J. H. H.
2/3/44.

AIRCRAFT CONSTRUCTION IN CANADA

References: A.H.B. files - 87/7168; MA/D/62; 058/4099; 87/7942; 058/4113; 058/4150; 058/4154.

When Major Alec Ross Hume was in Canada in the summer of 1915 recruiting for the R.F.C., he also investigated and reported on the aircraft industry there and in the United States. His chief interest naturally was in the Curtiss establishment at Buffalo and Toronto. After the outbreak of war when the British Government began placing contracts in America, the Curtiss Co. was asked to carry out as much work as possible in Canada and as a result an independent factory was set up at Toronto under the direction of Mr. J.A.D. McCurdy. Other directors of Curtiss Aeroplanes and Motors, Limited (20 Strachan Ave., Toronto) were Sir Henry Pellatt, Glenn H. Curtiss, H.H. Macrae and G.R. Hall. "Here for a very long time (Ross Hume reported) there was no organization of any kind and it was a considerable time before any improvements were made. These resulted from constant complaints by me (Ross Hume) to Mr. Curtiss. The organization even now (December 1915) is bad and there is room for a very great deal of improvement."(1) The Curtiss Co. was developing a twin tractor biplane, the "Canada", in which the War Office was quite interested, but its construction was long delayed.

"The Canadian Tygard Co. are going to start shortly to build a reciprocating petrol motor designed by Mr. Tygard. It is a freak machine but I think will turn out to be quite satisfactory and should give very good results", with a low weight per horsepower.(2)

Before Major Ross Hume left Canada late in December 1915 he received from Mr. A.G.C. Dinnick, an investment banker of Toronto, a proposal to build aeroplanes and train pilots in Canada. In May 1915 Dinnick had attempted to interest the War Office in his plan and was advised to get in touch with Col. Stanton. Now he discussed the matter with Ross Hume, A.B. Rogers, of the A.I.D. and Lt. F.J. Toulmin, the Admiralty Inspector in Toronto, and gave the Major a carefully prepared statement to lay before the War Office. Dinnick offered "to build whatever type of aeroplane is most needed; to be turned out complete and tested for active service; to be delivered to the British Government at actual cost." There was an ample supply of labour

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(1) Report, undated (December 1915 ?), by Major Ross Hume. Lieut. Frank J. Toulmin, R.N.V.R., was Admiralty Inspector at the Curtiss Factory.

(2) Ibid.

and expert English mechanics were to be found in many Canadian factories; only British-born men would be employed. Canada also possessed an ample supply of seasoned hardwood.

Among the advantages of his proposal he noted (i) a great reduction in cost over American prices, (ii) keep money circulating within the empire and (iii) construction on British territory. He offered the use of his office as purchasing agents for the government without fee, profit or commission. The Hon. Arthur Stanley, brother of Lord Derby, was named as a reference.(3)

A.B. Rogers was strongly in favour of adopting the offer. He agreed with Dinnick that there was plenty of labour to be had for the asking, and it was his "firm conviction that properly established works supervised by a Government Representative would produce machines much quicker and quite 40% to 50% cheaper"; current prices paid for aircraft were certainly excessive. Under present conditions little progress was being made on the production of the "Canada" machine. No assembly or erection of parts had yet been attempted; all of the fittings were being made in the United States and despite repeated promises no deliveries had been made.(4)

Ross Hume, after inspecting the proposed site on the outskirts of Toronto in company with Dinnick, Rogers and Toulmin, also commended the banker's proposal. Skilled labour was available, without "fear of any interference by unions ....." . Dinnick could devote his whole time to management of the factory. His idea was to supply the machines to the British Government at 10% over the cost price, using the 10% to run and support a big flying school and to encourage aviation generally. If the War Office did not approve of the 10% addition, Ross Hume believed Dinnick would supply aircraft at actual cost price. If the offer was accepted and the improved "Canada" built with the 200 h.p. R.A.F. engine the government would get at least two machines for the present price of one. Furthermore the Italian, Russian and French governments were after large type aircraft, and if Dinnick's offer was taken up these Governments could be saved considerable expense and money would be kept in Canada rather than enriching the United States.

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(3) Dinnick to Ross Hume, December 12, 1915. Ross Hume reported that Dinnick was "a very well known financier ...(with the) reputation of being an extremely conscientious business man." He was head of the Canadian branch of the City Investment Trust, the English branch of which was under Stanley.

