A Canadian View of recent developments in Aerodynamic Research

CAI hears outline of possible future research trends in Canada

A PREDICTION that in future smaller countries such as Canada will have to become more self-reliant in aeronautical research and development, was made recently by the NAE's R. J. Templin in his paper "A Canadian View of Recent Developments in Aerodynamic Research". Mr. Templin, who is head of the aerodynamics section of the National Aeronautical Establishment, was addressing the Canadian Aeronautical Institute at its special meeting in Montreal, Feb. 23-24, commemorating the 50th anniversary of powered flight in Canada.

Mr. Templin explained that, in the past, it had been possible for aircraft companies in the small countries to draw almost all of the necessary research information from the output of agencies in larger countries such as the U.S. and the U.K. However, he pointed out, this source was drying up as a growing . . . "fraction of the effort in these countries is being diverted to space flight and long range missile research and development."

Difficult to Answer: The speaker posed three questions of particular interest to aviation in Canada:

- What are the possible future requirements for aircraft in Canadian operations?
- Would any of these requirements justify Canadian development?
- In the various specialized fields, and in particular in the field of aerodynamics, what type of applied research should be carried out in the future to best meet possible Canadian needs, and in order to keep abreast of developments elsewhere?

Mr. Templin went on to say that the range of possible future aircraft requirements appeared to be very wide.

In the military sphere it appeared that armed aircraft would continue to be needed for such roles as the support of ground forces and ocean reconnaissance, even if events proved that the manned interceptor was no longer required in large numbers.

Unarmed military aircraft were likely to be required for transportation purposes, especially in support of mobile ground forces, and there might even arise a requirement for a high speed northern reconnaissance and identification aircraft. A successful VTOL aircraft might have a profound effect on military aircraft as a transport and as a partial replacement for wheeled vehicles in the battle area.

Straight Up: In the civil field as well, the VTOL aircraft could play an important part. The recent Royal Commission on Canada's Economic Prospects had pointed out that air transportation in Canada and the U.S. carried much less than one-half of one per cent of the ton-miles of freight transported on the railways, and they had estimated that the amount would probably increase by about four times in the next 20 years. But, according to the Commission's final report . . . "if the helicopter principle is ever successfully adapted to fixed-wing jet aircraft for purposes of take-off and landing, the future growth of air transport would be enormously greater than we have estimated."

It had also been pointed out that the vertical take-off aircraft could play a valuable role in the future development of northern Canada. "All of the North is within 250 miles of airfields which are suitable for supply bases, but only a small fraction of this vast area can be reached from these same bases by a fully loaded helicopter with a radius of, say, 50 miles."

Commercial airline operations in Canada, and on international routes, could be expected to expand rapidly in the future, as in the past, and the airlines were likely to continue to operate the most modern available aircraft.

Canadian Transport: It could therefore be assumed that there would arise in the future, perhaps by 1970, a Canadian requirement for a supersonic medium-capacity transport aircraft. "Would this requirement be large enough to justify a Canadian development, taking into account at the same time the possible needs in the military transport field? Even this possibility seems hard to rule out, and it is seriously suggested that it should be investigated by the competent aircraft companies."

Summing up, Mr. Templin said that the most significant trend likely to affect the future course of aerodynamic research seemed to be the rapid widening of the speed range available for efficient aircraft flight. Minimum flying speeds were being reduced to zero by research on STOL and VTOL problems, and flight at hypersonic speeds was no longer considered to be beyond the realm of possibility.

"In the field of aerodynamics, it appears that applied and basic research should be continued on the problems associated with vertical take-off aircraft. Satisfactory solutions to some of these problems are not yet at hand. When new wind tunnel facilities are completed there will be opportunities to make contributions to a major current and future problem: the achievement of high lift-drag ratios throughout the 'air-breathing' speed range, up to Mach numbers of about 5. Limited research at hypersonic speeds should be carried out, in order to keep abreast of rapid developments in this field. Experience already gained in the dynamic testing of models in free flight and in wind tunnels should be extended to this speed regime."

Anniversary Dinner: Highlight of

the two-day meeting was the special anniversary dinner on Feb. 23. The guest speaker was the Governor-General and the premier guest of honor was, naturally, the Hon. J. A. D. McCurdy.

Mr. Massey paid stirring tribute to Canada's aviation pioneers by reviewing many of their achievements and citing examples of their resourcefulness. He noted that . . . "The aircraft came to Canada as a godsend. It probably has meant more to us than it has to any other country. I think it is true to say that nowhere else did pioneer flying play such a part in national development—I am not thinking now of communications only in the opening up of inaccessible country, but of economic exploitation."

