC-8 vs. the Boeing 707 passenger jet airliners. Whichever way the order goes it will be for four which, with spares, will cost an estimated \$35 millions for 1961 delivery.

- Orders have just been placed for another 11 Viscount 700s bringing TCAs total Viscount fleet when delivered to 36 Viscount 700s. The later ones will have slightly uprated versions of the Rolls-Royce Dart.

- Orders will probably be placed this year for a minimum of four long-range turbo-props to phase out the Super-Constellations in 1959-60 on transcontinental runs. Under consideration will be the Britannia 300 LR—now the 310—(as ordered by CPA) or another version which Canadair may build (see separate story this issue). Other aircraft which will receive evaluation, the Vickers Vanguard (big brother of the Viscount) and Lockheed Electra.

Best bet so far is the Vanguard—because of cutting maintenance cost by having two types of one manufacturer's aircraft. Also for the same reason the Rolls-Royce RB-109 engines are attractive to TCA.

► **DC-3 Longevity.** The big equipment changes—jets and long-range turbo-props—will not come until 1959-61. Up to 1958 TCA will be operating nine Super-Constellations (two "Gs" being added this year), 36 Viscount 700s. Also, according to present calculations, 22 North Stars and close to 20 DC-3s will still be in the airline's hands.

It will be 1962 before TCA gets rid of all reciprocating engine aircraft—which may still be considerably ahead of other carriers.

Despite the acute summertime shortages of trans-Atlantic equipment, the airline feels there just isn't enough year-round long-haul revenue traffic ahead to warrant buying more long-range aircraft for the interim period, before the jets and turboprops.

► **Jet Decision.** With the big decision only a matter of weeks away now it's still anybody's guess which manufacturer TCA will buy from.

One thing is sure: TCA, like other airlines with long-stage routes, will order either the Boeing 707-320 Intercontinental or the big-wing DC-8-1881 overwater version for both transoceanic as well as transcontinental nonstop service.

- **Boeing** already has the 707 in the air. Although this is only about half the weight of the future Intercontinental and a long way away engineeringwise, the concept is flying daily.

What's more the USAF Strategic Air Command has ordered the jet-tanker version of the aircraft—a firm recommendation for a company with more jet bomber (B-52 and B-47 design and production) experience than any other company in the world.

TCA officials were more than impressed with the ease of flying the 707 with no previous jet experience and being able to make four landings. They also have much to say about the confidence of a manufacturer who invites a prospective customer to sit in the left-hand seat of the cockpit—compared with the cautious de Havilland Comet treatment of being allowed to fly it only at altitude and then from the right hand seat.

- **Douglas** with nothing more than an engineer's sketch-pad and a wooden mock-up has, at time of writing, racked up a slightly longer order-list than Boeing.

Douglas has promised to build nine aircraft to be devoted exclusively to flight testing to compress five-years flight testing into one to catch up with Boeing's lead.

To the engineering fraternity in TCA, Boeing's 707 already flying

must be stacked up against Douglas' unequalled airline experience (DC-2 to DC-7C) as well as TCA Douglas systems experience (DC-3 and North Star—re-engineered DC-4).

Also Douglas has had plenty of jet design and production experience on small and medium-sized jets: F4D, A3D, AD-6, B-66. In addition Douglas has done quantity production and major modifications of Boeing's B-47s under license.

► **Differences.** At this stage it's impossible to establish any major points of difference between the long-range versions of either the 707 or DC-8.

Both manufacturers have top reputations in aviation, both have obtained large orders for their jet airliners and both have promised water-tank testing to meet possible demands for caution following results of the Comet investigation.

Also both are still at the design stage and are very flexible to customer demands. From a looks viewpoint it's a question of "which twin has the Toni." The interior layouts are similarly flexible.

The payload of both aircraft (now 34,000 lb.) is the same. The DC-8 is slightly longer (10 ft.); the Boeing 707 has 150 sq. ft. more wing area and a stalling speed some 2 mph less.

But it's seen highly likely that the gross take-off weight for both aircraft will increase from 287,000 lb. to 300,000 and the cruise speed will raise slightly.

► **J.75 vs. Conway.** More interesting from TCA's viewpoint is the choice of engines. At the time of writing there is considerable support for Rolls-Royce's new Conway bypass engine as standard equipment instead of Pratt & Whitney's J-75.

As far as is known both are expect-

	Boeing 707-320 (Intercontinental)	Douglas DC-8-1881 (Overwater)
Gross take-off weight	287,000 lb.	287,500 lb.
Landing weight	190,000 lb.	190,500 lb.
Zero fuel weight	175,000 lb.	167,550 lb.
Operational weight empty.....	132,000 lb.	132,000 lb.
Payload (space limited)	34,000 lb.	35,930 lb.
Span	141' 6"	139' 9"
Wing area	2,908 sq. ft.	2,758 sq. ft.
Sweepback angle	35 degrees	30 degrees
Aspect ratio	6.92	7.08
Body length	138' 10"	148' 10"
Body width	12' 4"	12' 3"
Body depth	14' 2½"	13' 8½"
Over-all height	38' 11"	42' 4"
Landing gear track	22' 1"	20' 10"
C/L inb'd engines from C/L fuse...	32' 6"	25' 8"
C/L outb'd engines from C/L fuse...	51' 5"	49' 10"
Cargo volume	1,350 cu. ft.	1,500 cu. ft.
Fuel capacity	17,650 Imp. gal.	18,000 Imp. gal.
Cruise speed	550 mph. approx.	550 mph. approx.
Max. speed	580-600 mph.	580-600 mph.
Stall speed	114 mph.	116 mph.

ed to be in the 15,000 lb. thrust class by 1959. Major comparison disadvantage is: too little information is available yet about the J-75 because of declassification difficulty despite the fact that it is looked to be standard, airline equipment by the late 1950s.

But TCA will make no engine decision until it has sufficient evaluation information about the J-75 which is backed by a tremendous engineering design and production organization at Pratt and Whitney.

Here TCA feels it has a definite advantage over U.S. carriers which, for national prestige purposes, couldn't very easily consider the Conway engine.

If TCA orders either jet with the Conway another airline or airlines will have to order 10 more aircraft with Conways—14 is the minimum set by the manufacturers to wipe out the cost of new certification trials as the jet airliners will first be certified with the J-75s.

For the reasons of more time to evaluate engines and design proposals TCA officials are glad they didn't have to join the mad scramble for jet airliner orders last fall—and would be quite willing to wait another year if it were possible.

► **TCA's Jet Need.** But the airline must order the jet airliners now if it is to get 1961 delivery.

Why does TCA need to invest so heavily (\$35 millions) in the first place with no trans-Canada competition?

It must, according to TCA, meet U.S. competition which exists trans-Continental and it's stated in the Trans-Canada Air Lines Act that the airline must follow a policy of having equipment as good as any similar airline.

On stages of 600 miles or more the

big jet airliners claim operating costs better than either the DC-7 or Super-Constellation. (0.025c per passenger mile as compared with 0.028c for the reciprocating engines) as long as the jets are filled.

Also, only a 45% passenger load of total available seats (120) is needed to break-even on costs compared with a 65% load on the DC-7 or Super-Constellation for equivalent long range hops.

Another major advantage: replacing with jets means fewer aircraft will be needed in total.

The 550 mph cruise speed will mean TCA's four jet airliners will be able to do two trans-Atlantic return trips per day and one trans-Continental return trip—all starting and ending at convenient times.

Typical estimated times are: Vancouver-Toronto, 4 hrs. 10 mins.; Toronto-Vancouver, 4 hrs. 40 mins.; Montreal-London, 6 hrs. 30 mins.; London-Montreal, 7 hrs. 25 mins. Based on increasing knowledge of jet streams and pressure pattern flying, many of these times will be reduced by as much as an hour west to east.

► **Jet Problems.** Solution of the technical problems of ground noise reduction and braking on icy runways is already in sight. TCA officials feel problems of air traffic control and ground facilities and handling are more critical matters over which the airline has less control.

● **Air Traffic Control.** With jet airliners streaking across the sky at 40,000 ft. and at 550 mph a descent must be started at least 100 miles away, which means the airport traffic controller must have a clear picture of where all other slower moving traffic is in the area, and often unseen in cloud. This is impossible under present technical air traffic control conditions in Canada.

Today Canadian airports have neither surveillance radar (to see who is where in a 150 mile radius) nor approach radar (to bring aircraft to the runway through traffic and weather).

With often more than 1,000 landings and take-offs a day at New York airports such as LaGuardia, both these radar systems have been established as have VOR airways (inaugurated in Canada this February).

But even in the U.S., the traffic is so heavy, there is a demand now for radar surveillance of aircraft all the time they are flying on airways.

This eventually means automatic electronic systems which will keep track of all aircraft flying the air roads so as to space them safely (no mean task with jets) and bring them in safely and quickly to airports with a minimum of time wasted in "stacking" traffic waiting to land.

In Canada bold forward planning along these lines must be started immediately, TCA believes, if long-range jet operations is to work safely and efficiently by 1960 when the traffic into Canadian airports will be doubled if not tripled.

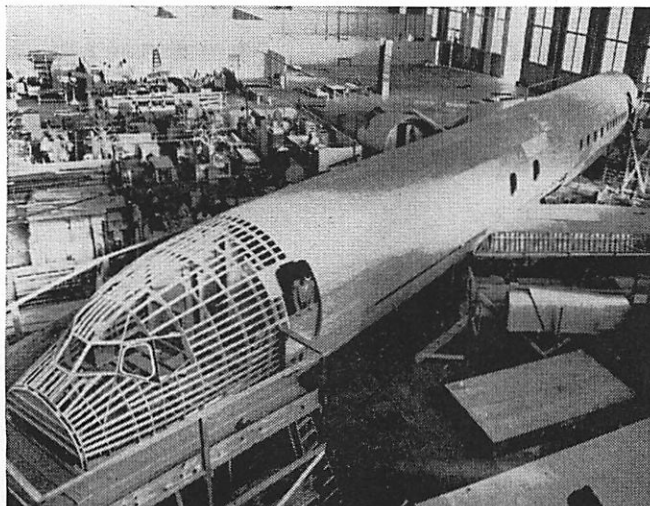
● **Ground Handling.** Even today deplaning passengers tend to complain about immigration and customs delays.

Imagine the chaos if the present system was not expanded and one jet airliner deplanes 120 people — not to speak of the queues at ticket counters before flight time.

Also, because of the size of these aircraft more airport apron room will be necessary. Also tank trucks (80 gals. per minute) will mean hours' delay in refueling aircraft when they require delivery of fuel at the rate of 1,000 gallons per minute which is only possible with underground high pressure hydrant installations.



FLIGHT DECK. Up front in the 707 prototype. Prospective buyers ride in the left-hand seat.



\$250,000 MOCK-UP. This plywood DC-8 will never fly but otherwise it will exactly duplicate Douglas plans.

Also, with runways costing \$1,000 and more per foot, runway extension planning should be started early.

Fortunately planned runway extensions (400 yards in Montreal and 600 yards in Toronto) meet the average demanded for these jet airliners now. But it's only a beginning.

● **Noise.** Rolls-Royce has already brought out a noise reduction system known as Greatrex which U. S. manufacturers are basing their work of silencing on. The Rolls-Royce system will reduce the noise by 10 decibels. Now it's been possible to increase the reduction to 25 db's without affecting engine performance — as quiet or noisy as present-day Super-Constellations or DC-7s. Still further progress is expected to be made.

Also because the velocity output of the gases of both the J-75 and Conway will be slower than the Pratt & Whitney J-57, noise will not be as great a problem with the more advanced engines.

● **Reverse thrust.** How do you stop a jet on an icy runway? Reverse thrust is the answer to both this and fantastically long runways.

On most conventional aircraft slowing down can be done by reversing the thrust of the propellers. Military jets are presently using drag parachutes.

Already 40% reverse thrust has been achieved and it's known that 60% thrust can be achieved. This difficulty, it's believed, will be overcome along with the noise problem by the delivery deadline of the jet airliners—1958-59.

● **Fuel reserves.** Both aircraft meet TCA's fuel reserve operating requirements of: an additional of 7% of total estimated flight-planned fuel consumption for possible unaccounted-for headwinds; plus sufficient fuel reserves to reach an alternate airport; plus one hour's flying (cruising) reserves.

The Comet would not meet these requirements which are the same as for all TCA's present aircraft.

Exactly what the jet age will mean for commercial aviation is difficult to assess at this stage.

The only things certain at the moment are that the move to jets is going to be made and it is going to cost a lot of money (an estimated \$3,000,000,000 for American operators alone).

Otherwise, the situation was summed up recently by a United States airline official as follows:

"We are buying airplanes that haven't yet been fully designed, with millions of dollars we don't have,

to be operated off airports that are too small, in an air traffic control system that is too slow, carrying more passengers than we have ever had before."

► **Manufacturing picture.** If airline orders are an indication, and from a business point of view there would appear to be no better yardstick, United States aircraft manufacturers have assumed the initiative in the commercial jet transport race.

At writing, the Boeing Airplane and Douglas Aircraft Companies have between them orders for 190 commercial jets.

Boeing has indicated it will begin first deliveries of its 707-120 in 1958. The first 707-220 should be available in October, 1959, with the 707-320 Intercontinental to follow shortly after.

Douglas is expected to begin deliveries of its domestic DC-8 at about the same time, with the overwater version following shortly after.

While the U. S. manufacturers are demonstrably dominating the commercial jet scene at the moment, the British industry is far from being counted out.

De Havilland has an unmatched backlog of operational experience to offer with its Comets which will be available in 1958. BOAC has recently outlined its requirements for a long-range jet transport for introduction in the 1960s. The corporation is urging design of a jet specifically for the civil market.

► **Power plans.** Further, there are indications that European operators who have ordered American jets have not yet made a definite decision as to the engines they will use. The Curtiss-Wright J67, Bristol Olympus and Rolls-Royce Conway are listed as possible replacements for the P&W J75s specified by the manufacturers.

In this connection a London report has it that Rolls-Royce has placed stringent conditions on any sale of Conway by-pass engines for installation in Boeing's 707. Rolls-Royce is said to be insisting on company installation and flight testing of the first engines.

A comparison between Boeing's and Douglas' extremely advantageous order position and that of de Havilland Aircraft of England is inevitable. De Havilland, in spite of—or if you wish in a tragic sense because of—its actual in-service experience with Comets has only one solid civil order for Comet IVs, the 19 requested by BOAC.

The situation may be quite neatly summed up. The interested airlines know exactly what the Comets can do and they don't think it's enough for

their long-range plans. Boeing and Douglas in the United States know what the operators want from their jet transports and they have promised to deliver.

► **Boeing.** Boeing has announced details on three versions of its 707 jet transport. They have been designated as the 707-120, the first and basic production aircraft; the 707-220 and the 707-320.

The first two (Stratoliners) will be identical in size. The difference in the two versions will be in the power plants. The 707-120, which is said to be principally intended for continental use, will have four Pratt & Whitney J57 engines.

The 707-220, which theoretically will be able to fly the Atlantic non-stop, is to have the more powerful P&W J75 engines. The larger 707-320, the Intercontinental, will be powered either by P&W J75s or by British engines.

For the two Stratoliner versions, maximum practical ranges carrying payloads of 31,250 pounds are given as 4,000 statute miles for the 707-120 and 4,250 miles for the 707-220.

Cruising speeds listed by Boeing for the three aircraft are 591 mph for the 707-120; an increase of 14 mph to 605 mph for the more powerful 707-220; and 600 mph for the larger 707-320 on the assumption that it carries the P&W J75s as power plants.

There are at least three seating arrangements possible on the two Stratoliner versions of the 707. The standard version, with seats five abreast, will accommodate 109 passengers. A combination standard and tourist arrangement will take 118, with 49 first-class passengers seated five abreast in the fore of the aircraft and 69 tourist passengers in six-abreast seats aft. The all tourist-version seats 125 passengers six abreast.

The 707-320 Intercontinental will accommodate 122 first-class passengers seated five abreast. The class combination arrangement will accommodate 34 luxury class seated four abreast and forward, and 90 tourist passengers seated six abreast aft. While the all tourist version of the Intercontinental will take 147 passengers seated six abreast.

Interiors of the 707s are to be free of permanent bulkheads or partitions to facilitate quick conversion of the seating arrangements.

Following are some of the identical specifications on the 707-120s and 707-220s:

Wing area 2,433 sq. ft.; wing span 130 ft. 10 inches; fuselage length over-all 128 ft. 10 inches; sweepback at $\frac{1}{4}$ chord line 35 per cent; aspect

ratio 7.07:1; total usable cargo volume 1,290 cu. ft.; design payload 31,250 pounds.

The slight differences between the two versions are indicated by the following fundamental figures, with the 707-120 specification listed first in each case:

Gross weight 245,000 pounds and 257,000 pounds; wing loading 100.7 and 105.6 pounds per sq. ft.; landing weight 165,000 and 175,000 pounds; zero fuel weight 155,000 and 160,000 pounds; operating weight, empty 111,000 and 116,500 pounds; fuel capacity 14,487 and 15,053 imp. gal.