(4) Rogers to Ross Hume, December 14, 1915. He believed it would be possible to build an improved "Canada" design with three engines (original plans were for a T.E. type), carrying a pilot and four gunners, with only slight alterations. Only four weeks would be necessary to get into full working order for this or any other design!

The Curtiss Company of Canada, Ross Hume reported, though nominally independent, was in reality only a branch of the American company.(5) Practically all the foremen at Toronto were Americans. McCurdy, a close personal friend of Curtiss, had been put in as Managing Director. The only Canadian shareholder was Sir Henry Pellatt, the rest of the stock being held by the American company. 70% of the money spent on the manufacture of aircraft at Toronto went to the United States. "Mr. McCurdy, though very charming personally and only too willing to do everything to help, is in no way fitted to be Managing Director and the organization and work is in consequence still very bad."(6)

In April 1916 Dinnick arrived in London to lay his proposal, complete with architects' plans, before Maj.Gen. Sir David Henderson (April 7th). The factory could be completed in seven weeks and deliveries would commence within twelve, with a weekly capacity of twelve machines. Buildings would cost $327,600 (including the architects' commission of $15,600); land would cost another $81,000. The factory would be "unique on the American continent" as ample land was available immediately adjoining it for test flights of finished aircraft. Five hundred men and fifty women would be employed.

"I would suggest it is important (Dinnick wrote to Henderson on April 7) that careful consideration be given to the establishment of aircraft works in Canada, where these works are disassociated from American interests. In view of further developments in Mexico and elsewhere aeroplane factories in the U.S. may be subjected at any time to control by the U.S. Government exclusively for their own requirements." Furthermore "it is important that a reliable or controlled air-craft works in Canada would be of substantial value should trouble arise in the Far East" in addition to speeding up aeroplane supply for the war in Europe.

He was willing to meet the wishes of the British Government whether the factory should be a private one or under government control, but proposed a private plant under officials appointed by the government "thus making the works to all intents and purposes a Government factory, of which I would undertake the management." While he did not expect to make any profits he would expect some arrangement to remunerate him for the time and work required in management of the factory.

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(5) The major heard that the American Curtiss company was negotiating to sell the Canadian one to a group of American financiers.

(6) Ross Hume to Col. D.S. MacInnes, Military Aeronautics 2, December 13, 1915.

Henderson then referred the matter to the Ministry of Munitions and Imperial Munitions Board, asking the Board's opinion "first as to whether as matter of policy it is desirable to construct aeroplanes in Canada, second, whether Board would favour plan on lines suggested by Dinnick and would supervise and control factory in event of decision to proceed, third, whether Dinnick is serious and capable of managing such business."(7)

The War Office, satisfied that present requirements in aircraft could be provided in the United Kingdom, was not greatly interested at first. "In principle" the establishment of an aircraft industry in Canada was viewed with favour, but the matter appeared to be one for the Canadian Government "to decide on and mainly finance, the British Government assisting in any way possible." If a factory were started under government auspices the War Office would place an order.(8)

Perry of the Imperial Munitions Board in Canada consulted Toulmin, the Admiralty representative and Maj. W.S. Dinnick, brother of the author of the scheme. The Board was "strongly in favour of establishment of aeroplane factory (in) Canada" and consulted with the Canadian Government to see how far it would assist. Like Brand, however, Perry doubted the wisdom of entrusting the "difficult business of starting factory to Dinnick who has no manufacturing experience." If the Curtiss work was satisfactory the best course might be to negotiate with them to establish a plant on a substantial scale in Canada.(9)

Dinnick protested to Henderson that he had not proposed seeking financial assistance from the Canadian Government. His understanding was that the Imperial Munitions Board would consult the authorities at Ottawa "as to whether they had any political objections to the British Government establishing a factory in Canada". There was no evidence that there were any such objections but the Canadians did object to the Board's suggestion that they finance the factory. Dinnick believed that if it were made clear to Ottawa that the British Government was prepared to finance the undertaking Canada's cordial co-operation would be forthcoming. He asked authorization to proceed with the erection of his factory under British direction and financial assistance.(10)

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(7) Cable, Min.of Munitions to Imp.Munitions Board, April 27, 1916.

(8) Cable further to above, April 29. Brand, Ministry of Munitions, did not feel sure that Dinnick was sufficiently experienced to manage an aircraft factory.