The Governor-General concluded his address by quoting Antoine de Saint Exupery's *Wind, Sand and Stars:*

"and now, having spoken of the men born of the pilot's craft, I shall say something about the tool with which they worked—the aeroplane. Have you looked at a modern aeroplane? Have you followed from year to year the evolution of its lines? Have you ever thought, not only about the aeroplane but about whatever man builds, that all of man's industrial efforts, all his computations and calculations, all the nights spent over working draughts and blueprints invariably culminate in the production of a thing whose sole and guiding principle is the ultimate principle of simplicity?

"It results from these, that perfection of invention touches hands with absence of invention, as if that line which the human eye will follow with effortless delight were a line that had not been invented but simply discovered; had, in the beginning, been hidden by nature and in the end been found by the engineer.

"In this spirit do engineers, physicists concerned with aerodynamics, and the swarm of preoccupied draughtsmen tackle their work. In appearance, but only in appearance, they seem to be polishing surfaces and refining away angles, easing this joint or stabilizing that wing, rendering these parts invisible, so that, in the end there is no longer a wing hooked to a framework, but a form, flawless in its perfection, completely disengaged from its matrix —a sort of spontaneous whole, its parts mysteriously fused together and resembling in their unity a poem."

A DEATH IN THE FAMILY

ROBERT NOORDUYN, 1893-1959

Robert B. Churchill Noorduyn, 65, the man whose name was synonymous with the Canadian bush airplane, died Feb. 22 at his home in Burlington, Vermont, following a lengthy illness. Interment was at Burlington.

Though Bob Noorduyn was best known in Canada for his justly famous Norseman, he was also responsible for the development of a number of other bush types which were widely used in the era when virtually all Canadian flying fell into the bush category. More than any single person he can be said to have been responsible for distilling bush plane criteria for the first time. His perception and understanding in this respect resulted in the Norseman, a utility airplane that may be safely regarded as an aeronautical tour de force.

Bob Noorduyn truly personified the international character of the aeronautical sciences. Born April 6, 1893, at Nimegen, Holland, he was educated in the land of his birth and in Germany. He first entered the aviation field in 1913 when he joined Sopwith Aviation Co. as an apprentice. In 1914, he moved to Sir W. G. Armstrong Whitworth Aircraft Ltd., where he served variously as a project engineer and later chief inspector. He was responsible for production control on quantity production of the FK.8 observation aircraft. In this regard he worked closely with his countryman, Frederick Koolhoven.

Between 1917 and 1920 he was associated in an engineering capacity with British Aerial Transport Co. Ltd., his duties embracing the production of experimental aircraft for the RAF, as well as production of the FK.26, a Koolhoven-designed commercial type.

In 1920, Mr. Noorduyn moved to

BOB NOORDUYN

the U.S. as personal assistant to Anthony Fokker, remaining on in the U.S. as representative and manager in the U.S. for the Fokker company. In 1924 he organized the Atlantic Aviation Corp., which later became Fokker Aircraft Corp., with which he was associated in a variety of executive positions until new financial interests took over in 1928.

During this period, Noorduyn originated the conversion of the single-engine Fokker F.7 into a trimotor, and also designed the Fokker Universal, as well as a light two seater aircraft intended for low cost production.

He moved over to Bellanca Aircraft Corp. in 1929 and while with this company originated and put into effect the design and production programs which resulted in the Bellanca Pacemaker and Skyrocket types.

Between 1932 and 1934, he was associated with Pitcairn Aircraft Inc. and during this period designed and developed the four-place Pitcairn Autogiro.

Noorduyn transferred his activities to Montreal in 1934, organizing Noorduyn Aircraft Ltd. and beginning work on the design of the Norseman immediately. The following year Noorduyn Aviation Ltd. was formed as a successor to Noorduyn Aircraft to carry out production of the Norseman, and the first production delivery was made to Dominions Skyways in January 1936. This particular aircraft is still in use.

Between 1935 and 1945, Bob Noorduyn was vice president & general manager of the company, during which time about 1000 Norsemen and 3000 Harvard aircraft were produced, mainly for the RCAF and USAAF.

Following the War, the Norseman license was sold to CanCar and Noorduyn's connection with the further development of his aircraft was severed. It was not until 1953, when CanCar decided to dispose of the Norseman license, that his interest was renewed. At that time Noorduyn Norseman Aircraft Ltd. was formed in Montreal, with Bob Noorduyn as president and consultant, to provide continued service to Norseman users throughout the world. There are believed to be over 500 Norsemen still in service.

Noorduyn, best known as a designer, was also a pilot. He held an FAI license and during the period 1920-27 did considerable test and demonstration flying.

He was active in the early days of the AITA and was president of the organization from 1942 to 1945.

The funeral was attended by a Canadian group of some 20 of his former business associates and friends, including: Philip Lariviere, R. T. Riley, Austin Latremoille, Tim Sims, Howie Rees, Norman Bell, H. F. Chase, Bob Redmayne, Tom Wheeler, Leigh Capreol, Bill Calder, Joe Zinatto, William Tousignant, John Chadborn, Pete Vachon and Ches Newhall.