► **Douglas.** It is possible that the final DC-8 will be vastly different from what is presently proposed. This is also true of Boeing's 707. But with a prototype flying, Boeing's design is not likely to alter as much as might be expected with a largely paper-work aircraft such as the DC-8.

Douglas is also working toward two versions of its jet transport, one for domestic routes and the other an overwater aircraft.

The power plants for the domestic version will be four P&W J57s. The overwater craft will carry the more powerful P&W J75s.

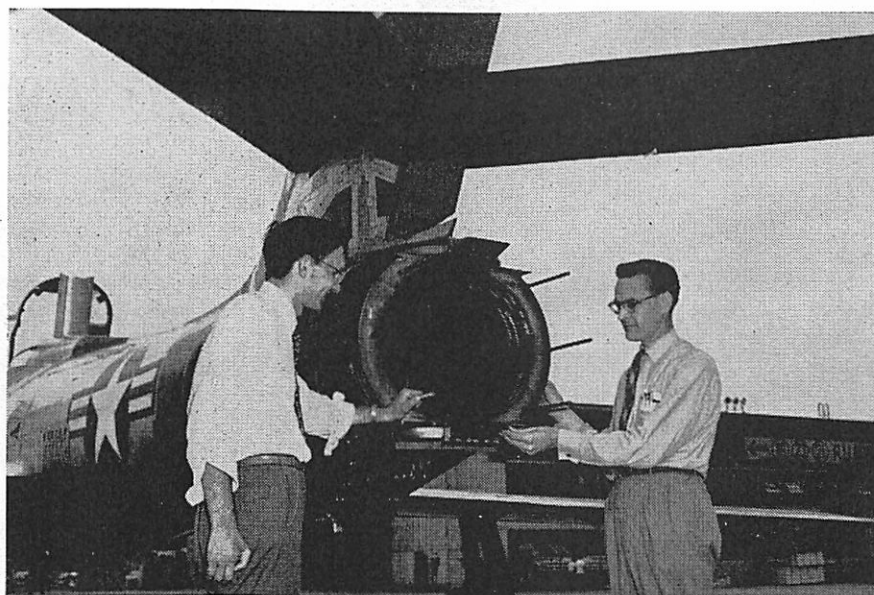
The domestic DC-8 will have a range of approximately 3,500 miles carrying a maximum payload of 34,115 pounds. There are a number of seating arrangements possible. The basic figures released on the two versions are 103 passengers for the domestic and 125 for the intercontinental DC-8.

The manufacturer has outlined at least four possible seating arrangements:

An all first-class setup which accommodates 100 passengers seated alternately four and five abreast; a combined first-class and tourist arrangement for 109 passengers with first-class ticket holders four abreast in the fore and tourists six abreast aft; an all-tourist, 131-passenger, six-abreast layout; and an alternate 109 passenger, five-abreast, first-class arrangement with no seats fore of the right-hand forward entrance of the aircraft.

Some of the basic specifications for the domestic DC-8 at the present time are:

Wing area 2,600 sq. ft.; wing span 134¾ ft.; aspect ratio 7:1; fuselage length over-all 140½ ft.; gross weight, domestic 211,000 pounds, overwater 275,000 pounds; wing loading at maximum gross weight 81.5 pounds per sq. ft.; landing weight 142,500 pounds; fuel capacity, domestic 86,700 pounds, overwater 120,500 pounds; cargo volume 1,250 cu. ft.



THRUST REVERSER mounted on the hot end of a F-84F test aircraft at the USAF's Wright Air Development Center. "Cascades" and "flippers" can be seen.

Slowing high-speed aircraft

By **DICK LaCOSTE**

Washington Correspondent

DAYTON, Ohio—Aeronautical engineers long have sought to develop a thrust-reversal device for jet aircraft. Some were good. Others practically useless.

Such an aerodynamic brake has been developed by the U.S. Air Force's Air Research and Development Command. Experiments to date presage success.

Designed, fabricated and tested at ARDC's Wright Air Development Centre here, the thrust reverser can slow down aircraft while in flight or when landing.

One advantage of the device is that it would enable jet fighters to engage slower enemy aircraft in aerial battles. Another is that it can be used for landing, thus permitting steeper descent. After touchdown the thrust reverse can be substituted for conventional friction brakes or parachutes.

For the ARDC tests, the device was installed on a Republic F-84F fighter which was powered by a Curtiss-Wright J-65 turbojet engine. The research program first was approved by ARDC headquarters early in 1953.

Featuring a series of "cascades" and two movable "flippers" the experimental device diverts the hot gases from the jet engine's tailpipe and turns them forward in the direction of flight. The reversal of the gases acts much like a reversible pro-

peller on conventional aircraft. The result is immediate reduction of the aircraft's forward speed.

► **Drag Chute.** Additional research in slowing aircraft on their way to touchdown has been the development of a drag parachute for the U.S. Air Force's B-47 jet bombers.

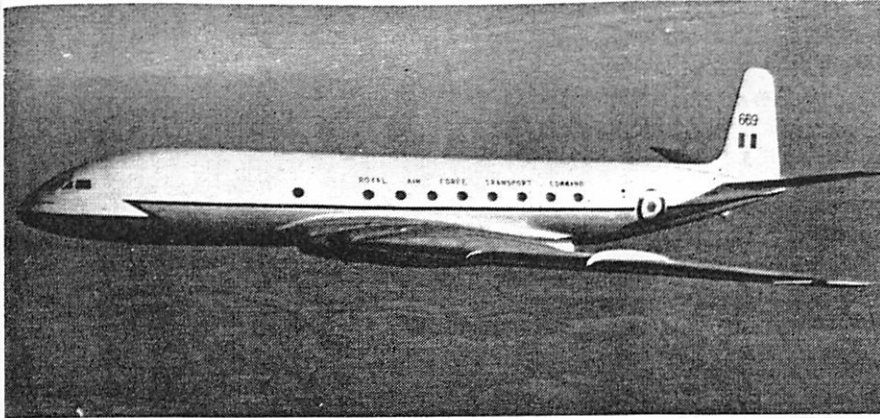
B-47's have used a 32-ft. diameter landing deceleration parachute for about six years. The smaller 'chute—approximately 16 ft. in diameter—will be additional equipment. With the use of the new and smaller 'chute, B-47s now can be landed on fields that can accommodate propeller-driven craft of comparable size.

The new drag parachute is too large to be used to slow down speedy jet fighters, but the same size 'chute can be used as a brake on the F-94 Starfire, F-86 Sabre, the F-100, F-101 and the F-102.

Drag parachutes not only will enable planes to land on shorter runways, but their use will mean longer life for brakes and tires. Pilots also can maintain better control in landings and spins on test aircraft.

Parachute drag devices weigh about one third less than other deceleration devices. They lower an aircraft's over-all weight.

Whatever future research and development bring forth in the way of contributing to safer landings, the most promising progress to date appears to be reverse thrust for jets and the extra drag 'chute for B-47s.



RAF'S COMET 2. The first of the de Havilland Comet 2 aircraft earmarked for the Royal Air Force Transport Command recently got its service markings. The RAF's No. 216 Transport Squadron is expected to be fully equipped with Comets by mid-1957.

Probe nuclear propulsion

By OLIVER STEWART

London Correspondent

The significant thing about the Rolls-Royce announcement that it had built the first laboratory in Britain to be engaged on problems of nuclear reactors for propulsion purposes, escaped many commentators. It was the name of one of those on the advanced planning group which is directing the work of this laboratory: Dr. A. A. Griffith, Fellow of the Royal Society.

Dr. Griffiths designed and partly built a gas turbine for aircraft propulsion long before the war, long before the first Whittle engine ran and long before the Germans or anybody else had made any practical progress. The work was done at the Royal Aircraft Establishment and was—necessarily at the time—secret. The consequence is that this first step toward the turbine power plant for aircraft is often forgotten.

But that is by no means the end of Dr. Griffith's contribution to advanced thought in aviation. He was primarily responsible for the Rolls-Royce flying bedstead. Those who know him personally say that his thought ranges far ahead of anything known today but that he always bears in mind the practical engineering side and never loses himself in vague imaginative speculation.

It is probably a fair guess to say that the Rolls-Royce laboratory al-

ready has complete and comprehensive plans for a nuclear power plant for aircraft. There are rumors that it has started work already on methods of shielding (against radiation) which may bring about a 25% reduction in weight compared with the conventional lead and water shielding. Whatever the truth of these stories, we can be certain that in Rolls-Royce things are moving fast toward flight trials of a practical nuclear reactor for aircraft propulsion.

► **That Alphabet.** When the International Civil Aviation Organization first recommended its new phonetic alphabet ("Alpha - Brave - Charlie - Delta") in place of the commonly used one ("Able-Baker-Charlie-Dog") I reported that British pilots disliked it. Some Royal Air Force pilots said that the RAF would never adopt it but would stick to the old one. Now however there is an order that the new ICAO alphabet be adopted by all from March 1 onwards.

This brought a final protest from many pilots; but presumably there will be no further choice in the matter. Scottish pilots and those of Scottish descent are particularly incensed over the way in which ICAO insists on spelling whisky. In the alphabet, it will be recalled, "W" is "Whiskey," but with the "e" it is Irish and not the more widely used Scotch!

Shakespearean scholars are also annoyed about "R, Romeo and J

Juliett," for in the folios Juliet with an extra "t" on the end is, I am told, unknown. Altogether although the words used are ostensibly English, the alphabet seems to have been devised for everybody *but* those who speak English. Yet English speaking pilots are in the majority.

► **Future Civil Aircraft.** Ridicule is often cast upon the House of Lords; but those who take the trouble to read the official reports of the debates often find more knowledge of the subject displayed by peers than by commoner Members of Parliament in the lower house. This was certainly so when Lord Brabazon of Tara directed the attention of the Lords at the dangers through which British aviation is now passing.

Lord Brabazon, although an aeronautical pioneer, was able to say that he had never had any financial interest in any aircraft firm and that he spoke entirely as an independent critic. That is the strength of the Lords; they often bring to their discussions an absolute independence not to be found in the Commons. Lord Brabazon pointed out that, since work on the Vickers 1000 with Conway by-pass engines was stopped, Britain has no aircraft under actual development (apart from projects) which will be able to compete in speed with the new Douglas and Boeing jet transports.

Several speakers supported him and asked whether it was not time to take aviation entirely out of the hands of the Ministry of Supply, which is usually considered to be primarily responsible for the recent rapid decline in British aviation.

► **Bad Weather Crash.** Typical of the kind of weather that causes crashes was the quickly forming fog blanket which shut down on an English aerodrome and involved eight Hunters in difficulties. Six of them were written off and one pilot was killed.

The sequence of events was familiar. When the weather clamped down at base the aircraft were diverted; but as they made to approach the alternative aerodrome that also was suddenly blanketed. By then there was insufficient fuel for a further diversion. Two Hunters managed to get in, two crashed and the pilots of the remaining four baled out. It showed the need for accelerated information from ground stations.



DOT APACHE. The first of three Piper Super Custom "Apaches" purchased by the Department of Transport was delivered in Ottawa recently. On the left is a cabin shot of the fully equipped aircraft. Left to right in the other photo are G. R. White, general manager of Trans Aircraft Co., Hamilton, the Canadian Piper Distributor, J. D. Hunter, DOT superintendent of flight operations, and S. T. Grant, a pilot with the department. These aircraft are completely equipped with full instrumentation, dual vacuum pumps, dual generators, Lear ADF-14's, Narco Omni-gators with 75 megacycle marker beacon, 27 channel VHF, a Narco VHF Transmitter — receiver, auxiliary fuel tank. This brings to seven the number of Apaches Glen White has sold to date.

More Viscounts

Trans-Canada Air Lines has confirmed a \$12 million order for 11 more Viscount 700's (Intelligence Column, December issue). These will bring TCA's Viscount fleet to 36.

* * *

PWA

Russell Baker, president of Pacific Western Airlines Ltd., Vancouver, and T. P. Fox, president of Associated Airways, Edmonton, announced today, that final arrangements had been concluded for the acquisition by Pacific Western Airlines of the stock of Associated Airways Ltd. At the same time it was made known that K. J. Springer of Vancouver had been elected the new chairman of the board; Russell Baker, director, president and general manager; T. P. Fox, vice-president and director; and Desmond F. Kidd, Vancouver, and Bruce C. Samis, Vancouver, completing the board.

Mr. Fox who also is president of Associated Helicopters Ltd., Edmonton, pointed out that his helicopter business was not involved in the transaction.

In the acquisition of Associated Airways, Pacific Western gained operating rights from five charter bases in Alberta and the Northwest Territories, regular services to ten northern points, and 19 aircraft ranging through a Bristol Freighter, Avro York, two D.C. 3's, three Barkleys, five Beavers, an Otter and smaller machines.

The purchase of Associated following that of Queen Charlotte Airlines Ltd., Vancouver, last year, gives P. W. A. over 20 charter bases in Canada west of

Saskatchewan, with regular services to 116 communities, and an aircraft fleet of 15 freight and passenger transports, and 70 bush machines.

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BOAC Connies

BOAC is reported planning to sell some of its Constellations when its Britannias get well into service this summer.

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Cargo Fleets

Lockheed's C-130 turboprop is getting a lot of attention as the major North American airlines focus attention on future cargo transports following firming of plans for jet and turboprop passenger aircraft.

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United Boost

A 17% increase in daily available seating capacity is planned by United Air Lines for 1956. The company is estimating 4.62 billion revenue passenger miles this year.

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Atlantic Traffic

Traffic over the North Atlantic this winter is reported at an all time high with operators logging load factors between 50% and 70% in a large number of cases.

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Winging South

Passenger traffic on the New York-Bermuda route tripled in the early weeks of 1956 compared with the same period last year, according to BOAC. The airline began using Viscounts on part of this schedule Jan. 1.

ALPA Anniversary

The silver anniversary of the Air Line Pilots Association is being celebrated this year. Membership in the organization during the quarter century has grown from seven to over 10,000. A special issue of "The Air Line Pilot" marks the occasion.

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Northern Transports

Bancroft Industries Ltd. of Montreal has purchased a C-47 through L. B. Smith Aircraft Corp. Equipped with skis the aircraft is to be used for bush operations. Another Montreal customer, World Wide Airways, has picked up two more winterized C-46s from the Smith corporation.

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Tighten Schedule

Qantas Empire Airways this month cut the elapsed time on its Sydney to London schedule by 21½ hours. A weekly express first class Super Constellation service via Darwin, Singapore, Calcutta, Karachi, Cairo and Rome will be pared to 54 hours.

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KLM Proposal

U. S. airlines are said planning protests to the American State Department over KLM's activities in stirring up public support in the United States for services to be discussed in bilateral negotiations. The Dutch airline is seeking approval for a service Los Angeles to Europe and Montreal to Europe, but excluding intermediate traffic between LA and Montreal.

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Travel Booster

Income tax deductions for expenditures on foreign travel have been suggested as a means of encouraging international understanding by making travel available to more people in modest circumstances. The idea was outlined recently by John Brancker, traffic director of the IATA.

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BOAC Decentralizes

British Overseas Airways Corp. has made its Canadian operation autonomous, independent of the New York office. The move is part of BOAC's decentralization of its North American organization.

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Iberia's Metropolitans

Five of the new Convair Model 440 Metropolitan transports have been ordered by Iberia, the Spanish national airline. Iberia's chairman says the new craft will be used on continental routes radiating from Madrid.

TCA Report

A net surplus of \$190,095 was earned in 1955 by Trans-Canada Air Lines. Operating revenues from all sources rose to \$77,428,254, a 12.6% increase. Operating expenses increased by 13.3% to \$76,770,922. Number of passengers carried increased by 17% to 1,682,195 accounting for \$61,105,243 revenue. Freight and express revenues showed a combined increase of 30% for \$3,352 and \$1,929,598 respectively. Mail revenue was down 1% at \$8,297,605 although volume rose by 11%.

At year end total fleet was: seven Super Constellations, 14 Viscounts, 22 North Stars and 26 DC-3s giving a total of 2,600 installed seats operating on 23,174 miles of air routes. Capital expenditures in 1955 totaled \$15,200,000 and commitments for new aircraft over the next two years (Viscounts) approximated \$15,500,000.

New Procedure

International and domestic airlines have begun use of the new ATC/IATA Reservations Interline Message Procedure designed to speed handling of bookings. The new system went into effect officially the first of this month.

Charter 'Copter

Using a three-place Bell 47G, Pacific Western Airlines has initiated a commercial helicopter charter service at Vancouver.

KLM Electras

KLM Royal Dutch Airlines has become the first European airline to place an order for a fleet of Lockheed Electra transports. Order was for 12 of the 410 mph turbo-prop craft, with delivery to start in Sept., 1957.

All-cargo Service

United Air Lines plans to place five new DC-6As in all-cargo service during the spring and summer. Aim is to trim hours off present Cargoliner schedules and increase all-cargo lift by 70 per cent.