(9) Cable I.M.B. to M.of M., May 5, 1916.

(10) Dinnick to Henderson, May 8, 1916. Henderson referred the letter to Brig. Gen. D.S. MacInnes, newly appointed Director of Aeronautical Equipment (D.A.E.).

The Imperial Munitions Board, however, could "see no advantage in tying up to Dinnick" and proposed thanking him for his offer.(11) (over) He was then informed by Gen. D.S. MacInnes that "pending investigation of your scheme by the representatives of the Munitions Department in Canada, it is regretted that no further action can be taken."(12)

War Office enthusiasm for the factory proposal was quite neutral. Gen. MacInnes, D.A.E., wrote "We are only interested to the extent that if (the) Canadian Government wish to develop aircraft manufacture in Canada on a Canadian basis in the form of a National Factory or a purely Canadian Company we are prepared to co-operate to the extent of placing an order as soon as we can do so."(13)

Meanwhile, the Imperial Munitions Board in Canada was carefully investigating the aircraft situation there and in America and urging upon the authorities the necessity of action. Perry cabled Brand asking him to see Sir David Henderson and Mr. Balfour "and" impress on them importance strategically even more than commercially (of) establishment of aeroplane manufacture in Canada now instead of using British orders solely to build up great plants in foreign country. Curtiss plant have been building up out of our War business and there is no earthly reason why we should not do this in Canada and gain advantage ourselves .... Admiralty complete co-operation essential as largest orders received from them - if they flood American plant with orders without any compensation or previous arrangement U.S. firms will then snap their fingers at us and difficulty of establishing Canadian plant will be enormously increased in many ways."(14)

The Curtiss Company had at that time received about $12,000,000 of British orders, principally Admiralty contracts, and had built up their plant out of this business "which is very profitable". The Board could see no reason why this business should not be largely transferred to a Canadian National Factory in the course of twelve months if the Admiralty and War Office were prepared to co-operate. "In addition to political and strategical considerations this would result in great cheapening of ultimate cost of aeroplanes to British Government". The small Curtiss plant at Toronto, then producing fuselages for the Admiralty(15), could be doubled in capacity within a month

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(12) MacInnes to Dinnick, May 11, 1916.

(13) Minute, May 6, 1916. Cable, M.of M. to I.M.B., in this sense, May 6, adding "doubtful whether War Office or Admiralty would favour proposal merely to extend Curtiss plant."

(14) Cable, I.M.B. to M.of M., May 9, 1916.

(15) Its capacity was five complete "Canada" twin-engine fuselages fortnightly. Toulmin said the Toronto work was superior in quality to that of the Buffalo plant.

without great expense. Engines, which were then being procured from the Buffalo factory, could be manufactured in Canada.

The Curtiss Company (Buffalo) was prepared to assist in the establishment of a complete Canadian plant, but the Board pointed out that it would greatly facilitate these negotiations if the Admiralty and War Office would place further orders through the Board, leaving it to the Board to allocate the work between the Canadian and American plants. The Board would then probably arrange to take over and extend the Toronto factory and establish an engine works there, meanwhile continuing to procure motors from the U.S. until Canadian production was satisfactory.

The prime cost of establishing the Canadian factory could be met out of orders for Welman machines of the "Canada" type ($22,500 each). "We could finance this by way of advance and plant would then belong to us. After the War the plant could be kept going as National Factory if desired. Canadian Government is favourable to plan and will give support but ... at present (it) does not seem to be necessary to ask them for direct financial assistance."(16)

R.H. Brand of the Ministry of Munitions recommended to the War Office that "in view of the advantage involved in the construction of an aeroplane factory in Canada .... this scheme (Dinnick's) deserves serious consideration."(18)

The question of the aircraft factory and a proposed flying school was discussed by Brand with the Canadian High Commissioner and Mr. McCurdy who was then in England. The latter said that he expected further "fairly large orders" from the War Office, which led Brand to suggest to Gen. MacInnes that "unless there is great urgency, might it not be desirable not finally to settle anything until we are quite sure that it is out of the question to start a factory in Canada?"(17)

On the last day of May, the Air Board considered the two proposals, for a factory and a school, and approved both, provided that the factory was not a private enterprise. It recommended that the War Office, and Admiralty, should guarantee orders for a certain number of aeroplanes and engines.(19) The

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(16) Cable, I.M.B. to M.of M., May 9, 1916. The Board was also urging the establishment of a flying school; vide infra.

