

ERNEST WALTER STEDMAN, *Fellow*—1888-1957

WITH the death of Air Vice-Marshal E. W. Stedman, C.B., O.B.E., Hon.F.C.A.I., F.I.A.S., F.R.Ae.S., in Ottawa on 27th March 1957, there passed from the scene one of the creators of the Royal Canadian Air Force, the officer responsible for its technical development, and a pioneer of Canadian aviation.

Air Vice-Marshal Stedman was a Canadian by adoption. Born at Malling, Kent, 21st July 1888, he took his secondary education at H.M. Dockyard School, Sheerness, and served two years' apprenticeship there before going to the Royal College of Science (A.R.C.S. First Class 1910). He was a Whitworth Scholar (1910) and studied civil and mechanical engineering at the City and Guilds Central Technical College, London, 1910-11.

After working as a draughtsman and engineer in industry, he was appointed in 1913 a Scientific Assistant in Aeronautical Research at the National Physical Laboratory and worked in the 4-foot wind tunnel there.

On the outbreak of war in 1914 he joined the Royal Naval Volunteer Reserve, transferring later to the Royal Naval Air Service, and being posted in 1918 to the newly formed Royal Air Force, in which at the end of the war, he held the rank of Lieutenant Colonel. At the time of the Armistice he was technical officer with a squadron of Handley Page heavy bombers awaiting favourable conditions for bombing Berlin.

On leaving the Service he joined Handley Page Limited as head of the technical staff and first crossed the Atlantic in 1919 as technical advisor for the Handley Page attempt to win the *Daily Mail* prize for the first non-stop Atlantic flight, abandoned when Alcock and Brown were successful.

Returning briefly to England, he again sailed for Canada in 1920 and resided in Ottawa until his death.

Colonel Stedman's arrival in Canada was opportune. The Air Board, newly established in 1919 for the control of aeronautics, was seeking a technical officer to undertake its engineering and scientific work. In October 1920 Colonel Stedman was appointed Director of Technical Services, and immediately began the organisation of the Board's technical branch.

On 1st January 1923 the Department of National Defence came into being and civil and military aeronautics were consolidated in the Canadian Air Force, which, shortly after, received the distinction "Royal," and became the Royal Canadian Air Force. The R.C.A.F. was first organised in three directorates and Colonel Stedman became Assistant Director, Supply and Research. His directorate comprised two sections—technical and research, responsible for the technical development of aeronautics, design and construction of aircraft, engines and accessories, maintenance, airworthiness and aero engineering generally; and equipment and supply responsible for supply of equipment, storekeeping, storage depots, and disposal of surplus.

During succeeding years, as the air force expanded and his responsibilities increased, he was successively Chief Aeronautical Engineer, Air Member for Engineering and Supply, Air Member for Aeronautical Engineering, Director General of Air Research and finally, in 1945, Air Member for Research and Development. He rose in rank in the R.C.A.F. from Wing Commander in 1924 to Air Vice-Marshal in 1941.



Air Vice-Marshal E. W. Stedman, C.B., O.B.E., Hon.F.C.A.I., F.I.A.S., F.R.Ae.S., R.C.A.F. (Retd.).

During his régime Air Vice-Marshal Stedman played a leading role in the technical development of Canadian aviation, from the dormant period following the 1914-18 War to the great era after the Second World War, with domestic and inter-continental air services in operation and a thriving industry.

The sound basis for technical organisation and development and for the intake and training of technical officers for which he was responsible, made possible the development of the R.C.A.F. from a service of 45 officers and 195 airmen at its inception in 1923, to the competent fighting force of 1939-45, the success of the British Commonwealth Air Training Plan, and the creation of a major industry in Canada.

Air Vice-Marshal Stedman was directly involved in most of the technical developments over this stirring period, including the adaptation of war surplus aircraft to civil uses, the surmounting of difficulties due to climate and terrain, the modification of imported aircraft to suit Canadian conditions, the design and construction of types of aircraft for Canadian requirements, such as forest patrol and fire suppression and aerial photography and survey, the practice for stressing for airworthiness, the development of aeronautical research and the establishment of a gas turbine industry.

Air Regulations 1920 required the certification of the airworthiness of aircraft. As no established procedure was available, Air Vice-Marshal Stedman prepared in detail a method for calculating the strength and stability of aircraft, which served until the familiar Handbook of Strength Calculations was issued by the Air Ministry.

Some of the earliest problems encountered in the use of aircraft designed elsewhere arose from the severity of the climate and included the design of skis and fitting them to wheeled aircraft, the starting and operation of engines at low temperatures, the effects of the wide temperature range on rigging and on structures of metal and wood, the

protection of crews in open cockpit machines, the hardening of rubber shock absorbers, and the shrinkage of wood.

During this period, the practice of aerial photography and survey was evolved and aircraft, camera mounts, plotting machines and techniques developed which placed Canada in the forefront in this new art and made possible the recent completion of the aerial mapping of the entire Dominion.