Route Extension

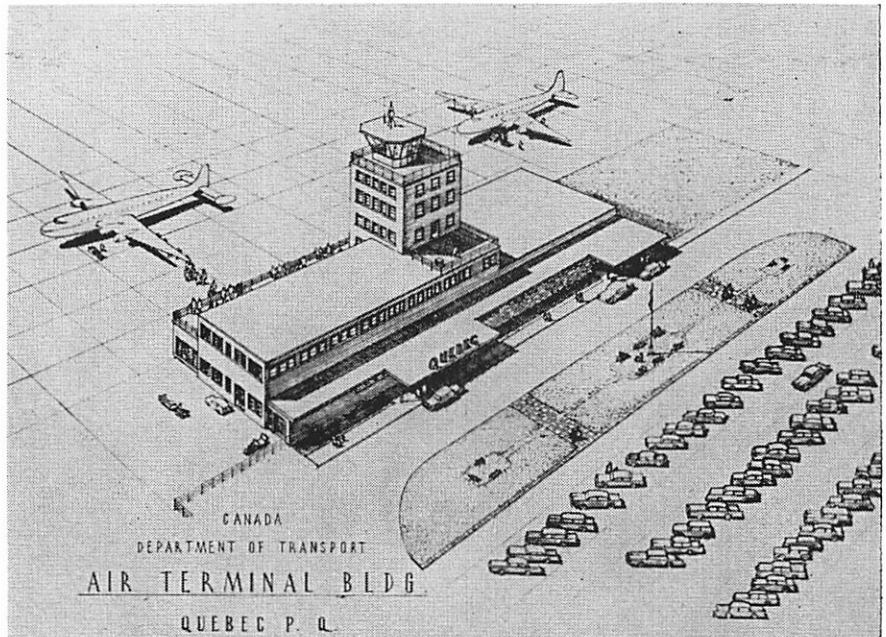
Canadian Pacific Air Lines will set up the long planned Lima-Buenos Aires extension May 15. There are also plans for increasing flights on other routes.

Curtain Lifts

British European Airways has arranged for a service between London and Belgrade, Yugoslavia effective April 22.

New Transport

Frye Corp. has designated its new four-engine transport the F-1 Safari and says there are definite commitments for six planes with options for more. A high-wing transport, the craft is designed to operate from short, unimproved fields and give seat-mile costs "as low or lower than any transport plane ever produced."



QUEBEC TERMINAL. The architect's sketch is of the proposed \$750,000 Quebec City Airport terminal building under construction at Ancienne Lorette. DOT officials say planning for the building involved considerable study to allow for future expansion.

CPA Navigators

Twelve new navigators have been taken on by Canadian Pacific Airlines to keep pace with expansion of overseas operations. The new crew members were taken on following interviews in major cities across Canada.

Profit Margin

Bristol is said to require sales on 80 Britannias to break even on outlay to get the line developed and into production. At time of writing 50 had been ordered.

Turbine Orders

According to a recent survey, 41 airlines had ordered a total of 672 turbine transports. BEA, with a total of 87 ordered leads the field. The Vickers Viscount, with 298 orders, is the aircraft most in demand.

Teleprinter Service

British Overseas Airways recently claimed another first for British civil aviation: A ground-to-air teletype communications system in use on an Atlantic spanning Stratocruiser.

Freight Record

American Airlines claims a new industry record in 1955 with 69,482,000-ton miles of air freight. Total was an increase of more than 24 per cent over the previous year.

SABENA-Aeroflot

SABENA Belgian World Airlines has announced an agreement with Aeroflot, the Russian Airline, permitting passengers on SABENA flights into Prague to continue on to Moscow via Aeroflot.

Pay Later?

American Aviation Daily observes that very few of the foreign carriers who have ordered U. S. jet transports have completed arrangements to finance them.

Eastern Order

Eastern Air Lines plans to order 12 Convair 440 Metropolitans, according to a U. S. source. Delivery would be scheduled for early in 1957.

Installment Flying

British Overseas Airways has introduced a Canadian Ticket Instalment Plan. Trips may be made for 10% down with 24 months to pay the balance.

New Service

Canadian Aircraft Renters Ltd., Toronto, has applied to the Air Transport Board for a license to operate experimentally for a period of eight months only, a point-to-point commercial air service to transport persons at per seat rates, from a base at Toronto Island Airport, serving the points Welland, St. Catharines, Brantford and Kitchener, Ont. A daily pattern of service, using twin-engined Beechcraft D18-S or similar type aircraft, is contemplated:

- 1) Toronto-Welland-St. Catharines-Toronto (Morning)
- 2) Toronto-St. Catharines-Brantford-Kitchener-Toronto (Morning)
- 3) Toronto - Kitchener - Brantford - St. Catharines-Toronto (Afternoon)
- 4) Toronto-St. Catharines-Welland-Toronto (Afternoon)

The operation is proposed to be daytime VFR and will include, at no extra charge, a stop at Malton Airport on any trip if any of the passengers desire to make connections with the major airlines.

aviation news digest

Defense Estimates

Defense estimates for the next fiscal year (1956-57) total \$1,775,000,000, which is the same amount as was requested for 1955-56. From preliminary forecasts available it seems that the actual expenditure up to March 31 will not be significantly different from the estimate. The breakdown of expenditures is about the same as last year's with an \$8-million increase for the air force, a \$26.5-million increase for defense research and a \$32-million decrease for mutual aid.

The figures are: defense administration, \$13,700,000 (0.69% of gross total); defense research, \$79,032,389 (4%); mutual aid, \$143,000,000 (7.27%); air force, \$872,382,925 (44.3%); navy, \$325,000,000 (16.5%); army, \$476,739,000 (44.3%).

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New Company

A new Canadian company, Philips Canadian Industrial Development Co., has been formed by N. V. Philips concern of Eindhoven, Holland. President of the new firm is R. M. Brophy, who has been associated with the parent company's Canadian interests since 1945. Philips has extensive research facilities at Eindhoven and has contributed a number of important items in the electronic field over the years.

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TCA Choice

Trans-Canada Air Lines is reported close to a decision between the Electra and the Vanguard. It is understood that if the Lockheed model is chosen it will be equipped with the Rolls-Royce RB 109 Tyne.

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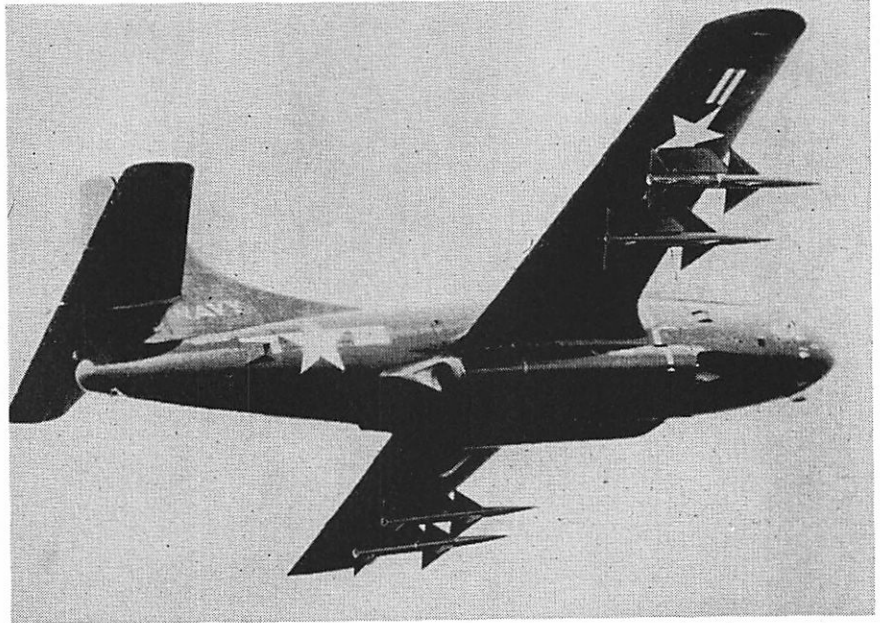
New Scholarships

Avro and Orenda, members of the A. V. Roe Canada Ltd. group, are offering fourteen \$500 scholarships, together with other forms of student assistance at eastern universities. Eight scholarships, an aircraft design prize and a \$3,000 students' loan fund are being established at the University of Toronto. The other six scholarships are divided equally between McGill University in Montreal and Queen's University at Kingston. Nine of the scholarships are accompanied by grants of \$300 to the universities. In addition, Avro is offering three \$500 scholarships each year to a child or ward of an employee of the company to provide four years tuition at the University of Toronto.

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Egyptian MIGs

The Egyptian Air Force is said to have taken delivery of some of the 200 to 300 MIG-15s it has on order.



CANADA BUILT MISSILE? Four needle nose "Sparrows" snuggle under the wings of a US Navy F3D. The supersonic air-to-air guided missiles are said to be Canada's choice for a guided weapon to be built in this country as armament for the new Avro CF-105. The Velvet Glove project is now described as strictly an experimental and familiarization venture which gave Canada the nucleus of a missile industry.

PSC Contract

Photographic Survey Corporation of Toronto has a contract to assist in 225,000-acre aerial survey along the Caroni River in Venezuela. The survey is to help develop power in the South American country in the vicinity of the rapidly expanding industrial area around Ciudad Bolivar. An official of the Canadian firm estimated it would take just over a year to complete the work. PSC, Aeromapas Nacionales of Caracas, an associate company of PSC, and Cartographia Mercator, another Caracas firm, received the contract jointly. The project will be carried out by largely the same team which did the detailed mapping over an area of 90,000 acres on the lower reaches of the Caroni in 1954-55.

* * *

DDP Reorganization

In future contracts for repair and overhaul of engines and accessories as well as propellers will be dealt with by No. 2 Division of the Aircraft Branch of the Department of Defense Production. The division is under the supervision of P. J. Hebert.

* * *

Westland S-58

Westland Aircraft Ltd. has extended its licensing agreement with the Sikorsky Division of the United Aircraft Corp. to produce a new helicopter based on the S-58. It will be called the Wessex and will be powered by the Napier Gazelle gas turbine engine.



MEXICAN JUNKET. In distinguished company at the International Aeronautical Federation held recently in Mexico City is Vic Symonds, sales manager of the Bristol Aeroplane Co. of Canada. Left to right are Jacques Allais, president of the French Aero Club, Mr. Symonds, Mme. Jacqueline Auriol, daughter-in-law of the former French president, and Canadian pilot Charles Parkin. Mme. Auriol flew the Bristol Sycamore helicopter in the background. The aircraft was flown from Winnipeg to Mexico City for the occasion.

Gamble Plotter

The Type T301 Gamble Stereo Plotter, invented by Samuel G. Gamble, chief topographical engineer of the Department of Mines and Technical Surveys, will be shown in the U. S. for the first time at the meeting of the American Congress of Surveying and Mapping and American Society of Photogrammetry. It will be demonstrated by Don Ross, photographic project manager with PSC Applied Research, Toronto.

DC-3 Source

Plans for the release of 23 DC-3 type aircraft to civil carriers were announced recently by the U. S. Navy "to accelerate development of the air transport industry." Lessees must bear cost of overhaul, spare parts and other expenses on the craft which navy spokesmen say have seen considerable service and will require major overhauls to come up to flight standards.

* * *

CPA Report

Heavy participation in the DEW-line cargo airlift during 1955 boosted Canadian Pacific Airlines' gross revenue from domestic operations by 45%. The company's net profit in the year was \$275,000, a drop from the \$969,000 piled up in 1954 with the sale of two DC-6As and final payment on Korean airlift contracts. Total mileage in 1955 operations was 11,646,543, carrying 276,201 revenue passengers, 23,901,550 lb. of freight (including DEW lift) and 3,908,128 lb. mail.

* * *

TCA Changes

Trans-Canada Air Lines has replaced its durable North Stars with propeller-turbine Vickers Viscounts on all first class flights in the trans-continental service. Effective June 1, the airline will operate a second east-west Super Constellation flight Toronto-Calgary-Vancouver. These and other changes will provide 15 per cent more passenger capacity than was available last summer and 35 per cent more than was provided in the winter schedule. On its overseas routes TCA has begun daily service across the Atlantic and effective June 6 there will be 10 trans-Atlantic flights weekly, three of them originating and terminating in Toronto.

* * *

Britannia Customer

Reports persist of Capital Airlines' interest in the Bristol Britannia for its New York-Chicago run. Ten aircraft is the figure most frequently heard.

* * *

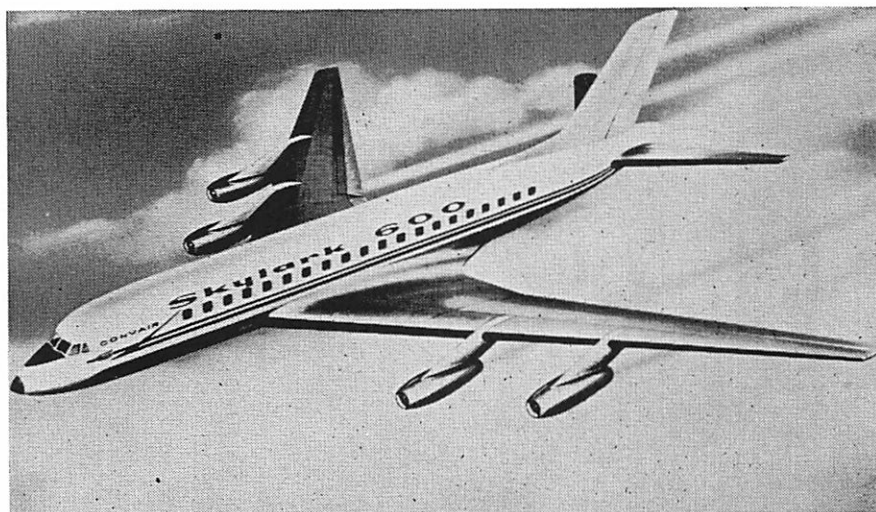
Traffic Separation

Saturation traffic appears precipitating an end to joint civil-military use of major airports in the U. S. Military has been notified that leases will not be renewed at Miami and Greater Pittsburgh fields and a separate military field is being sought in St. Louis area.

* * *

Helicopter Transfer

Free helicopter transfer service between Newark Airport and La Guardia or Idlewild Airports is being offered by Delta Air Lines for connecting passengers using the airline's first-class service between New York-Atlanta or points beyond.



CONVAIR'S jet transport proposal for a medium range jet airliner. The Skylark 600, says Convair, will have a 609 mph cruising speed. On a first-class 80-passenger configuration operating costs will be 1.4c to 1.7c per seat mile. Over a 500-mile range block speed will be 413 mph, on a 1,000-mile stage the speed will be 470 mph and 504 mph block speed on a 1,500-mile stage. The engines will be General Electric CJ-805's—commercial version of the J79.

Barriers Down

Less international red tape for air travelers is being predicted by International Air Transport Association officials. Most governments are said to be taking steps to simplify passport and visa requirements and to streamline baggage declaration procedures for air travelers.

* * *

Continental Aircoach

A new type of nonstop transcontinental aircoach service is to be inaugurated this month by American Airlines. The aircraft will be a DC-7 with a special interior design. The Royal Coachman" services will operate between New York and Los Angeles and later between Washington and Los Angeles.

* * *

KLM Fokkers

KLM is reported considering an increase in its order for two Fokker F-27 twin turbine transports.

* * *

Lufthansa Route

Twice-weekly trans-Atlantic service has been inaugurated by Lufthansa (the West German air line). Route is Chicago - Montreal - Shannon - Manchester - Frankfurt-Dusseldorf.

* * *

Viscount Record

Trans-Canada Air Lines' first year of operations with Vickers' Viscounts set up the following statistics: 470,000 passengers carried at an over-all passenger load factor of 81%; total miles 7,443,000; revenue passenger miles 223,000,000; total hours 29,000; daily utilization per aircraft, seven hours; fleet average utilization eight hours daily.

Fare Reduction

A reduction for return fares amounting to 70% of one-way passage has been announced by Canadian Pacific Airlines between Canada or the U. S. and Lima or Buenos Aires. Excursion rates are for two or more persons with a 30-day return limit.

* * *

Melting Pot

A program for interchange of ideas between the company and the airlines to quicken the flow of transport design advancement has been undertaken by Lockheed Aircraft Corp. An Airline Operations Engineering Department will be headed by Charles D. Mercer, head of flight engineering and flight operations.

* * *

Western Anniversary

Western Air Lines recently celebrated 30 years of scheduled air transportation, making it the oldest continuously operative airline in the United States. The line made its inaugural flight on April 17, 1926. It was estimated that in a single day of operations in 1956 Western would carry 15 times as many passengers as the company served during its entire first year.

* * *

Fare Conference

The Traffic Conference of the International Air Transport Association, where airlines work out international rates and fares for government approval will be held in Europe on May 29.

* * *

Aeroflot Plans

Aeroflot, the Soviet airline, has its 1956 traffic targets set at 20% above 1955 for passengers and 13.5% up for cargo.



LOCKHEED F-104A STARFIRE new USAF supersonic night-and-day fighter powered by the General Electric J-79 engine with afterburner which develops half of its thrust as a ramjet. (Prototype powered with the Curtiss-Wright J-65 with afterburner, first flown, February, 1954). Now in quantity production it features: "most powerful jet engine, thrust per pound developed; first downward ejection" system for a production jet fighter; an all flying tail. Note unusual supersonic speed wing configuration. Wings are razor thin and so leading edge sharp protectors have to be put on on the ground.