(17) Brand to MacInnes, May 16, 1916. While the factory and school could not be entirely dissociated the Ministry of Munitions was attempting to settle the school question first.

Brand, Representative of Imperial Munitions Board ?

(18) Memo. by R.I.M.B., dated May 12, 1916; sent to MacInnes. MacInnes proposed discussing the factory with Sueter of the Admiralty.

(19) Air Board to War Office and Admiralty, June 2, 1916. *The Air Board, formed in May 1916, had first discussed Brand's proposals at its Fourth Meeting on May 29, 1916, when it was decided to inform the Colonial Office after consulting the War Office and Admiralty. At the Fifth Meeting on May 31 it was also decided to obtain the Treasury's views. There was some further discussion in the Eighth (June 7) and Twelfth (June 15) Meetings.*

Admiralty, however, was quite cold to the proposition. Rear Admiral C.L. Vaughan Lee, Director of Air Services, admitted that the establishment of a national aircraft factory appeared desirable but did not believe the Admiralty should commit itself to the extent of guaranteeing orders.(20) Others agreed with him that the factory offered no advantages which would justify any charge upon naval funds, and the Air Board was so informed.(21)

The War Office, on the other hand, was now very keen. Gen. MacInnes, D.A.E., pointed out that "we are now finding difficulties in getting the output of aeroplanes that we require in England, and it will be of great assistance to us if we can arrange for Training Machines to be built in Canada. It is proposed, therefore, to place an order for 200 aeroplanes fitted with engines, with the necessary spares, in Canada. The Aeroplanes would be built in Canada; the engines would have to be purchased in the U.S., and fitted into machines in Canada before despatch to England. The value of the Contract would be approximately £400,000. Is there any objection in arranging a contract provided that the factory in Canada is under the Imperial Munitions Board or the Canadian Government?"(22)

Financial aspects of the proposition were considered. The Air Board strongly favoured getting the Canadian Government to put up the factory, but, feeling some financial assistance would be necessary, wanted power to settle the terms with the Canadian Government. "The only real question before us at the moment is the amount of financial assistance that might be asked for by the Canadian Government." The Board would prefer a loan but this might not appeal to Canada; on the other hand if the British Government became part owners in the factory the cost price of the aircraft should be lower. While "the whole position (was) very vague" the Board was anxious to proceed with negotiations.(23)

After sounding the Treasury semi-officially, the Army Council laid the proposition before it on June 27. An additional source of aircraft supply was

(20) Minute dated June 6, 1916. He was on the other hand strongly in favour of the aviation school.

(21) Admiralty to Air Board, June 16, 1916. During the war the R.N.A.S. had fewer difficulties obtaining aircraft supplies than did the military branch.

(22) Minute, D.A.E. to D.F.S., June 3, 1916.

(23) Minute by W.P. Perry (?), June 10, 1916. He had discussed the subject with Sir David Henderson.

a matter of great importance. The Air Board hoped to induce the Canadian Government to take up the factory scheme and the Army Council was prepared to place an initial order for 200 aircraft on the basis of actual cost of production. "How far it may be necessary to offer to the Canadian authorities some financial assistance towards the Capital cost of the scheme in addition to a promise of orders, it is at present impossible to say ...." The Council asked the Treasury to sanction the proposal that the Air Board be allowed a free hand to negotiate with the Canadian Government for the best terms possible, any necessary expenditure being chargeable to Army Votes.(24)

The Treasury Lords replied that they had no objection to a "continuance" of negotiations with the Canadian Government but because of the present position of American exchanges and the extreme difficulties which might arise in financing such a large order they must ask that H.M. Government be not committed to any definite scheme until they had an opportunity to consider how the payments were to be financed. "My Lords trust that the Canadian Government may be willing to meet without assistance the capital expenditure necessary for the setting up of the factory, or failing that financing arrangements may be desired which would obviate placing a heavy burden on the exchange."(25)