Air Vice-Marshal Stedman, recognising that the R.C.A.F. was essentially a technical service, was responsible for the decision to restrict the intake and training of pilots to graduates in applied science and the setting up, in 1923, of the plan to train selected undergraduates during successive summer vacations. He followed this up with the practice of sending officers, after some service experience, to the Imperial College of Science and Technology in London for post-graduate courses and of posting junior officers to the National Research Laboratories for service in the aerodynamics laboratory. A strong nucleus of trained aeronautical engineers was thus built up and he saw many of these officers reach senior rank in the R.C.A.F.

In 1920, an Associate Committee on Air Research was set up by the National Research Council at the request of the Air Board. Air Vice-Marshal Stedman served as a member of the committee from November 1920 until the committee lapsed in 1948, and was Chairman from 1936 to 1942.

He had, from the beginning, a keen interest in, and unusual appreciation of, the value of research in the development of aviation. As a member of the Associate Committee and in his successive appointments carrying increasing responsibilities for research, he strove constantly to expand the aeronautical research potential of Canada and throughout his career made effective use of the research facilities as they grew. At the end of the war, when appointed Air Member for Research and Development, he stated: "Research for defence is surely one of the most pressing needs of the post-war era."

When, in 1928, the National Research Council laboratories in Ottawa were projected, Air Vice-Marshal Stedman arranged with the President that a wind tunnel and water channel should be included, thereby initiating the development of the extensive aeronautical research facilities of the Council today.

Prior to the provision of the Ottawa laboratories, he supported and used the aerodynamics laboratory of the University of Toronto. When the laboratory was in difficulties in 1922, he arranged for a grant from the Department for the construction of a building to house the wind tunnel.

Air Vice-Marshal Stedman was also responsible for initiating the creation of an aeronautical museum recording the development of Canadian aviation. He arranged that, as aircraft engines became obsolete in the R.C.A.F., samples were reserved for museum purposes. In addition, he, personally, contributed many items including an ensign designed and approved for use at air stations of the Air Board, and a copy of his manual for airworthiness calculations.

Work in Canada on gas turbines was initiated by Stedman in 1942, leading to the construction and operation, under National Research Council auspices, of a cold weather test station at Winnipeg and, in July 1944, to the setting up of Turbo Research Limited, a Crown company for experimentation and scientific research and development of gas turbines. Air Vice-Marshal Stedman was a

Director and one of those responsible for the decision that Turbo Research Limited should concentrate on the development of axial turbines, from which the Chinook, Orenda, and Iroquois have resulted. The creation of an aircraft engine industry, a goal toward which Air Vice-Marshal Stedman had constantly worked, thus came in sight.

Following his retirement from the R.C.A.F. in 1946, Air Vice-Marshal Stedman served briefly with the Defence Research Board as Scientific Advisor—Air. He witnessed the Bikini atom bomb tests in July 1946.

When Carleton College (now University) embarked on an engineering course in 1947, he joined the faculty as Assistant Professor and Chairman of the Department and served there until 1954.

Latterly he had been engaged on the writing of his memoirs, which, unfortunately, he was unable to complete.

Air Vice-Marshal Stedman was a Fellow of the Royal Aeronautical Society and was awarded the Silver Medal of the Society in 1922. He was a Fellow of the Institute of the Aeronautical Sciences and an Honorary Fellow of the Canadian Aeronautical Institute. He was a Member of the Council of the Institution of Civil Engineers and was awarded the Bayliss Prize of the Institution in 1910. A member of the Engineering Institute of Canada, he had served as a Chairman of the Ottawa Branch and member of Council.

Air Vice-Marshal Stedman was awarded the O.B.E. for his services in the First World War, the C.B. in 1944, and was a Commander of the U.S. Legion of Merit.

He was the author of numerous technical papers on aeronautical and engineering subjects.

A keen stamp collector, he possessed a notable collection. His recreations included ski-ing, skating, swimming, canoeing, and motoring.

Reserved, rather shy, sincere, Air Vice-Marshal Stedman was a staunch, but undemonstrative, friend. During the flight of HMA-R100 to Canada in August 1930 he was a passenger on the Canadian flight and also on the return flight to England. The loss of many friends in the R101 disaster shortly after was a great shock to him.

He was an engineer of wide interests and an inquiring mind, constantly extending his knowledge. During undergraduate days, he enrolled for additional courses outside the regular curriculum and, later, obtained leave, in 1931, to take a special course in metallurgy at McGill University.

Well-known in aircraft plants and government offices at home and abroad as a result of his tours to observe developments, his views and suggestions based on his wide experience in aeronautics were everywhere welcomed and respected. For example, the introduction of the seat-pack type parachute into the R.A.F. resulted from a discussion in the office of Sir Hugh Trenchard, and information acquired as a result of his unsatisfactory experience with benzol and alcohol in gasoline, on the newly discovered tetra-ethyl lead as an anti-knock agent, proved helpful to the Royal Aircraft Establishment in assessing the merit of TEL.

Air Vice-Marshal Stedman's foresight, sound judgment and aeronautical knowledge during the critical formative years provided the foundation on which the R.C.A.F., as a technical service, developed to its present stature.

Canada owes him a debt of gratitude for his great contributions to the advancement of the Royal Canadian Air Force and to Canadian aviation.

His associates and many friends throughout the world of aeronautics will have learned of his passing with sorrow.—J. H. PARKIN.