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Bristol Expansion

Bristol Aeroplane Co. of Canada (1956) has formed a Mexican subsidiary, Bristol de Mexico, S.A. de C.V. The new company will operate initially as an engine overhaul base, on lines similar to Bristol's Canadian overhaul and repair plants. Staff will be Mexican nationals, with the exception of a few Canadian technicians. Headquarters for the new company will be at the Central Airport in Mexico City where a new building is to be erected. The plant is expected to be in full operation by the end of the year. Directors of the Mexican company will be R. J. Reynolds, president; B. A. Chalmers, vice-president; J. A. Anderson, vice-president and general manager; J. N. Dalton. Building plans call for a modern test cell, designed by F. Janke who has already provided similar facilities for Bristol plants at Montreal and Vancouver.

* * *

300-Plus Viscounts

Purchase of three aircraft by the Iranian Government recently boosted Vickers Viscount sales over the 300 mark. Total sales on Viscounts stood at 302 at press time. Trans-Canada Air Lines led the way in North America placing its initial order for 15 Viscounts in 1952. Two repeat orders have hiked the total of TCA's potential Viscount fleet to 36 aircraft.

Avro Management

Seen as a step in anticipation of public financing by A. V. Roe, Canada, later this year or early in 1957 is incorporation of Avro Industries Ltd. as a private company to act as the management company for A. V. Roe Canada group of companies. Included in the group are Avro Aircraft, Orenda Engines, Canadian Steel Improvement and Canadian Car and Foundry.

* * *

Atlantic Dectra

A British plan to set up a new Dectra navigation system across the North Atlantic between Scotland and Newfoundland is said to be receiving favorable consideration by the Canadian Government. Dectra is the long range version of the DECCA system.

* * *

Titanium Price

The price of U. K.-produced, raw titanium has been cut to just under \$3 a lb. by Imperial Chemical Industries of London. The price is an all-time world low.

* * *

Farnborough Show

The flying display and exhibition of the Society of British Aircraft Constructors will be held Sept. 3-9 at the Royal Aircraft Establishment, Farnborough. The public will be admitted for the last three days of the show.

Pilots Wanted

Nineteen new pilots were hired recently by Canadian Pacific Airlines and the company is reportedly in the market for at least that many more to keep pace with expansion on overseas and domestic routes. The first group of prospective CPA flyers was under training for familiarization with the line's operations, while members of the flight crew selection board toured Canada to test and select 20 more pilots. Increase of frequency on CPA's polar route from one to two flights a week effective Apr. 1 and introduction of service from Lima, Peru, to Buenos Aires, Argentina, in June brought on the search for new talent.

* * *

ASL Research

Aeromagnetic Surveys Ltd. of Toronto has opened a new research and development laboratory at the Oshawa airport. ASL General Manager Douglas MacKay says the facility, which is complete with all the latest test devices, will also serve as a maintenance shop for company-designed and developed geophysics equipment. The new lab is staffed by engineers and technicians of the calibre of Vaino Ranka, Finnish-born developer of the ASL Electromagnetometer. Gil Hobrough will direct research and development, while maintenance work will be under the supervision of Ron Johnston.

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Helicopter EM

Kenting Aviation of Oshawa will take lease with an option to buy a Bristol Sycamore helicopter for use in connection with mining geophysical survey work to be carried out for the operator's Hunting group associate, Aeromagnetic Surveys Ltd. of Toronto. Helicopter EM equipment has been under development for some time by ASL and was extensively tested over the past few months. Kenting will be taking on the Sycamore as of July 1 and there is a possibility that more 'copters will be rented or bought as the season advances. This marks Kenting's return to the helicopter field after an absence of some years. The company was the first commercial operator of helicopters in Canada. Al Soutar, Kenting's operation manager, is one of Canada's most experienced helicopter pilots.

* * *

Postwar High

Employment in the aircraft industry in Britain reached a postwar high in January with 250,000 persons on the job, an increase of 1,600 over the figure for December, 1955, and 9,100 up on the January, 1955, total.

* * *

Gnat Production

Plans are said to be going ahead to produce the Folland Gnat light jet fighter as a private venture, without any official support from the British Government, which so far has placed only a development batch order for six of the aircraft. Folland is banking on interesting military leaders in India, Finland, Holland, Belgium, New Zealand, Germany, Yugoslavia, Switzerland and Israel as possible customers.

* * *

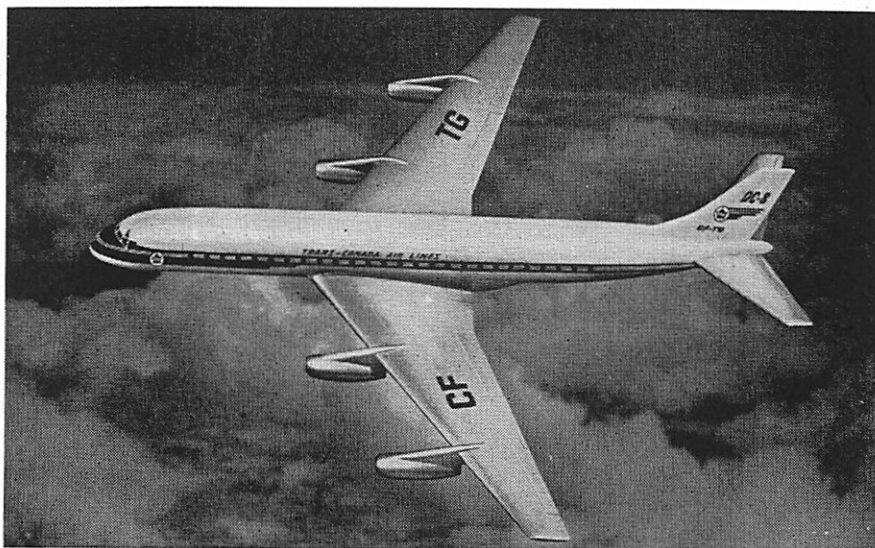
Canadair Tooling

The aircraft tooling contract between Canadair Ltd. of Montreal and Republic Aviation Corp. mooted in the May issue of Canadian Aviation has firmed into a "substantial" order for Canadair. The announcement was made recently by J. Geoffrey Notman, president and general manager of the Canadian firm. Additional orders for original tool design may follow, according to Notman. Republic turns out F-84 jet fighters, F-103 interceptors and F-105 fighter-bombers for the USAF.

* * *

Executive F-27

A private and business version of the Fokker-Fairchild F-27, exclusive of interior finishings, is expected to sell for about \$540,000.



DOUGLAS DC-8's for TCA.

The facts on TCA's jets

Trans-Canada Air Lines became the first carrier to make a firm decision on a combination of British jet power plants and American airframe with an order for four Douglas DC-8s fitted with Rolls-Royce Conway by-pass engines. The order is to be filled early in 1960. TCA has an option on two more DC-8s and Airline President G. R. McGregor anticipates requirement for eight jet liners in all during the period 1960 to 1965. Other potential buyers of a British engine, American airframe combination are Canadian Pacific Airlines, British Overseas Airways, Qantas (Australia) and Air India National. Canadian Pacific has indicated it would follow TCA's lead in the jet field to simplify maintenance in Canada. There are also reports in London that Air France is contemplating an order for Bristol Olympus engines, either for use in Sncase 210 Caravelles or for additional Boeing 707-320s which the airline has on option. The TCA order confirms predictions made by Canadian Aviation in a comprehensive article dealing with the airline's choice of a commercial jet carrier (March, 1956). The Canadian order is valued at \$28,000,000. The commercial Conways as they will be supplied for TCA will develop 16,000 lb thrust. Price for the engines is \$280,000, slightly more than the Pratt &

Whitney J75. The Conway is 12,000 lb lighter than the J75 and has a slightly lower fuel consumption. Outside noise level is 12 decibels less than that of a conventional jet engine and can be reduced further with noise suppressors. McGregor said in announcing the order that a Conway-powered DC-8 will provide "the fastest, most comfortable air service yet known." The president implied that additional TCA equipment orders were under consideration. The inclination is toward a medium haul aircraft to fill in between the DC-8s and Viscounts. Douglas' DC-9, the lightweight development of the DC-8, the Lockheed Electra and the Vickers Vanguard might fit the requirement. McGregor was not definite on the relative merits of medium turbojets and turboprops. TCA is evidently anticipating a Boeing announcement on a medium-haul ship in the near future. McGregor describes this market potential as "larger than that for the heavy jets." He does not feel that the recently announced Convair Skylark 600 will fill TCA's medium needs. It is too close in size to the DC-8 and Boeing's 707. The president said at one point that he was looking at the medium range jets "very regretfully," observing that over shorter ranges the jet loses much of its speed advantage. The turboprops were "far more flexible."

Aircraft Appliances & Equipment Ltd., Toronto, aircraft electrical and electronic sales, repair and overhaul firm has moved into a new larger Toronto plant.

Defense orders (DDP) highlights (latest list) show a \$45-million order for aircraft from Avro Aircraft Ltd.

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► New light aircraft are coming into Canada from the U. S. almost at the rate of 20 a month now—surely there's opportunity for someone in Canada to build light aircraft.

► Canadair will do the engineering for a Convair/Napier project to fit Eland turboprops to Convair-Liners, according to an American Aviation Daily report. There's been little interest by operators so far in having their aircraft re-engined. But it's hoped the Convair with Napier Eland turboprops will be seen in North America this year.

► Despite Transport Minister Marler's recent hewing of the government line on no competition for TCA, reports persist that CPA will be flying out of eastern Canada to Europe within 12 months.

► RCAF has been carrying out formal flight tests of the ab initio trainer Beech Model 73 Jet Mentor to determine whether it will meet Canada's military needs for an ab initio jet trainer. This marks the fourth jet trainer to be evaluated by the RCAF. Others were the Jet Provost (U. K.), Fouga Magister (France), Cessna T-37 (U. S.). Two of these, the Magister and the Beech 73 are tandem seating and two, the Provost and Cessna T-37, side-by-side seating.

► Transport Minister Marler admitted in a recent statement in Parliament that Toronto Malton terminal facilities are badly congested yet said that two years would elapse before a start was made on the planned new terminal.

► Avro Aircraft's new 34-ton CF-105 supersonic two-place long-range interceptor will show considerable external similarity to the (U. K.) Avro Vulcan delta-wing bomber, according to a Garrett Corp. drawing, whose Canadian subsidiary, Garrett Mfg. Corp. of Canada, has developed the heat exchanger for the aircraft—claimed to be the largest ever manufactured for aircraft use.

► With the exception of a contract to produce a transport version of the CL-28 (CL-44) Canadair Britannia it's seen as unlikely that any unclassified airframe contracts will be issued this year unless there is a marked change in the international situation. It's thought that the current British example of being caught short on air troop transports may stimulate the Canadian Government into acting on the need for replacement of the North Stars and expansion of the number of long range units available. Other airframe requirements for defense, an ab initio jet trainer and a short range 2½-ton STOL transport for the army will probably be carried over to the next fiscal year.

► British jet-flap invention is getting increased attention from U. S. manufacturers trying to get licensing rights.

► Hunting Percival Jet Provost will be brought over to Canada late September for further demonstrations to the RCAF and possibly U. S. services.

► Canadian International Air Show (September 7 & 8) at Toronto's Canadian National Exhibition promises to be the biggest yet with a truly international flavor. Promised participation by: RCAF—all types, U. S. Navy's "Blue Angels" aerobatic team, Hawker Hunter aerobatic team, Canadian and U. S. commercial and executive aircraft. Possible entries: Russia's Tupolev 104, France's Fouga Magister, and the U. K.'s Avro Vulcan bomber.

Monopoly principle stifling expansion

Ottawa appears determined to continue flying blind, ignoring check points, on the question of competition in the air transport field.

Recent statements by Hon. George C. Marler, Minister of Transport, indicate the Government is as firm as ever on perpetuation of the present monopoly situation.

What appears to have been lost sight of, as was pointed out by John B. Hamilton, Opposition member for York West, is that the theory of regulation in the matter of air transport has, or should have, its basis in the protection of air routes and not the protection of a company.

The minister's reply to critics of the no competition principle was basically that it was probable the opening of routes to more than one carrier would lead to a situation in which two companies would be splitting a passenger load sufficient to support economic operation by a single firm. The result would be higher costs for air transport, either in the form of a boost in fares or government subsidy.

In the air transport industry in Canada, according to government reasoning, competition will not bring the lower prices and more efficient service which it brings to most other business.

The Government, then, takes the position of continuing the monopoly not to protect individual operators, but to guard the public against higher costs.

But do the facts support this stand?

Where there is competition, on international air routes served by a Canadian

and one or more foreign operators, fares are comparable and in most instances lower than on domestic routes. Competition has not brought the dreaded higher fares here!

In illustrating the limited passenger potential with which Canadian carriers must contend on domestic routes, the Minister of Transport made comparisons between the numbers carried (in 1954) on the New York-Chicago, New York-Boston and Montreal-Toronto runs. The U. S. routes, served at that time by four and three carriers respectively, produced well above the Montreal-Toronto total.

The minister's figures, presumably, are based on the number of persons actually carried by the airlines concerned. What they represent then, is the capacity of the carrier presently serving the route, which could be far different from passenger potential.

Anyone who travels the Montreal-Toronto run at all frequently is well aware of the space limitations which exist here, and on other domestic routes as well.

It is time, past time, for a careful, factual re-examination of the air transport situation in Canada. What was sound judgment 10 or even two years ago may not be supported by the facts today.

There are operators with a sound business sense and years of experience in the air transport field who feel there is a place for them on the more productive domestic routes. The Government is stifling the latent potential of the industry in Canada by banishing them to the bush leagues.

For airlines, new routes, turboprops and business

The year of 1956 was one of the best in the history of the Canadian aviation industry and indications are that the favorable conditions will continue, or perhaps even increase, in 1957.

Canada continues to expand and new fields continue to open up, particularly in the north. Air transportation plays a big part in the economy of the country and that economy was in its most prosperous conditions in history as 1956 came to a close.

Trans-Canada Air Lines set records for traffic volume in 1956 and looks forward to 1957 — the 20th year of

our history — as another record-breaking year.

TCA flew more than one billion revenue passenger miles in its North American services in 1956, and about another 188 million miles were flown on overseas routes for an over-all increase of some 23 percent from 1955. For the first time in the airline's history, more than two million passengers were carried.

In 1957, TCA will place another 11 propeller-turbine Viscounts in service in accordance with the company's program of fleet expansion and modernization and to provide adequate capacity for the volume of traffic.

It seems logical that international air traffic will continue to increase at the rate of about 20% per year during the next decade. We have developed an expansion program to provide the equipment, personnel and facilities to cope with this increase, to anticipate logical route extensions and to offer the ultimate in speed and comfort of flight.

Starting in May, 1957, we will take delivery of one new intercontinental aircraft per month for the balance of the year. Orders were placed earlier

this year for eight DC-6B airliners, four for delivery in 1956 and the others in 1957.

In addition, CPA has ordered five Bristol Britannia long-range turboprop airliners. When introduced on our international routes next fall, they will reduce the flying time by one third.

A new \$400,000 office building is now under construction at Vancouver headquarters and next year we plan to erect a new \$1,300,000 hangar for the Britannias.

The new year 1957 will bring with it some major problems for air carriers largely dependent upon Dew Line and Mid-Canada Line revenues in the past two years.

While these problems are matters of great concern to the companies involved, these circumstances present powerful incentive and challenge to come up with new long-range thinking about the future function and role of such companies. These circumstances will necessitate fundamental thinking on the part of those shaping

Canada's aviation policy and those entrusted with the implementation of such policy.

TransAir Limited sees a continued expansion of bushline activity springing from the increasing tempo of mineral exploration and development programs.

Our company has invested heavily in an air base at Churchill in the firm belief that the sound economic development of Canada in the future will necessarily involve the steady expansion and development of this key rail-head, seaport and air base.

I am of the opinion that 1957 will see a levelling off in the Canadian air transport industry with considerable cutback in the categories employed in the defence airlifts. This will require considerable adjustment by the Class A charter operators.

The smaller charter operators should continue at the current pace, along with the general construction and exploration activity that is taking place in Canada's northland.

With regard to our own company we expect continued growth and some

further steps in our program of modernization of our air fleet.

We have recently become a public company with a successful debenture and stock issue across Canada, and we are continually broadening the scope of our activity.

We expect to continue to expand in the overseas survey field and our helicopter fleet will be expanding about 20% to handle the increased activity in the oil, mining and general development program of the country.

(Continued on page 87)

G. R. MCGREGOR,
President,
Trans-Canada Air Lines

R. A. KEITH,
Assistant to the President,
Canadian Pacific Air Lines, Ltd.

R. D. TURNER,
President,
TransAir Ltd.

JOHN ROBERTS,
President,
Spartan Air Services Ltd.

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Trans-Canada orders Vanguards

A \$67,100,000 vote of confidence

Trans-Canada Airlines moved toward becoming the first airline in the world with an all-turbine fleet with announcement of an order for 20 Vickers Vanguards powered by four Rolls-Royce Tyne engines. The \$67,100,000 order is the largest single dollar export order for any commodity to be placed in Britain since the end of the Second World War. An \$11,700,000 option on another four Vanguards was also announced.