War Office officials, for a time so anxious, had now become less enthusiastic. It was expected that there might be some difficulty in keeping the aircraft firms in Britain fully occupied and furthermore some old type machines now appeared to be available for training purposes. In view of this and the Treasury's attitude Brig.Gen. D.S. MacInnes, D.A.E., proposed going slow in the matter of placing orders in Canada - "at any rate until we are more clear as to designs."(26) Brancker too had changed his views. "At the last meeting of the Air Board, I explained that the matter was not vital to us, but that we wanted to encourage the institution of this factory from an Imperial point of view as it was obvious that Canada must be provided with an efficient aerial defence in the future. The present policy of the Board is to treat this and the Canadian School as one project and if anything is settled, it seems probable that the output of the Factory will not exceed the requirements of the school."(27)

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(24) Army Council to Treasury, June 27, 1916.
(25) Treasury to Air Board, June 30, 1916.
(26) Minute, D.A.E. to D.A.O., July 6, 1916.
(27) Minute by D.Air O., July 10, 1916. Does Jones supply an answer for this change of attitude?

When Lord Innes Ker went to Canada on a recruiting mission in August 1916, he discussed the factory and school proposal with representatives of the Canadian Government and Imperial Munitions Board and it was agreed that Canada would lend financial assistance to start the factory, if Britain would provide funds for the school.(28) The Board then prepared a plan.

After further consideration in Canada a scheme was submitted to the Privy Council in Ottawa and approved.(29) The Dominion Government agreed to provide funds, up to $1,000,000, for the establishment of an aircraft and engine factory which would belong to that Government but would be managed during the war by the Imperial Munitions Board. The capital cost, according to the Air Board's estimates, would be $750,000 (£155,000) for a plant able to produce 350 aircraft annually. The British authorities were to agree to keep the factory supplied with orders for aircraft until the end of the war. Price of the machines was to be agreed on beforehand, either the same as that paid American manufacturers or, preferably, the actual cost of manufacture plus a percentage which would be applied towards amortization of the factory.(30)

Brig. Gen. Brancker in referring this offer to the financial advisers of the War Office expressed his confidence that the factory could be kept busy until the end of the war but suggested that a definite limit be laid down as to the rate of output.(31) Financial approval was at once given(32) and the Air Board agreed to the proposal on October 27. MacInnes, however, asked Major J.D. Weir to consult with C.B. Gordon, Vice Chairman of the Imperial Munitions Board, and report his opinion and recommendations with respect to the factory.(33)

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(28) Cable, I.M.B. to M.of M., August 29, 1916. The Board proposed to ask Wilcox formerly president of the Steel Co. of Canada, to take charge of the factory if a national one was decided on. Letter, Brand to Sir Paul Harvey, Aug. 29.

(29) P.C.2460, dated October 13, 1916.

(30) An aviation school was to be established in connection with the factory; vide supra. Wilcox had agreed to manage the factory for the Imperial Munitions Board. R.H. Brand, R.I.M.B., to Brancker, October 18, 1916. (other side) →

(31) Minute, D.Air O. to D.F.S., October 21, 1916.

(32) Minute dated October 25, 1916. B.E. Halloway, in examining the financial aspects of the factory proposal, emphasized that "our liability is confined to the purchase of the output." Taking the Curtiss Co.'s price of £2000 as "a fair standard" and assuming the War Office purchased 250 aircraft annually (estimated capacity of plant was 350) Britain's liability would be roughly £500,000. The proposed aviation school would probably absorb about 50 aircraft from the factory in the first year, which would mean that about £100,000 of the £500,000 payable for the factory output would be included in the cost of the school. Minute by F.5, dated October 21, 1916.

(33) Cable, Morgan, Grenfell & Co., London, to J.P. Morgan & Co., New York, October 25, 1916, asking Morgan to communicate instructions to Weir.

Major Weir, accompanied by Turner, then went to Toronto where he inspected various plants and discussed the situation with E.R. Wood, of the Munitions Board, and F.W. Baillie. After further discussion with Gordon they agreed on the "correct policy" to be pursued. "As both the immediate war purposes and future development of aviation in Canada appear to be best served by the establishment of an industry through private enterprise, it is recommended that no Government Aircraft Factory be established but that private enterprise be assisted to establish both aeroplane and aero-engine building works in Canada." The Canadian Company could take over the Curtiss works and staff in Toronto and immediately commence building 100 Curtiss machines for training purposes. Engines for these aircraft (Curtiss O.X.-2 of 90 h.p.) could be purchased along with existing orders in the U.S.A. Immediately after this program further orders would be undertaken for M.F. or B.E. trainers for Canadian school requirements, to be engined by a four cylinder Hispano Suiza, built or assembled in Canada with the assistance of Wright Simplex Co. of New Brunswick, New Jersey. By obtaining forgings and aluminum castings from this company production could be obtained in less than six months.(34)