► **TCA President** Gordon R. McGregor indicated that choice of the Vanguard to fill the need for an intermediate range, high-capacity aircraft was a vote of confidence in the Rolls-Royce-Vickers combination which proved so successful in the Dart-powered Viscounts which TCA introduced in North America.

As ordered by TCA, the Vanguard specifications include a maximum payload of 24,000 lb.; ultimate range of 3,000 statute miles with full tanks and 21,000-lb. payload; speed 420 mph; gross take-off weight 141,000 lb.; landing weight 114,000 lb.; over-all length 122 ft. 4 in.; span 118 ft.; cargo volume 1,430 cu. ft.

The fuselage configuration is a double bubble, with the cargo hold below the passenger deck. Passenger capacity is 82 first-class, 90 combined first-class tourist and 102 all tourist. The aircraft is readily convertible to an all-cargo carrier.

The airframe is still at the mock-up stage, with the first prototype expected to be off late in 1958. Delivery to TCA will begin in the early fall of 1960 and will be completed by late spring 1961.

► **The Tyne**, on which flying tests are now going forward, is a two-shaft, high-pressure ratio propeller turbine capable of developing 5,315 equivalent shaft hp. At 2,023 lb., the Tyne has a specific weight of 36% less than the Dart and will give 2.9 times the power of the Dart

when it first went into airline service. R. M. Kendall, general manager of Rolls-Royce of Canada, said that Tynes would not likely be built in Canada, but indicated that the Canadian company would provide full servicing and overhaul, which might involve expansion of Rolls-Royce Montreal facilities.

In the main, the Vanguard will replace TCA's present North Star fleet. It will be used on middle distance runs and also on some of the heavier short runs now served by Viscounts. The airline is counting on its Rolls-Royce Conway powered Douglas DC-8 jet airliners and its remaining Super Constellations to handle overseas and transCanada traffic. The Vanguards are expected to pick up the one and two-stop longer range domestic routes now handled by the Super Constellations.

► **With its 1961 fleet** of Viscounts, Vanguards, DC-8s (and very likely Super Constellations), Mr. McGregor said, Trans-Canada would have approximately three times its present passenger-mile capacity for about the same number of aircraft. He implied that the airline would be picking up its option on two additional DC-8s.

TCA's present outstanding aircraft orders, in addition to the Vanguards, include 28 Viscounts (18 now in service), two Super Constellations (nine now in service) and four DC-8s.

The TCA president indicated the airline came very close to going for Douglas' pure-jet intermediate DC-9 when it was announced last spring. However, further study showed a turbo-prop would be more flexible and suitable to TCA's requirements.

The Vanguard is to be fully flight tested in Canada. The aircraft is to be equipped with the cloud/collision weather radar.

Vickers Orders

Further dollar orders for Viscounts and Vanguards are expected following the TCA order for 20 Vanguards. This was stated by George Edwards, head of Vickers-Armstrong (Aircraft) Ltd.

He said after the TCA deal that further orders to the value of \$50 or \$60 million were expected "within four weeks." Vanguard production is planned at four a month by November 1960.

Edwards said the Vanguard was unlikely to get any longer, but might get a little faster with a maximum of 465 mph.

Turboprop DHC-4

Incorporation of turboprop engines in a further development of the DHC-4 is planned by de Havilland Aircraft of Canada. This was revealed by the firm's operations director Russell Bannock. New version of this twin-engined transport is to be named the Caribou. It will have a 2½ ton payload and a takeoff and landing run of about 500 feet.

Pratt and Whitney engines are expected to power the aircraft initially. Development contracts have been received from the Canadian and U. S. armies.

CDC Market Bendix

Bendix Aviation Corp. products, formerly sold in Canada by Aviation Electric Ltd., will now be handled by Computing Devices of Canada Ltd. Bendix equipment covers a wide range of communications gear to ARINC specifications.

Specific types are AN/ARC-45 eight channel lightweight UHF transmitter-receiver, AN/ARC-44 FM transmitter-receiver, TA-20A VHF transmitter and RA-18C receiver, MI-36A audio amplifier, MI-51A cockpit loudspeaker system, CNA-2C audio control panel, and SCL-3 selective calling system.

The MN 85 localizer VOR, MN 100 glide slope, and MN53 marker beacon receivers are used by commercial operators and have been adapted for military use.

Longe Range Britannia

The Bristol Britannia Series 310, the long range version, made its first flight at Filton, England, at the end of December. The 310 is designed for such operations as non-stop flights across the North Atlantic and between Europe and the west coast of North America. Twenty-six of the total of 65 orders for the Britannia are for the long range type.

Stronger Hercules

Modified version of the Lockheed C-130 turbo-prop transport is proposed, designated the C-130B. The new model, which is now being considered by the USAF, will be powered by Allison T56-A7 engines. The increased power is expected to provide a greater take-off gross weight and generally improved performance.

aviation news digest



French Caravelle on Display

Sud Aviation's SE 210 Caravelle wound up a North American tour late in June with calls at Montreal and Toronto.

Most revolutionary feature of the sleek French bid in the medium-range, pure jet airliner field is the mounting of its two Rolls-Royce Avon engines at the rear of the fuselage. The positioning is said to make for a "clean" wing giving high efficiency at top speeds and also to greatly simplify wing construction, permitting continuity of high-lift devices along the entire trailing edge.

The manufacturer says the Caravelle, which has been ordered by Air France, is the most economical aircraft in its class either now operating or under construction. Its economy factor is said to have greatly impressed U. S. carriers during demonstrations.

Maximum take-off weight is 94,800 lb.; accommodation in the cabin can be set for up to 90 passengers; cruising speed is 470 mph.; range in the 80-passenger tourist version is 1,950 miles and in the 64 passenger first class version 2,200 miles.

The Sud Aviation pure jet was among aircraft evaluated by Trans-Canada Air Lines some time ago before last year's decision to buy Vickers-Armstrong's turbo-prop Vanguard as a medium range replacement. There is unconfirmed word from the United States that Capital Airlines is giving serious consideration to substituting the Caravelle for the de Havilland Comets which it took off its firm order plans a short time ago.

Flying to a tight schedule throughout its South and North American

tours, the Caravelle is understood to have impressed mightily with its good operating characteristics.

A discerning few who viewed the aircraft during its short stop at Malton Airport in Toronto commented on similarity of the Caravelle specifications with those of the now defunct Avro Aircraft of Canada Jetliner project.

Faster Forecasts

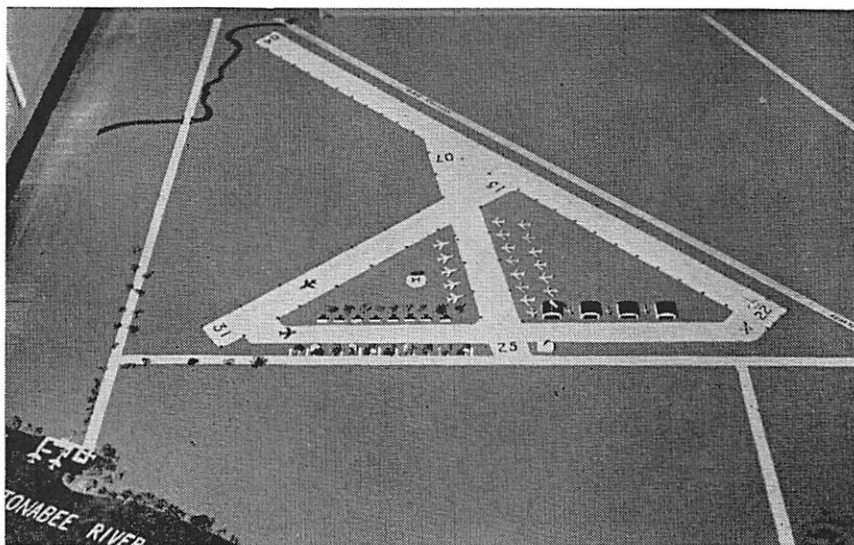
The speed of transmission of weather maps has been doubled at some 60 centres operated by the Meteorological Branch of the Department of Transport. This has been achieved by increasing the speed of the facsimile equipment used over the Weatherfax network. This extends over 13,000 miles of circuit by land lines and radio. The branch teletype circuits have also been converted from 60 to 75 words per minute. This will speed up the assembly of weather information at the central points. The system used to increase the speed of the facsimile transmission in Canada is being studied by other nations.

CPA Training

Training courses on the operation of the Bristol Britannia are being undertaken by engineers and technicians of Canadian Pacific Airlines.

First group of four air engineers, headed by Inspector E. M. Davidson, left Vancouver in May via CPA's Polar flight. Second air engineer group was headed by Project Engineer John DeForest. Seven CPA aircraft electricians and George A. Warden, power plant engineer, depart on July 10.

The technical groups return to Vancouver on completion of their courses, to set up maintenance and engineering procedures for the turbine-driven aircraft.



THE PROJECT. A model of the proposed Peterborough Airport.

Peterborough airport project

The City of Peterborough, Ont., has joined with the newly formed Peterborough Airport Company to develop an airfield three miles southwest of the city. Operations began last month and it is expected that the first runway of 3,000 feet will be completed in about three months. A second runway 3,800 feet long is to be constructed in 1958, and a third (6,500 feet) will be added in

two years' time. Hangars, with workshops, will be started this fall.

Plans are for a small subdivision next to the airport, with motels, service station and a restaurant. The Trans-Canada Highway runs within 1,500 feet of the proposed airport. CNR Railway line runs adjacent to it.

A seaplane base is to be built on the Otonabee River, adjoining the site.

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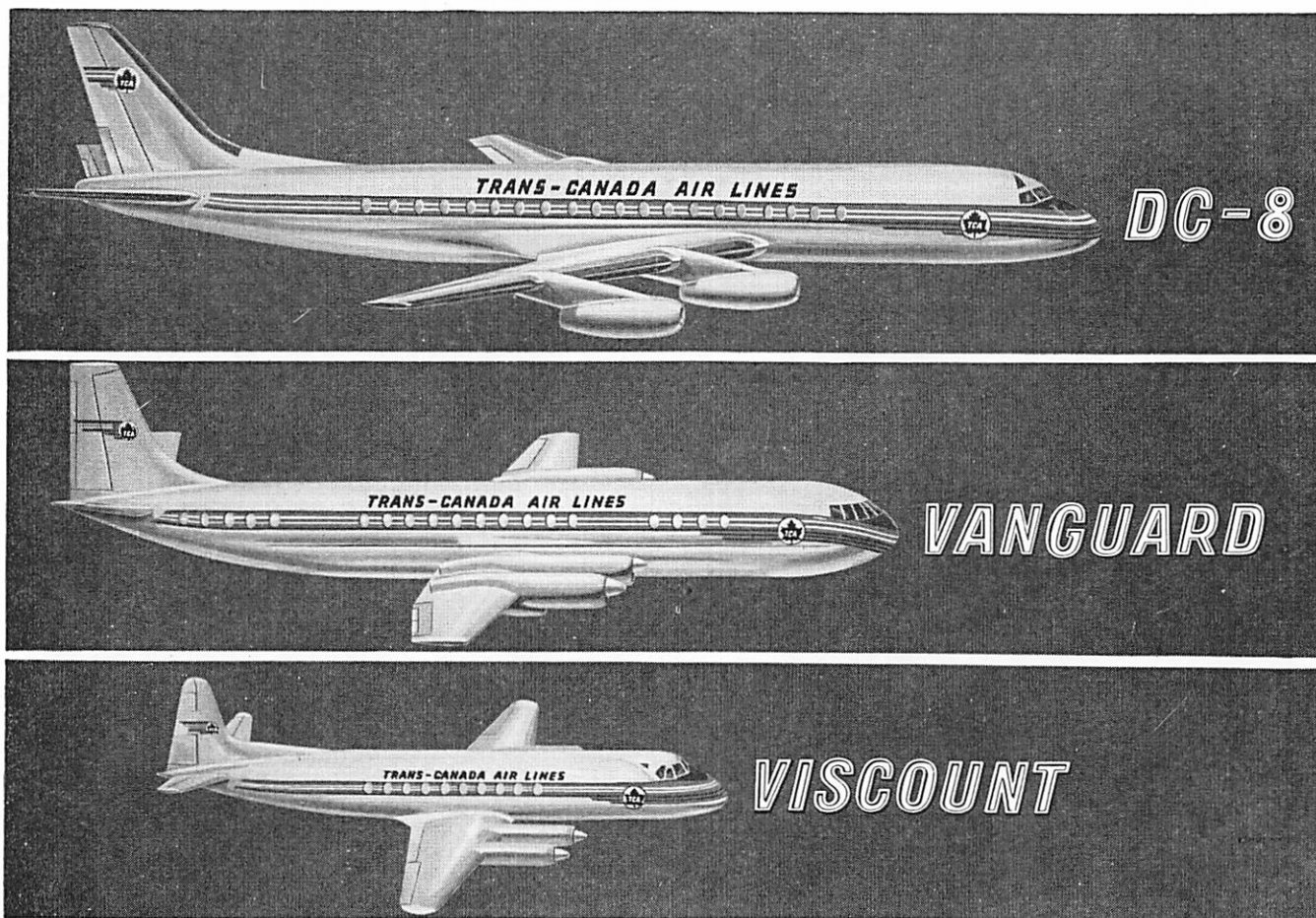
The next few years will mark a revolutionary advance in air transportation. Present piston-engined types will be replaced by propeller-turbine and jet airliners. TCA, in the front rank of world airlines, will become the first intercontinental airline in the world to operate an all-turbine fleet.

The remodelling of the TCA fleet has already begun. In 1955, TCA introduced the now famous Viscount, and became the first airline in North America to fly turbo-prop aircraft.

An order has been placed for 20 Vickers Vanguard airliners, powered by Rolls-Royce Tyne turbo-prop engines. Seating up to 102 passengers and flying at 420 miles per hour, the Vanguard will serve TCA's high-density inter-city and Southern routes. The Viscount, likely to be the best short-range aircraft for many years, will continue to serve short-range routes.

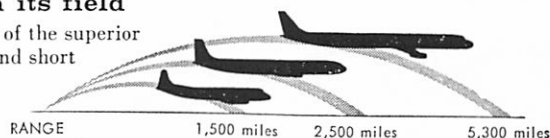
Giant Douglas DC-8 jetliners will round out TCA's re-equipment programme. Cruising at 550 miles per hour, carrying up to 120 passengers, they will cut flying times on trans-Continental and trans-Atlantic services by almost half.

The composition of this future fleet has been determined after years of exhaustive study and evaluation. It represents a balanced combination of aircraft best able to fulfill TCA's particular route requirements.



Three fine aircraft... each ahead in its field

In the Vanguard and Viscount, advantage will be taken of the superior operating qualities of turbo-prop aircraft over medium and short distances. The turbo-jet DC-8, with its higher speed, will realize its full potential on TCA's long distance routes.



TRANS-CANADA AIR LINES

one of the world's great airlines

Current & Candid

by Veni Vidi

"Popped over to London the other day on the Comet. Just stayed the weekend, saw a few friends, did a little shopping and then popped back."

To be able to say that right now still gives one top-line-shooting privileges both in and out of aviation circles. The jet airliner age has at last arrived and its glamour is living up to all the advanced drum thumping.

Now possibly I'm a difficult case, but that flight set me wondering just what lunatic phase the airlines — aided and abetted by the manufacturers — are entering.

On the credit side, it was certainly a pleasant flight. Short, smooth and comfortable. But the BOAC people were quick to point out it was really only a foretaste of what was coming when they introduced their 707s as Pan American has already done.

In fact, they said, in 10 years' time BOAC alone will be offering some 15,000 seats each week over the Atlantic, compared with a planned 4,000 this year. BOAC's top executive, Sir Gerard d'Erlanger, has gone on record that his line plans to snaffle 50 per cent of all the traffic between Britain and North America.

Well, it looks as if he'll have to.

Yet TCA is hardly holding back. One of its executives told me the other day that by the time it has all its DC-8s in service, it will be offering 10 times its present capacity.

It's the same story everywhere — five, 10, 15 times the number of seats.

The other night, in the relaxing quiet of a de-luxe Comet seat, I got to wondering just what there was about this particular flight that could make me, or the chap down the street, decide to fly the Atlantic more often than we do now — which is as often as either of us can possibly afford.

Would it be that now we could arrive on the other side within hours without feeling we had spent the night wedged in a cement mixer? Well, it's a point. But six hours or 12, propeller vibration or jet velvet ride, it really makes no odds to me.

The point is that even at economy rates, I can only afford to cross the Atlantic infrequently.

Unless the airlines can slice deeper into the fare structure — each time reaching a bigger section of the yet untapped flying public—I for one am completely at a loss to see how they are going to generate the traffic to fill the multiples of present seat capacity.

For the sake of argument, let's assume that a \$300 return fare between Montreal and London can be introduced. What will happen in holiday centres?

Remember that little village you discovered in the Austrian Tyrol or conversely in New Brunswick? Remember that island off Jamaica? What happened when it caught on? Hotel and restaurant prices went almost into orbit. Higher prices at the other end serve to cancel out the advantages of lower en route fares.

Captain Eddie Rickenbacker was in Montreal not long ago, and I asked him the same questions, plus a few on how he estimated the airlines would pay for the planes now on order.