To these proposals MacInnes agreed in principle. An order for 200 Curtiss aircraft could be placed with the Toronto company. He asked for fuller details about the Hispano-Suiza engines; the 200 h.p. type was preferred but the 150 h.p.engine could be taken pro tem.(35)

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After further discussion between Flavelle and Sir David Henderson the Ministry of Munitions (Imperial Munitions Board) was authorized to place an order with a Canadian Company for 200 Curtiss aircraft at not more than $5,250 (the original price paid by the Admiralty for the planes) - or less if could be arranged. The order for Hispano-Suiza engines, however, was not favoured. The Wright Simplex Co., it was stated, had not given satisfaction to the French Government, being six months late with the first engine of the Hispano-Suiza type, partly due to bad workmanship and partly to inability to produce the quality of steel required.(36) The difficulty which the company had encountered in

(34) Cable, I.M.B. to M.of M., November 9, 1916. The cable inquired if production of either a 150 h.p. or 75 h.p Hispano Suiza in Canada in six month's time was desirable, and if Britain would place an order with the Canadian company for such engines if full production was not absorbed in Canada. Gordon cabled that he and Wood agreed with Weir. → During a discussion →

(35) Cable, through Morgan, Grenfell & Co., to Weir, November 12, 1916. See also letter, Brand to Sir Paul Harvey, November 15, 1916.

(36) Some days later the Ministry asked the Board to verify this report if possible. The information had been received "through prejudiced sources" and it was thought the Company might have now overcome any difficulties. The Board replied that Wright Simplex had had difficulty over the steel, but all problems had now been solved. Cable, M.of M. to I.M.B., December 6, 1916, and reply of same date.

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The Canadian Government offered to advance $1,000,000 towards the cost of establishing a state-controlled factory. His offer and proposals that a Canadian company take over the Curtiss plant at Toronto, that Wright-Simplex Co. establish a branch factory in Canada and that Curtiss engines be manufactured in Canada were discussed by the Air Board at its meeting on November 22, 1916. It was decided to consult the War office and Treasury. (1)

(1) At this meeting the proposal to establish twenty reserve squadrons in Canada in lieu of the aviation school was approved.

(34) Cable, I.M.B. to M.of M., November 9, 1916. The cable inquired if production of either a 150 h.p. or 75 h.p Hispano Suiza in Canada in six month's time was desirable, and if Britain would place an order with the Canadian company for such engines if full production was not absorbed in Canada. Gordon cabled that he and Wood agreed with Weir. — During a discussion →

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producing the 150 h.p. engine made it unlikely it would easily produce the 200 h.p. type. The Board in Canada was asked to continue trying to develop plans for building Curtiss engines in Canada, as had originally been contemplated in the scheme agreed to by the Dominion Government. If the proposal to establish 20 new reserve squadrons in the R.F.C. was approved considerable numbers of these engines would be required for school purposes. There was, however, considerable scepticism over the optimistic belief of the Willys Company that in 12 months' time it could reach an output of 1200 engines per month. "Experience seems to show great difficulties exist in producing on the American continent high quality of steel required, and in getting workmen to work to very fine limits required ....."(37)

Time was "essential" and on December (the Saturday preceding December 6) Wood signed an agreement in New York with the Curtiss Company covering the Canadian plans; he thought the agreement a "good" one.(38)

The Imperial Munitions Board incorporated and organized a new company, Canadian Aeroplanes Limited, with a capitalization of $1,000,000 all owned by the Board. The C.A.L. took over and paid for the assets of the Canadian Curtiss Company, including rights to make in Canada the JN.4 aeroplane and OX.2 engine. It then sought to acquire a suitable site for the erection of an aeroplane and engine factory, meanwhile renting the former Curtiss premises in order to continue work on the contract for 200 machines which had been authorized. For guidance as to the size of the new plant which it was proposed to erect the Board asked what number of planes would be required monthly from Canada and also what program was proposed for the Canadian flying school. By the end of March 1917 20 complete planes would be ready at the old plant and the new plant, "capable of producing planes at a capacity to be suggested by the authorities", would also be in operation. If these aircraft were to be used at Canadian schools in the early spring, it was absolutely essential that suitable flying sites be acquired immediately and construction of the necessary buildings and equipment started.(39)

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(37) Cable, Flavelle to Gordon and Wood, November 25, 1916. Gordon suggested, November 26, that three Willys engineers go to England to learn at first hand what difficulties would likely be met in producing engines in Canada.