"Son," he replied, "people said that about buying the DC-3. They said that you just never would get that many people to fly, and that if you did, the world would soon be so saturated with tourists everyone would rather stay home anyway. We had faith in aviation and airlines then. We still have."

The battle between faith and economics promises to be a thriller.

Readers' Reaction

(Continued from page 84)

an amusement park in Montreal but could never find out what happened to the plane after that.

It could not be La Scarabee because I was the last co-owner of that one and have explained what happened to it to your publication. If by chance the plane at Goderich should be the de Lesseps second machine it is a very valuable record. Any Bleriot plane other than a duplicate would be of value as an antique.

I am very anxious to learn more about this plane.

During some of my investigations I learned of a plane which was said to be in the Armouries in Montreal and a friend wrote an officer at Montreal who said that the old plane had been taken away but he did not know where. We do not know what type of plane it was.

I would be glad of any information on this subject as it should be passed on to Frank Ellis.

Yours truly,
T. Fogden.

Montreal, Que.

Editor,
Canadian Aviation.

Dear Sir:

Your January issue contains a brief chronological record entitled "Milestones Along the Way." This is a most interesting summary but I wish to draw your attention to some serious errors.

It was in September 1937 (not summer 1938) that Canadian Car & Foundry Co. Ltd. opened up the first unit of its aircraft operation—at Fort William (not Montreal). Design of the Maple Leaf Trainer and Gregor single-seat deck fighter was in progress at that time. Tooling of the Hawker Hurricane began at the plant in January 1939 (not summer 1940).

Incidentally, both the Maple Leaf Trainer and the Gregor fighter were test flown in 1939, while the first Canadian-built Hurricane made its initial flight on January 9, 1940. Production on the Hurricane proceeded throughout 1940, 1941 and 1942, a total of, I believe, 1,600 being produced. Miss E. G. MacGill was appointed chief engineer Fort William by myself to succeed Mr. M. Gregor who resigned early in 1940.

Tooling up for the Avro Lancaster was actually begun by National Steel Car Corp. in February 1942 and the Federal Government did not expropriate the Malton facility to form Victory Aircraft until later in the year. It would have been of interest to note that the first Canadian Lancaster flew on August 1, 1943, and that the facility produced 430 before termination. Victory Aircraft also built the Lincoln and the York before Avro Aircraft was formed.

The foregoing is merely to set the record straight since printed errors have a nasty way of perpetuating themselves.

Yours truly,
David Boyd.

editorial

Bolstered Civilian Fleets Needed in Military Back-up

The Air Transport Board has recommended that wherever feasible commercial carriers should be used to fill the air transport requirements of the military and other government departments.

The reasoning is sound.

It has long been recognized that in the event of national emergency existing military air transport facilities would be insufficient to meet demands. Further, the maintenance in normal circumstances of a military fleet large and well enough equipped to meet periodic emergency demands would be uneconomic.

The back-up of an efficiently organized, active air transport pool, familiar with the needs of the military and capable of being swiftly pressed into service, is essential.

In order to fulfill their military commitments, in both peace and in emergency, the commercial carriers should be able to offer a modern fleet of reliable aircraft which can guarantee to deliver the goods.

With this in mind, the Department of National Defense should give serious consideration to a second step which would represent a tangible investment in its possible future requirements. We refer to an arrangement under which carriers would be subsidized by the department in the purchase of new aircraft which would then be on immediate call in the event of a crisis.

This subject has been dealt with previously in some detail. The over-all benefits it could bring to the aviation industry, both carriers and manufacturers, have been pointed out.

Ottawa "Decision" Confusing

Interpretation and assessment of the Air Transport Board's decision (or lack of it) in Canadian Pacific Airlines' application for transcontinental traffic rights is difficult.

On the one hand, the board has indicated that it does not feel competition can be introduced without a detrimental effect on the operations of TCA — and, if it were allowed to compete, CPA. This, presumably, is a basis for ruling against CPA's application — against competition — which represents a complete about-face for the present government.

There's little logic in beating the dead horse of Conservative dedication to com-

petition, however, since it is basically sound for reasonable men to change their minds when they feel they are wrong.

The complications set in with the board's authorizing CPA to operate one daily return flight with domestic traffic rights in Vancouver, Winnipeg, Toronto and Montreal. The confusion is heightened by the board statement that "limited and controlled competition between regional carriers and the bigger organizations should be authorized." Any semblance of a firm picture for the future disappears completely with the announcement of intention to grant unrestricted charter rights on routes already served by a licensed airline.

aviation intelligence

CL-44 Exceeds Expectations

Range improvement for the Canadair Forty-Four of six percent—an increase of 320 miles—and a speed increase of $3\frac{1}{2}$ percent, or 13 mph, over the original performance guarantees are announced by Canadair Ltd., Montreal. These are in addition to the 11 to 12 percent reduction in runway requirements for the freighter, announced about two months ago. Runway lengths specified now are 6,800 ft. for maximum take-off weight, and 5,980 ft. for maximum landing weight.

TCA Shops For Medium Jet

The Convair 990, which made its first flight from San Diego's Lindbergh Field on January 24, is one of four aircraft being considered by Trans-Canada Air Lines for future short/medium-range jet coverage. Other contenders are said to be the Boeing 727 (page 45—January issue), the de Havilland Trident, and the Vickers VC-11. The type selected would supplement TCA's turboprop equipment on the medium haul routes, but is not expected to be introduced until about 1965. The Convair 990 is powered by four General Electric aft fan engines, each developing 16,100 lbs. of thrust. A top cruise speed of 640 mph. is claimed by engineers of the Convair Division of General Dynamics Corp. The 990's thin, highly-swept wing, has streamlined speed capsules attached to the upper surface. The type will enter service with American Airlines later this year. American is also said to be looking at the D.H. Trident.

New 60-Seat Canadair 540

The Canadair 540 has already exceeded its performance expectations in service with the RCAF, and now the manufacturer's test teams have come up with some striking operational economy figures. It is claimed that the new 60-seat commercial version can be operated profitably over route segments as short as 100 miles. For the 120-mile stage length, the break-even load factor is quoted at 45 percent, or 27 passengers; and for a 160-mile stage, 40 percent, or 24 passengers. This is computing direct operating costs strictly according to the 1960 ATA method, which includes an allowance for maintenance overheads. A factor of 78 percent is used between indirect and direct costs, based on an average for U. S. local service airlines over the past three years.

CF-104 Computer Contract Awarded

Garrett Manufacturing Limited, Rexdale, Ont., received a \$6,000,000 contract for the production of the central air data computing systems for the CF-104 aircraft being produced by Canadair Ltd., for the RCAF. Delivery is scheduled to begin shortly and will continue into 1963 for a total of 240 units. The equipment will be installed in both the operational and trainer versions of the CF-104. It automatically senses, measures and computes performance requirements relative to such areas as airspeed, true Mach number, angle of attack, barometric pressure, altitude and rate of climb. Flight intelligence data is also provided for the pilot, and to subsystems for autopilot, armament, navigation and induction air control. Much of the work on the systems will be subcontracted to other Canadian companies.

The \$6 million contract forms part of an initial \$18 million program being filled by Garrett's parent company, the Garrett Corporation, of Los Angeles, Calif. This is for units being supplied for Starfighter aircraft on order by West Germany, Belgium, Italy, Japan and the Netherlands. Based on the number of F-104 Starfighters presently on order—about 1,600—the company could realize total sales of about \$64 million for air data systems and environmental equipment. Licensing agreements have been signed with several countries which have the 104 on order. Picture on page 45.

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Current & Candid

by Veni Vidi

Royal Commissions are far too often a cheap and easy delaying tactic when governments don't want to make decisions. On the whole they tend to delay the process of sound governing.

However, once in a while — either because the cabinet faces a truly complex problem that defies easy understanding or because a situation has got into such a chronic mess that the policy makers have to stand back and think again — Royal Commissions become vital to intelligent government.

It is my proposition that commercial aviation in Canada has now been allowed to reach a state that can fairly be described as a "chronic mess" — a mess so serious and confusing that nothing short of a careful, detached view can form the basis for new policy decisions.

If this is the case, then a Royal Commission on Aviation would serve a most useful end. It would be useful even if the government was to do nothing about its final report, leaving it to gather dust with so many of its opposite numbers. Holding a full hearing, with the necessity for all interested parties to crystalize their thoughts in the form of briefs, would itself have the enormously valuable effect of making us all stop and think where we are going, where we want to go and how we should get there.

That sort of profound thinking is almost totally lacking in Canadian aviation circles these days — from the top of the ladder right down to the bottom.

It is easy enough to place the blame for this on the government. Certainly an industry so closely regulated by government has the right to expect more than day to day, almost hour to hour expedience in policy setting.

But — perhaps because of this government attitude — representatives of the industry are now little better.

Agreed TCA and its supporters are consistent in their opposition to increased competition. But do they think ahead at all? The arguments I have heard from the TCA camp seem to make sense for the present, yet they have a form of logic which suggests there can never be room for a change. This is a stagnant approach which precludes progress.

The competition camp, led of course by CPA, has adopted a policy of nibbling around the fringe. Each time they are allowed a bite they prostrate themselves in attitudes of gratitude, declare that *AT LAST* they have what they had always needed — and then within months are off again looking for the next bite.

How many CPA men — or other would-be competitors of the TCA empire — have come right out and said what it is they really need to get on a sound footing? Darned few, if any. And, of course, in the present hand to mouth situation they'd be fools to do it. Only little bites can be allowed when "policies" change by the hour.

How can the political heads of government be expected to sort out the conflicting "expert" advice? It is no criticism of Mr. Balcer to say that obviously he doesn't really understand all that he is told. It would take a team of crack airline economists working full time to sort it all out.

But one thing is certain: we cannot go on like this much longer. The government must formulate a sound and consistent policy and then must enforce it without regard to short term political repercussions.

I don't think such a policy can be arrived at without the sort of detailed and careful study only an impartial commission of experts can carry out.

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14's, and 14 in the Lodestars.

Thus, having stabilized its finances during the war years, TCA plunged into heavier deficits than ever before in an endeavor to maintain an adequate service. The average system load factor dropped from about 84% in 1943 to 1945, to 76% in 1946 and 68% in 1947.

International status

Representatives of TCA played an important part in the work of the various international councils that met after the war to chart the future of commercial aviation, and have since served with distinction on committees of the International Civil Aviation Organization and the International Air Transport Association. It is a tribute to the contribution made by TCA along with other Canadian airlines that Montréal was chosen as the headquarters of those organizations.

During the war a significant document was produced by TCA engineers: the first specification for a jet transport produced by any airline in the world. The Comet I was already under development but this was being produced to de Havilland's own spec. The TCA specification formed the basis for the controversial Avro Jetliner, which first flew only one week after the Comet, and there is general agreement that the Jetliner would have been a winner but for the temporary withdrawal of the Avon turbojet engines, two of which were specified to power the aircraft.

When the Avon engine, which was

in wide military operation, was withheld from commercial use, Avro was obliged to put four of the less efficient Derwent engines in the Jetliner. This resulted in greatly reduced performance; the Jetliner could not fly non-stop from Toronto to Winnipeg and with the limitations existing at the Lakehead this made the aircraft unacceptable to TCA. Other U. S. airlines that had shown interest backed down for similar reasons, but many people thought that TCA should have gone ahead and bought Jetliners anyway.

This was an occasion when TCA, motivated to a decision by sound commonsense, was blackballed for not buying Canadian. Not too long afterwards, with the advent of the North Star, it was to be blackballed for buying Canadian.

In 1947, its tenth anniversary year, TCA recorded phenomenal growth. The formation of Trans-Canada Air Lines (Atlantic) Ltd., as a subsidiary company to take over the operations of the government service, meant that the substantial volume of transatlantic business, which had always been flown by TCA, was added to the records officially.

Route mileage jumped from 6,511 in 1946, to 11,062 the following year; passengers carried from 183,121 (1945) and 305,442 (1946) to 443,782 in 1947. Operating revenues jumped from \$12.8 million (1946) to \$20.7 million, but operating expenses leapt from \$13.9 million (1946) to \$22.1 million. Within North America alone, more than 1,000 route

miles were added, and extensions in service resulted in a 34% increase in carrying capacity.

Though express services had been operated from the outset, the airline became increasingly air freight-conscious after the war. In 1947 an air cargo service was organized to utilize the larger holds in the aircraft being operated. By this time 30 DC-3's were in service and the first pressurized North Stars, deliveries of which had been delayed by production problems, were being used for training preparatory to service.

At this time TCA had about 36 crews—70 pilots—a figure that was to increase more than tenfold when the airline reached its recent peak number of 780 pilots in 1960/61. Today, with the introduction of larger, faster aircraft, the figure has dropped back to 650.

North Star reception

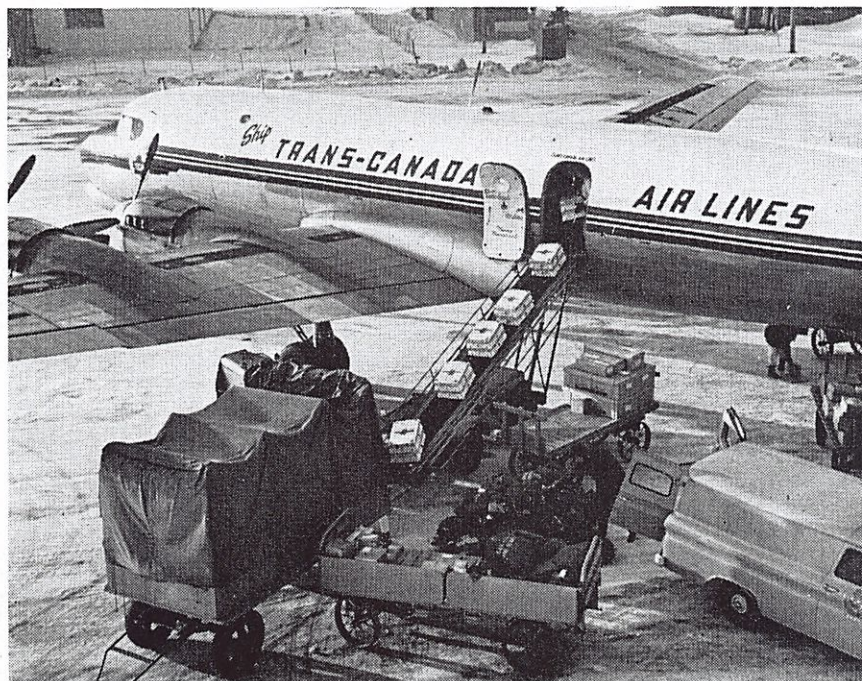
TCA's troubles with the North Star, magnified out of all proportion by political controversy, achieved such national impact that they became world news. One morning the nation—in fact the world—was told that the plane's wings might fall off any minute. "Confidential report reveals North Star wings cracking," one newspaper declared.

It was true. TCA engineers had discovered that in the course of time hair cracks were appearing around rivets near the trailing edge of the wing, and the precaution of adding a reinforcing strip was effected. Since BOAC was also flying North Stars (under the fleet name Argonaut), the Canadian and U. K. airlines had an arrangement whereby they exchanged technical and engineering information on the airplane. A letter from TCA chief engineer Jack Dymont to his BOAC counterpart—marked "confidential"—was intercepted and the newspaper story resulted. It was a good scoop. TCA has always been fair game to the press.

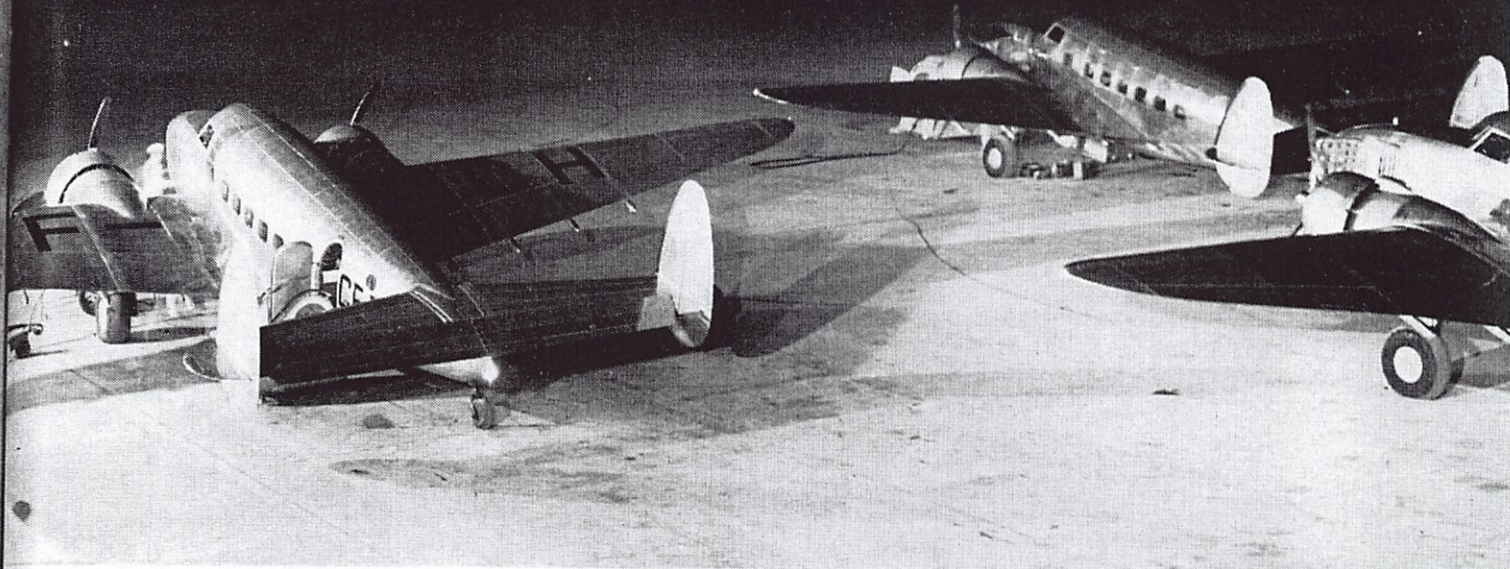
The vendetta conducted against C. D. Howe by the Opposition at Ottawa found considerable expression in the "Hunt the North Star" game. "Spies" went out to probe the files and talk with TCA mechanics hoping to hear the few discouraging words needed to spark a screaming headline.

This was a necessary political move following Howe's brilliant idea of building an aircraft for TCA in Canada to ease the sudden redundancy of thousands of aircraft workers after the war. Somehow, someone had to rebut this masterstroke.

On the accurate assumption that you cannot please all the people all



POWER CONVEYOR is used to transfer fragile packages into a converted North Star freighter—named the "Flying Merchant"—soon after the introduction of the transcontinental freight service.



DIMINUTIVE FLARES marked out the runway for TCA's early night operations. Here three of the airline's Lockheed 14H-2's—note the Fowler flap guides—get pre-flight attention.

trans-continental service. Previously, the Lodestars had been retained on the mountain hop after the DC-3s were introduced because of the DC-3's poor single-engine performance. (Other airlines and the RCAF were not so careful.) The North Star's superior performance also permitted direct flights from Calgary to Vancouver and eliminated the need for the bad-weather route, via Milwaukee and Minneapolis, around the Great Lakes' Thunderstorm Alley.

By 1952 tourist service was introduced, rather tardily, using 57-passenger North Stars, and the Lodestar became TCA's first all-freight aircraft.

In 1953 TCA gambled on three Bristol 170 Mk.31 Freighters, the first aircraft designed solely for cargo to be operated by a North American airline. They were used on five-a-week services from Montreal to the Lakehead and Winnipeg, and to New York from Montreal and Toronto.

Long experience with Canadian weather and a keen knowledge of economics has made TCA engineers particular and careful. The Freighters, like every other TCA aircraft, were modified before going into service. They needed 55 'mods', including bigger heaters, floodlights to inspect the wings for icing, ice-protector plates opposite the airscrew arcs,

a loading winch and radio and instrument changes.

The Freighters' high-wing design, angular and functional lines and fixed undercarriage provoked pungent remarks. One control tower operator is supposed to have asked, "Make it yourself?" while another warned, "Check gear down and welded." The aircraft's nose opened so that a car could be driven in, but such bulky loads were rare and tended to be one-way. After 3½ years the planes were sold to bush operators. The only survivor is one owned by Wardair Canada Ltd. of Yellowknife.

Connie came with troubles

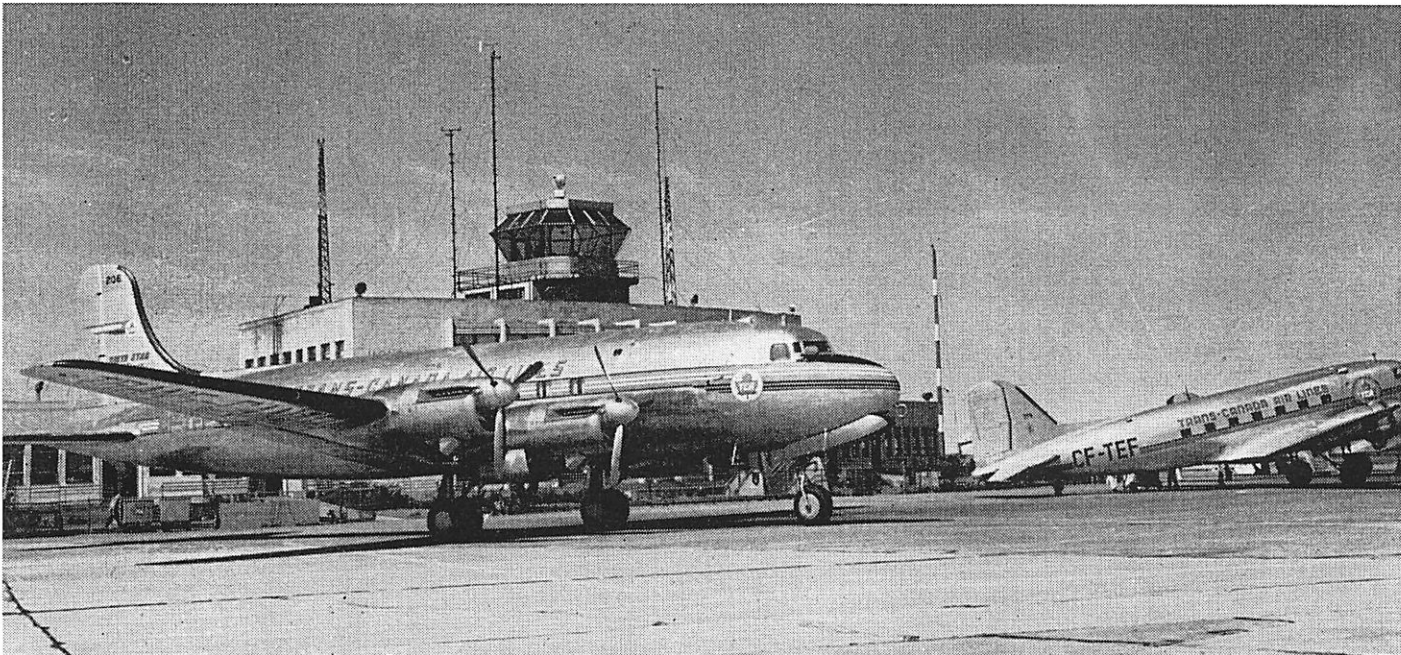
As the North Stars became obsolescent, TCA acquired 14 Super Constellations. These made possible regular non-stop trans-Atlantic flights, and where some were converted to Model G's by the addition of wing-tip tanks, Toronto-London could be flown non-stop. Although the Constellation and Super Connie had been in service long before TCA's were delivered, their teething problems were painful. The plumbing system had to be redesigned by TCA. Electrical equipment and accessories were more complex than ever before, and at first delays were so common that some passengers referred to the Super Cancellation. These problems, long

ago cured and forgotten, put the more recent troubles with the Vanguard into perspective.

The Connies cost a toothsome \$2 million each and were TCA's first really sophisticated aircraft. "In the days of the Lockheeds", says one pilot, "we were only one step away from the leather helmet, scarf and goggles. Today more is at stake, the fellows are more professional and treat their jobs more seriously." No one would now dream of taxiing back from the end of the runway to retrieve his lunch (handed up on a pole), as a North Star pilot is reputed to have done in Winnipeg.

Jet propulsion promised great things for post-war civil aviation. TCA may have been the first airline to prepare a detailed specification for a jet transport, when it drew up one in 1946 for the Avro Canada Jetliner. This was to be a twin-engined, medium-range transport powered by two of the new Rolls-Royce Avon engines. Unfortunately, the British Air Ministry prohibited the civil use of the Avon for some years, and Avro, lacking similar engines, had to substitute four Derwent engines. These had such a high fuel consumption that the Jetliner could not fly Toronto-Winnipeg non-stop, and TCA lost interest.

With some prescience, TCA President G. R. McGregor predicted in



PRIDE OF THE FLEET in 1946 was the Canadair North Star, with four Rolls-Royce Merlin engines. The "Starliner" is seen here parked close to the old Dorval terminal building at Montreal, with the DC-3 also in attendance.

1950 that pure jets would not be in general use for 10 years. Concluding that the prop-jet was a major and desirable step towards the jet age, TCA was among the first to recognize the potential of the Vickers Viscount. Although the Viscount's speed and relative lack of vibration promised new standards in air travel, it lacked the essential background of airline experience, and TCA engineers devoted 18 months to evaluation before placing an initial order for 15 aircraft. To meet strenuous Canadian climatic and North American operating standards, 200 changes, large and small, were demanded. A much improved Viscount for the world resulted. Over 435 have now been sold, making it the most successful post-war airliner.

When American certification of the Viscount was sought in order to meet Capital Airlines' order, no American rules existed for turbine aircraft. The U. S. Certificate of Airworthiness was subsequently granted on the basis of acceptance of the British certificate and 26 special requirements. Nineteen of these conditions had already been satisfied in the TCA Viscount 724.

Delivery of TCA's 51 Viscounts posed quite a problem for the short-haul aircraft. The hazardous weather and tortuous airfield approaches in Greenland were successfully negotiated and trans-Atlantic flights soon became commonplace. Refuelling stops were made at Prestwick, Scotland; Keflavik, Iceland; Blue West One or Eight, Greenland; Goose Bay or Gander. Over 170 Viscounts for North and South America have now

made this trip. The first such flight was made in December, 1955 by Vickers' chief test pilot Jock Bryce and TCA's Superintendent of Flying George Lothian.

Thus TCA's foresight gave the Canadian public the benefits of turbine travel well before the larger American airlines. It set the stage for North American sales of the Viscount, without whose success the Caravelle might not be flying in the U. S.

TCA was first in U. S.

In March, 1955 a TCA Viscount became the first turbine airliner to land in the United States. Airport employees stopped to gape at our shrill conveyance, the like of which they obviously hadn't seen before.

As everyone knows, jet engines are very thirsty on the ground and at low altitudes. American authorities were persuaded to allow Viscounts to wait at the ramp for take-off clearance in order to save fuel. Passengers were given leaflets to explain the lack of engine warm-ups. Apart from a jaded journalist who asserted "flying is flying", the Viscount ("pronounced 'Vi-count'", as Capital Airlines used to explain) made a hit with passengers on both sides of the border.

Operations officials were happy too. During the first month only 11 of 308 flights were delayed due to 'mechanicals'. Less trouble was experienced with the introduction of the Viscount than with any previous TCA aircraft. Operating costs were 9% below the 1953 estimates, and the cost per mile was less than that of larger aircraft which were fuller depreciated. TCA had picked a winner,

which will be in service for another six or seven years.

The Rolls-Royce Dart engines of the Viscounts are now operating 4,000 hours between overhauls. This period represents about 17 months or more than one million miles of flight without an engine change. No other airline engine in the world is believed to have such a long service life.

With the arrival of the Viscounts, the North Stars became surplus. By then the used aircraft market was shaky, and TCA was offered (and refused) an office building in Mexico in part exchange before all were sold. Now the North Stars serve such exotic carriers as Linea Expresa Bolivias C.A.

On April 1, 1960, on the twenty-first anniversary of the first trans-Canada passenger flight, TCA inaugurated the first Canadian jet service. A DC-8 made the Montreal to Vancouver trip in 5 hrs 40 min, compared to the original 17 hrs 35 min. Its speed (200 mph faster than a Spitfire!) has made it popular with passengers as well as pilots, who describe it as "viceless". It will not dutch roll, so this characteristic has to be simulated in training.

TCA had looked at the Vickers V.1000, which was abandoned, and chose the DC-8 in preference to the Boeing 707 because of cost, delivery date, and their satisfaction with earlier Douglas products.

DC-8 support step-up

The arrival of the first two DC-8s coincided with the opening of TCA's 84-acre, \$20 million overhaul and maintenance base at Dorval. Far cry

F-104 strategically obsolete

Like ourselves, the Germans have committed a high proportion of the money they have available for new military equipment to the production of the multi-purpose, all-weather version of the Starfighter F104G. And like ourselves, the Germans are beginning to feel uncomfortable about it.

There has been some strong talk about the whole program being "organized production for the scrap heap." The irrepressible German defense minister, Herr Strauss, has been reported as saying that it was fortunate "that we all made this mistake together," by which he meant that the Opposition had also agreed to the Starfighter.

There would, in fact, be nothing very wrong with that choice except that the assumptions under which it was made are no longer valid.

The Starfighter was to have been primarily a carrier of tactical nuclear weapons, an FBS (fighter-bomber, strike) aircraft in NATO parlance. It could perform a secondary reconnaissance role, but no better than a less "hot" and less expensive aircraft. Instead, the Germans have been thinking vaguely of using it as a high-altitude interceptor.

But the Starfighter's real task and real "raison d'être" was delivering nuclear weapons. It was an essential task at the time for NATO strategy then envisaged using tactical nuclear weapons practically from the opening of any hostilities. The theory was that from the point of view of their employment, these small nuclear weapons were like any other, only more efficient, and would thus be used side-by-side with non-nuclear arms as the situation demanded.

In fact, the latest NATO planning directive, the number and some of the contents of which have been made public (MC-96), envisaged the distribution of nuclear weapons down to small unit level. It was to have been a case of "a Davy Crockett in every pocket" — and presumably of a nuclear bomb in every Starfighter.

The patently erroneous belief that small nuclear weapons could be used freely, merely to gain tactical advantages, has been assailed for years now by military critics, not the least by men who are now President Kennedy's closest advisers. They seem to have prevailed at long last, for it is now clearly the policy of the United States that deterrence must be graduated, and, in particular, that conventional war must be deterred, and if at all possible countered, with conventional arms.

This is a complete change of tack. It must affect NATO, because the United States holds all the warheads for the nuclear weapons carriers of its allies.

It is, in my opinion, a long overdue and necessary change from a policy which simply did not make sense. It would require more space than is available in this column to demonstrate why this

is so. Some of the main reasons like the danger of "escalation" and the impossibility of having a "gentleman's agreement" with the enemy on the modalities of the employment of nuclear weapons have, in any case, been discussed often enough; they make it virtually impossible for a war to remain limited once nuclear weapons have been used."

There are other myths which have arisen in connection with the old concept of limited nuclear war, myths which, I believe, have so far not been assailed strongly enough and have as a consequence been widely accepted. One of them is that small nuclear weapons are comparatively harmless, at least in a time of multi-megaton bangs.

This is quite incorrect. In some respects (e.g. as far as primary radiation is concerned) very small atomic weapons can be more dangerous than those of a power several times greater.

The new American strategic outlook (which, as I said, must of necessity become NATO strategy, as well) could leave the over 1,000 Starfighters which NATO will have without much of a task to perform. At best they could act as a subsidiary strategic deterrent, a kind of front-line SAC discouraging the enemy from using his nuclear weapons. The trouble is that the West possesses too many means of strategic deterrence already, while it has too few with which to fight the small wars the other side is imposing, and is likely to continue to impose. NATO can hardly afford assigning another 1,000 of its most modern aircraft, which will have cost something like two billion dollars, to the deterrence of a kind of war which does not seriously threaten, and from which the enemy is already abundantly deterred.

The matter is now under anxious discussion in Europe. It is a subject that concerns us greatly, for we, too, have put most of our marbles into the Starfighter pot. The solution seems to lie in trying to modify the equipment of the fighter-bomber, strike Starfighter so it would be capable of performing another main function. This would be a particularly important and pressing task as far as the Canadian CF-104s are concerned, which by all political odds are not likely ever to carry nuclear weapons.

What this new role for the Starfighter could be is difficult to say. There is no requirement for a high-altitude, manned interceptor in the narrow airspace of Western Europe, and the Starfighter does not look as if it were suitable for close air support of ground troops. Perhaps it could do a job on the less restricted northern and south-eastern flanks of NATO or even outside the NATO area.

It would be a pity if this basically good aircraft, in the development and production of which so much of the allied effort has been devoted, were not deployed to best advantage.

aviation intelligence

CL-44 airlifts aviation gear

The special talents of the Canadair CL-44 swing-tail freighter were recognized in round-about fashion close to the home plant last month. Space on the Canadian-built aircraft — not operated by any of our own airlines — was leased from Seaboard World Airlines by Lufthansa, to transport aviation test equipment from Montreal International Airport to Germany. Redeeming feature of the operation was that the shipper, Jarry Hydraulics Ltd., Montreal, is a Canadian company which has earned a world-wide reputation for design and manufacture of landing gear and other hydraulic aircraft components. The test stands were on their way to an associate company of Jarry's near Dusseldorf.

Bids invited by Northrop

Aviation subcontractors in Ontario and Quebec are being invited to bid on about 20 components for the Northrop F-5 jet fighter program. A number of companies have been approached and the program promises to be a sizeable one. The F-5 is being produced by Northrop for the U. S. Mutual Security Program as a replacement for the F-86 and F-84, thousands of which are in service. Companies already supplying Northrop with parts for the T-38 trainer, closely related to the F-5, include Bristol Aero Industries, Winnipeg — producing the engine afterburners, and Dominion Rubber in Kitchener, producing fuel cells.