(38) Cable, Gordon to Brand, December 6, 1916.

(39) Cable, I.M.B. to Brand, December 16, 1916. Lt.Toulmin, formerly Admiralty inspector at the Canadian Curtiss plant, had been transferred to the Board and was acting as Chief Inspector.

Treasury difficulties however had arisen in Britain and it now appeared "more than doubtful" that the Treasury would agree to the establishment of reserve training squadrons in Canada; all new expenditures were being vetoed as far as possible. In view of this Brand cabled that the whole position would have to be reconsidered. "If training squadrons are not gone on with further orders for aeroplanes might be placed but no orders for Curtiss engines would be placed. Even if training schools are gone on with further planes would be required but it is probable that no more than the 1,000 Curtiss engines already on order in the U.S. would be required at any rate before the time at which Curtiss engines would be out of date. Air authorities therefore think it inadvisable in any case to contemplate making Curtiss engines. Decision to start schools would therefore at present only affect question of aeroplanes and not of engines. I do not understand why you are arranging for Canadian Aeroplanes Limited to make engines. Only proposals for engines in Canada authorities have in mind at present are for Hispano-Suiza(40)..... and possibly later larger order for Willys ..."(41) What use was being made of the $1,000,000 advance from the Canadian Government?

To this Flavelle replied that the C.A.L. had obtained without cost rights to manufacture OX.2 engines in Canada, but had no intention of actually making them except on instruction from England. Nor had the Board incurred any financial obligations beyond the purchase by the C.A.L. of the machinery and material of the Curtiss Company in Toronto, which would be used to produce the 200 aircraft ordered. It was expected that the C.A.L. would show a profit in operations.

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(40) In September it had been proposed to place an order for 5000 B.H.P. engines in the United States but this was abandoned "because of difficulties in test of engine." To replace it the War Office considered placing an order in Canada for 3000 Hispano-Suiza engines to be built, under the direction of the Imperial Munitions Board, by a company in touch with and assisted by the Wright-Simplex Co. (MacInnes to Air Board, December 9, 1916.) On December 15, 1916, the Imperial Munitions Board was authorized "to arrange for the formation of a Canadian Company in conjunction with Wright-Simplex Co., and to negotiate for placing with them an order up to 1000 150 h.p. Hispano-Suiza engines" at a price not to exceed $4500. Cable, Brand to I.M.B., December 15. Designs of engines over 150 h.p. were still unsettled.

(41) Cable, Brand to I.M.B., December 16, 1916. In another cable to Flavelle on the same day, Brand expressed surprise that the Board's plans had gone beyond the authorized order for 200 aircraft. He presumed that the Board would not commit the British Government to any expenditure beyond that involved in the aircraft order and had given an assurance to that effect to the Treasury.

As for engines Flavelle suggested immediate negotiations with the Wright-Simplex Company to have C.A.L. manufacture the Hispano-Suiza in Canada. He thought Wright-Simplex would probably acquire a half interest in C.A.L., the Board retaining the other half. If the engines were built at New Brunswick, New Jersey, an "industry could not be established on permanent lines in Canada".

The advance of $1,000,000 from the Dominion Government to assist in establishing an aircraft factory in Canada had been loaned by the Board to C.A.L. and would be a first charge on the business and assets of that company.

The Curtiss premises which the C.A.L. had leased would have to be vacated in two months, and if further orders were likely a suitable site must be purchased and buildings erected.(42)

Objections to the establishment of a training school in Canada had now been overcome and the air authorities, confident that further orders for the C.A.L. would materialize, recommended the purchase of a site and erection of buildings suitable for an eventual output of 15 aircraft weekly. They agreed also to the proposed negotiations with Wright-Simplex for an interest in the Canadian Company as preferable to having engines built at New Brunswick, but they stressed that early deliveries were vital.(43) Steps were taken by the War Office to complete definite orders for 200 aircraft and spares, and 1000 Hispano-Suiza engines and spares.(44)

Directors of the Wright-Simplex Company, however, were not favourably impressed at first with the proposition that they should enter into partnership with the Imperial Munitions Board in Canada(45) and Brand informed the Board that the "basis upon which the whole negotiations on this subject have proceede from beginning has been that an engine factory would be started in Canada and authorities here have been relying on this supposition ... If Wright-Simplex

(42) Flavelle to M.of M., December 21, 1916.