Potez prospects look good

Touring Eastern Canada last month, the Potez 840 executive turboprop attracted a number of prospective buyers in Toronto, Ottawa and Montreal. Host for the Toronto stop was Imperial Oil, with Interprovincial Pipeline, B.A. Oil, Steep Rock Iron Mines, Canada Packers, Duplate Automotive and Turnbull Elevator showing marked interest. Suggestions for improving the 840's acceptance on the North American market are already bearing fruit. Cabin sound level is to be reduced — partly by replacing the three-bladed props with four-bladers, and a more roomy interior arrangement is being sought.

DH-125 in North America

Possibility of Beech Aircraft Corp. representing de Havilland for sales of the DH-125 executive jet has been heightened by recent talks. This would facilitate promotion of the jet in the promising U. S. market and would not necessarily hinder the possible plan for the aircraft to be built in Toronto by de Havilland of Canada. Beech would gain a highly competitive item for meeting U. S. execu-jet projects, but would also be providing competition for company's own proposed Model 120 turboprop executive aircraft. Selling price for both machines has been stated at about \$500,000.

Follow-on order for Caribou

Further order from the U. S. Army for 48 de Havilland Canada Caribou transports brings total sales to 178 aircraft. Latest contract is for close to \$28 million; total sales to date amount to about \$107,000 million, with about 97% of that figure representing export business. Present backlog will keep de Havilland's 3,200 employees busy to the end of 1964.

End of Viscount era seen

Outlining the airline's plans before the House of Commons railway committee last month TCA president G. R. McGregor said the Viscount fleet would be phased out, and the aircraft replaced by a medium-range pure jet by 1966. There is still no word on what the jet might be, leaving room for speculation of a link between TCA's plans and the order for eight BAC One Elevens, with an option on a further two, by an "unidentified customer overseas" — to quote BAC.

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editorial

Hands off TCA's decision on its new short haul jet

Announcement of TCA's decision on a short haul jet is expected some time next month and is awaited with bated breath on all sides. Most of TCA's equipment decisions have evoked some controversy, but this one promises to be the grand-daddy of them all.

Pressure has been brought to bear through many channels in an attempt to influence the Canadian airline to buy this or that aircraft. At one time there were as many as six suggested contenders, with promises of Canadian participation in production of at least three of them.

Right up to the summer recess of parliament Transport Minister G. J. McIlraith was being asked for assurances in the matter, the Quebec lobby being particularly strong. The suggestion has been that TCA should choose the Caravelle, which could then be built in its entirety by Canadair in Montreal.

Douglas and de Havilland of Canada, on the other hand, have urged adoption of the DC-9, which is to be built partially under subcontract in Toronto — whether TCA buys the airplane or not.

As one might expect, the least pressure has been brought to bear by the British Aircraft Corporation, producer of the most likely contender — the BAC One Eleven. There has been a suggestion that this could be produced entirely in Canada, but the difficulties of such an arrangement are apparent to anyone connected with the aviation industry.

No doubt BAC would be willing to give up bits and pieces of the airplane in exchange for a TCA order and this is a much more likely arrangement. But the quid-pro-quo type of deal used in Canadian/U.S. defence production sharing is perhaps more satisfactory — and there must be something produced in Canada in the aviation line that Britain needs. She is already using DHC Beavers, and BOAC is showing increased interest in the Canadair CL-44 swing-tail freighter.

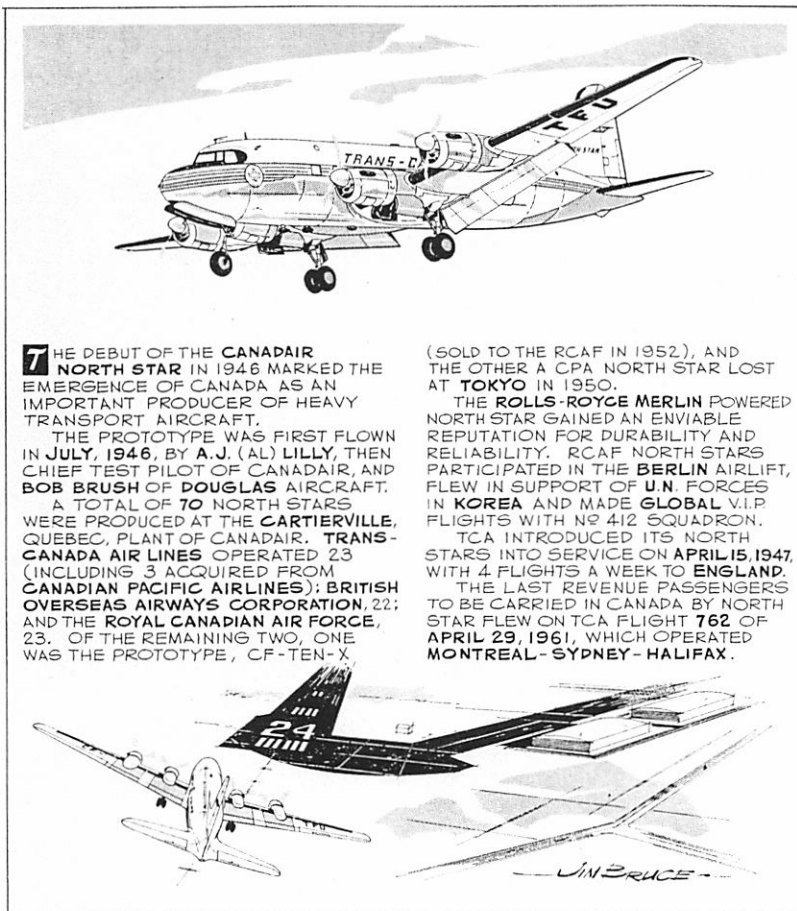
But all these factors are considered secondary by TCA to the choice of the right aircraft for the job — and rightly so. Our flag carrier has a design and engineering staff second to none, which has been responsible for many advances in world airline operations. TCA's president, Gordon MacGregor, has stood behind their decisions before and indications are that he will do so again.

Transport Minister McIlraith told parliament that TCA had been asked not to ratify its short haul jet decision until the government has considered it having regard to Canadian labour content. This is all well and good. When TCA has made a decision on the right machine for the job, efforts should be made to negotiate the most favorable production deal possible for Canadian industry.

But the decision must come first — and it should be respected.

Peter Brannan

THROUGH THE YEARS with Canadian Aviation



7HE DEBUT OF THE CANADA NORTH STAR IN 1946 MARKED THE EMERGENCE OF CANADA AS AN IMPORTANT PRODUCER OF HEAVY TRANSPORT AIRCRAFT.

THE PROTOTYPE WAS FIRST FLOWN IN JULY, 1946, BY A.J. (AL) LILLY, THEN CHIEF TEST PILOT OF CANADAIR, AND BOB BRUSH OF DOUGLAS AIRCRAFT.

A TOTAL OF 70 NORTH STARS WERE PRODUCED AT THE CARTIERVILLE, QUEBEC, PLANT OF CANADAIR. TRANS-CANADA AIR LINES OPERATED 23 (INCLUDING 3 ACQUIRED FROM CANADIAN PACIFIC AIRLINES); BRITISH OVERSEAS AIRWAYS CORPORATION, 22; AND THE ROYAL CANADIAN AIR FORCE, 23. OF THE REMAINING TWO, ONE WAS THE PROTOTYPE, CF-TEN-X.

(SOLD TO THE RCAF IN 1952), AND THE OTHER A CPA NORTH STAR LOST AT TOKYO IN 1950.

THE ROLLS-ROYCE MERLIN POWERED NORTH STAR GAINED AN ENVIABLE REPUTATION FOR DURABILITY AND RELIABILITY. RCAF NORTH STARS PARTICIPATED IN THE BERLIN AIRLIFT, FLEW IN SUPPORT OF U.N. FORCES IN KOREA AND MADE GLOBAL V.I.P. FLIGHTS WITH NO 412 SQUADRON.

TCA INTRODUCED ITS NORTH STARS INTO SERVICE ON APRIL 15, 1947, WITH 4 FLIGHTS A WEEK TO ENGLAND.

THE LAST REVENUE PASSENGERS TO BE CARRIED IN CANADA BY NORTH STAR FLEW ON TCA FLIGHT 762 OF APRIL 29, 1961, WHICH OPERATED MONTREAL-SYDNEY-HALIFAX.

NEXT MONTH: The Short Mayo-Mercury composite aircraft.

Dart developing 3,245 teph; the other, the Short Belfast, powered by four Tyne Mark 101 developing 5,715 teph.

The increased power rating of the Dart is obtained by increasing the flow of water/methanol injection, thus extending the degree of power boosting. Flame tube cooling has been increased and the main reduction gear strengthened.

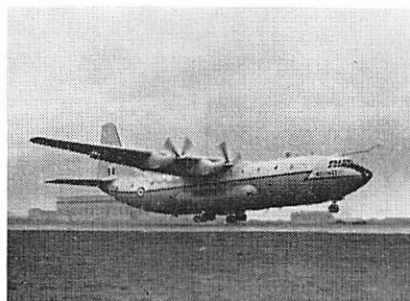
A major feature of the 748 MF is its adjustable or 'kneeling' undercarriage to facilitate transfer of freight. The aircraft can be raised or lowered to exactly match the height of the loading or unloading vehicle and the aircraft attitude can also be adjusted laterally should loading or unloading take place on uneven ground. It will carry payloads of up to 15,000 lb and has a ferry range of well over 2,000 nautical miles.

The Short Belfast will incorporate the Smith Series 5 automatic landing system which will enable the 100-ton transport to land in zero-zero conditions. The automatic equipment in the aircraft is triplicated to ensure continuity of operation in the event of failure. Apart from research aircraft, this is the first applica-

tion of the three-channel autoland system.

Another first flight reported from Britain is that of the second British Aircraft Corporation One Eleven. Production is proceeding apace with 17 aircraft of the 61 ordered already in the works. Despite the crash of the first prototype, deliveries to Braniff are still scheduled for late this year.

The first Hawker Siddeley (late de Havilland) Trident has been delivered to British European Airways and is now engaged in crew training. Services with the airplane are planned to start in April.

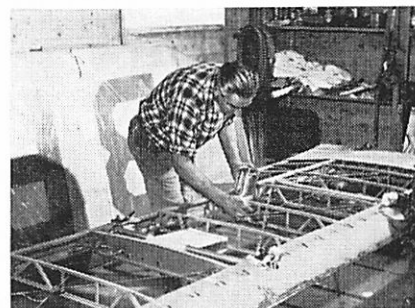


Belfast taking-off

Homebuilding

● George Le May of Calgary, private pilot and former racing driver, has two de Havilland Tiger Moths in his backyard.

The Tiger Moth was the primary training aircraft of the Commonwealth air forces until 1942. Many a pilot



George Le May at work

graduated from it to Spitfire fighters and Lancaster bombers.

But now the Tiger Moth is threatened with extinction. Mr. Le May says old age and crack-ups have reduced the 1,800 built in Canada to about 25, scattered across the country at small flying fields or in the hands of private enthusiasts.

Originally the Tiger Moths were sold to the federal government for about \$7,500 each. Now one can be bought for \$500-\$1,500—if the would-be purchaser can find it.

Mr. Le May discovered his first one, in about six different pieces, lying neglected in a garage.

The Tiger Moths in the Le May backyard have been getting the loving care they needed to restore them to near-original condition.

Restoration is a painstaking and expensive task. Mr. Le May spent \$1,000 and a year's work to put his first one back into shape.

He completely rebuilt it. His wife and a friend pitched in on the task of regluing fabric on wings and tail and checking the fuselage framework for warp and erosion. Finally, with a new coat of paint, the venerable Tiger Moth could take a place of pride on any flight line.

Unfortunately, soon after the job was finished, a high wind overturned the plane and smashed its wings. Mr. Le May began rebuilding immediately.

He feels that the old biplanes have much more to offer the flying enthusiast than the sleeker and more expensive modern planes.

"Modern aircraft don't have the sports appeal," he says. "It's like comparing a family sedan to a sports car."

The Tiger Moth is fully aerobatic. It will do anything a pilot wants to make it do."

The two-seater, open-cockpit craft has a cruising speed of about 85 mph with power from a four-cylinder inverted engine producing 130 hp.

As president of the Calgary ultralight aircraft association, Mr. Le May is

Ste. Therese crash findings

Recovery of diving DC-8F was "impossible within the altitude available"

By Peter Brannan

● The recently published report of the inquiry into the crash of an Air Canada DC-8F at Ste. Therese, Que. on November 29, 1963, indicates the most likely cause of the accident to have been the application of near maximum nose down trim. This is believed to have caused the aircraft (CF-TJN) to enter a dive, building up speed at such a rate that recovery was impossible in the altitude available.

The report states that the cause of the crash cannot be determined with certainty, but that many of the possible causes can be considered unlikely beyond any reasonable doubt. The "conclusions" section of the report continues:

"It is concluded that there was no engine failure, in-flight structural failure or severe icing sufficient to cause air flow disturbance on the flight surfaces and thereby render the aircraft uncontrollable. Additionally, it is concluded that aircrew incapacitation total or partial due to toxic environment, sudden illness or malice did not occur. It is therefore concluded that the above factors may be effectively ruled out as having occasioned the crash.

"It is also concluded that although turbulence existed along the flight path and was probably contributory to the cause of the accident, the extent of the turbulence was by itself not sufficient to have rendered the aircraft uncontrollable and turbulence is therefore ruled out as the primary cause of the accident.

"It is concluded that the most probable chain of events which occasioned the crash can be identified as follows: For one of the reasons which are set forth below, the pilot applied the near maximum available Aircraft Nose Down (AND) Trim to the horizontal stabilizer. The aircraft then commenced a diving descent building up speed at such a rate that any attempted recovery was ineffective because the stabilizer hydraulic motor had stalled, thus making it impossible within the altitude available to trim the aircraft out of the extreme AND position.

"The first reason which might have indicated to the pilot the necessity for applying nose down trim could have been icing of the pitot system as dis-

cussed in the analysis of evidence. While the experience and competency of the crew would likely have led them to recognize the fault in time to take corrective action, the possibility that this condition caused the application of AND trim cannot be dismissed.

"The second reason could have been a failure of a vertical gyro. The evidence indicated that it was possible to have a failure of a vertical gyro without an associated warning flag. If such a failure occurred and the aircraft was being flown with reference to the associated artificial horizon instrument it is likely that the pilot would be misled by the erroneous indication and could have applied nose-down trim.

The crash of an Air Canada (then TCA) DC-8F jetliner at Ste. Therese, Que., on November 29, 1963, with the loss of 111 passengers and seven crew members, sparked the most extensive accident investigation in the history of aviation in Canada. At the height of the round the clock salvage operations more than 1,500 personnel were employed, and excavation of the 17,000 sq ft crater area involved the moving and screening of 26,000 cubic yards of soil. The aircraft's total weight was 135,030 lb, and of this 105,442 lb of wreckage was recovered.

"The third reason could have been an unprogrammed and unnoticed extension of the Pitch Trim Compensator (PTC). This would have had the effect of moving the control column back, the elevators up and the aircraft to a nose up condition. The pilot would likely have counteracted the pitch up force of the elevators by trimming the horizontal stabilizer to or near to the limit of the Aircraft Nose Down setting.

"The evidence shows that the simultaneous application of up elevator from the PTC and the application of as little as 0.5 degrees of Aircraft Nose Down trim on the horizontal stabilizer has an adverse effect on aircraft stability and can create a difficult control problem. The problems of instability and control are more serious as further AND trim is applied. In aircraft CF-TJN 2.0 degrees of AND trim was available and

it appears that the pilot applied at least 1.6 degrees of the available trim.

"It is concluded that an unprogrammed extension of the Pitch Trim Compensator is the most probable cause for the pilot having applied Aircraft Nose Down Trim, which initiated the chain of events that culminated in the crash."

In the analysis of evidence it is noted that in the situation envisaged aboard CF-TJN, if the pilot did not attempt swift recovery action, the speed would build up to a point where recovery became difficult, if not impossible. As the speed of the aircraft increased the force required to pull back the control would increase until it became physically impossible to apply sufficient force. Recovery could still be effected by retrimming the horizontal stabilizer, but evidence showed that at high rates of speed, with a pull force exerted on the control column, the hydraulic motor actuating the screw jacks is effectively stalled and cannot overcome the aerodynamic forces.

It appeared the only possibility of recovery was to release the pressure on the control column, thereby relieving the aerodynamic forces on the empennage and unstalling the hydraulic motor which would then be able to move the stabilizer from its AND position. However, releasing the control column would momentarily aggravate the situation and permit the aircraft to assume a steeper glide angle and increase its velocity.

If the aircraft has sufficient altitude, recovery can be effected by this procedure, as has been demonstrated in other cases where jet aircraft have encountered similar situations. In these cases, however, losses in height of upwards of 13,000 ft were experienced before pull-out could be accomplished. The altitude of CF-TJN at the time of the incident is not known, but was probably between 5,000 and 7,000 ft.

The report recommended that DC-8 pilots should be made aware of the aircraft's stability characteristics with full extension of the Pitch Trim Compensator and with the stabilizer trimmed to counteract this effect. It also made other recommendations with a view to assisting the pilot in the event of any of the possible failures which might have led up to the upsetting of the aircraft. END