(43) Cable, Brand to I.M.B., December 21, 1916. The Board had cabled, on the same day, pointing out that no definite specifications had been received fo the 200 aircraft ordered, and it had accordingly directed C.A.L. to manufac ure 50 Curtiss JN.4s according to Admiralty specifications, as that type wa "considered best for school purposes here". But what type should the rema ing 150 be? Brand replied that all 200 should be JN.4s, according to Admiralty specifications and fitted with dual control. They would be used for Canadian school purposes.

(44) Minute by D.S. MacInnes, D.A.E., December 22, 1916.

(45) Cable, I.M.B. to M.of M., December 25, 1916.

(46) Cable, [illegible] to I.M.B., February 27, 1916.

(47) Cable, Perry to I.M.B. for January 3, 1917.

(are) unwilling to build in Canada whole matter would certainly have to be reconsidered and it is quite uncertain whether any orders would be placed at all ...."(46) The air authorities then suggested, in hope of facilitating negotiations, that, if necessary, finished parts for the first 200-300 Hispano-Suiza engines might be obtained from American sources for erection in the Canadian factory as soon as it could be got into operation.(47)

Wright-Simplex definitely refused to erect a factory and build engines on their own account in Canada, but they were willing to invest $500,000 in a company in which they would hold one half the stock, and they would lend the assistance of the parent company in developing the production of engines in Canada at as early a date as possible. As a condition, however, they demanded that only certain parts of the engine be made in Canada, the remaining parts to be made in their plant at New Brunswick and sold to the Canadian company. Another proposal had been received from John Willys of the Willys Overland Company, offering to take a contract for 1000 Hispano-Suiza engines at $4500 each, and to throw the whole resources of the company into completing the equipment of a plant at Toronto in order to produce motors in the seventh month from the date of the order.

In view of this the Board recommended that if Hispano-Suiza engines were required for prompt delivery they should be ordered from the Wright-Simplex Co., of New Brunswick. If the engines were to be built in Canada the work should be undertaken by a private corporation, by a company already organized in the United States with engineering and administrative capacity immediately available for the conduct of business in Canada. The Willys Overland Company satisfied this latter requirement, and an agreement with them would "mean more complete engine works in Canada" than would the Wright-Simplex offer. Therefore, if the establishment of an aero engine industry in Canada was considered desirable, the Board recommended that an order be placed with Willy Overland for 1000 Hispano-Suiza engines at $4500 each, deliveries to be made after placing the order, 150 in the eighth month 125 in the seventh month and 200 monthly thereafter. The Board did not believe that any company could make deliveries such as Willys Overland promised, but

(46) Cable, Brand to I.M.B., December 27, 1916.
(47) Cable, Perry to I.M.B., January 5, 1917.

it did believe "that the resources in plant, machinery, capital, engineering and mechanical skill possessed by Willys Overland (would) enable them to do as much if not more than any others who would undertake the obligation."(48)

Gen. MacInnes, D.A.E., then put it up to the Air Board whether negotiations should be opened on the lines proposed. "It is considered very desirable, from the Imperial point of view, that the manufacture of aircraft engines should be developed in Canada, and a proportion of the engines could be used there for the Reserve squadrons now being formed, while the remainder would be a reserve in case of any breakdown in manufacture in England or France."(49) After consideration at a meeting on January 15 the Air Board agreed it was desirable to open negotiations with Willys Overland for 1000 Hispano-Suiza engines "to be constructed to as large an extent as possible in Canada." The Board believed the 200 h.p. type should be ordered rather than the 150 h.p., provided no delay in output was involved.(50)

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(48) Cable, I.M.B. to M.of M., January 11, 1917. The Board estimated that at least $1,000,000 would be required for land, buildings and plant for the Canadian Company. A half interest might be owned by the Board or by private interests if it was possible to secure private capital.

(49) MacInnes to Air Board, January 13, 1917. In view of the high price asked and a French order, it was not proposed to continue negotiations with the Wright-Simplex Company.

(50) H.P. Harvey (Secretary, Air Board) to D.A.E., January 16, 1917. The Air Board agreed to defer pro tem. further negotiations with Wright-Simplex.