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SUBJECT: Notes on Developments at the Malton Plant of A. V. Roe Canada Limited (AVRO)

On April 30 a group of eighteen officers of our Armed Forces in attendance at the Industrial War College in Washington were conducted through the plant of A. V. Roe Canada Limited (AVRO) situated at Malton, an outlying suburb to the west of Toronto. General H. GREELEY, Deputy Director of the Industrial War College, was included in the visiting group. As was the case on the occasion of last year's tour of the plant by officers then attending the Industrial War College, representatives of this Consulate General accompanied the visiting party. Since there were no representatives of the Embassy in Ottawa in this year's party, the following notes on the visit to the AVRO plant are submitted as being of possible interest.

General Observations

The underlying impression resulting from this year's tour of the plant was that operations at Malton are on the whole in considerably better shape than was the case when the last visit took place just about twelve months ago. Instead of the feeling of uncertainty which seemed to prevail at that time in regard to a good many items, there now seems to be a more positive and confident attitude on the part of key personnel. Perhaps one of the factors involved has been AVRO's acquisition of ownership of the gas turbine establishment at Malton from the Canadian Government. Until last July AVRO had only an operator's status so far as that establishment was concerned although it already owned the other buildings and equipment of its Malton plant. Another encouraging factor has probably been the attainment during April of target rates of production. Furthermore, there is optimism that business on hand will at least assure production at approximately current levels until 1957 with the prospect that by then the development of a supersonic Delta-wing fighter* which is now in progress at the plant will have been productive of results leading to new orders from the Canadian Government.

It was noted that although reports were in circulation some time ago to the effect that the Canadian Government felt it would be more practical to look to Great Britain for the design and development of engines of the high thrust capacity required in future supersonic aircraft, instead of relying on the Malton plant for the development of such an engine, there appeared to be optimism in

*CF-105

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AVRO's gas turbine division regarding the ability of its engineering and designing staff to produce results which would bring about a change in such a governmental attitude. Work on gas turbine development is still being pushed actively and the production of two-spool turbines is being increased since it was commenced several weeks ago although the bulk of output is still of the one-spool type. Thrust testing standards at the plant have been raised since last year from 6,500 pounds to 7,500 pounds per engine. It was noted with interest that wind tunnel facilities at Cornell University are being utilized by AVRO in supplementation of its own more limited facilities.

The possibility of developing a novel vertical take-off type of aircraft consisting basically of a revolving disc with engines attached is also still a project receiving attention at Malton. Although highly classified, the general nature of this projected aircraft was the subject of press publicity some time ago and it is understood that appropriate representatives of our Armed Forces have been made acquainted with its features.

Among the indications of expansion and improvement noted during the visit was an extension in the gas turbine establishment to provide for a new engine overhauling section; space now available in the turbine establishment as a whole was reported to be 742,000 square feet. A building formerly occupied by the Sheaffer Pen Company was acquired since the last visit for use by AVRO's engineering and development unit, and some modernization was noted in the equipment of the air frame production division. In this connection it was mentioned that a number of Hufford metal stretching machines had been imported from the United States to perform operations for which older machinery developed by AVRO itself had been used formerly.

Steps had also been taken to bring about some further integration in material supply operations by the acquisition of the Steel Improvement Company of Canada. This subsidiary has a plant at Etobicoke which is the source of heat resisting metal materials, including titanium alloys, used in the construction of Orenda gas turbines. In addition to supplying AVRO's own requirements, this subsidiary is in a position to meet the needs of other industries with a resultant indirect diversification of production. It was indicated that rumors in circulation some months ago to the effect that AVRO was considering a substantial diversification of its output by entering into the manufacturing of products not related to aviation were not correct so far as the Malton plant itself is concerned.

Some reorganization within the AVRO staff was evidenced by references to readjustments in job classification and by changes in the higher bracket of personnel, particularly in the gas turbine division. Air Marshal W. A. CURTIS, who recently retired from the Canadian Air Force after having served as Chief of Staff, was present at Malton during this year's visit in his new capacity of Vice Chairman of AVRO, and gave the impression that he is quite active in that capacity. Crawford GORDON and J. C. FLOYD are still respectively president and chief engineer in charge of design. Generally speaking, Canadian

predominance in management appears to have been consolidated and British influence in the designing section has been continued but American direction in the gas turbine division has been lessened as a result of replacements in some key positions by persons of Canadian and British background.

Output

As was the case last year, the only orders for aircraft now on the books at Malton are those of the Canadian Government for two-engine CF-100 all-weather fighters. Commencing last August, production was changed over entirely to the Mark IV type having rocket armament and it was stated that about 600 units of this type were ordered. AVRO's efforts to obtain orders from NATO and FOA have not been successful thus far.

According to comments heard during our visit, some 70 CF-100 Mark IV planes were completed prior to April, which was the first month in which the target production rate of one plane per working day was reached. One of our guides stated that approximately five months are required for the construction of the CF-100 of this type from the start of parts production to final delivery and this appeared to be confirmed by the fact that plant identification numbers shown for planes on the assembly lines and in the process of being fitted out ran from 182 to 282 as of April 30. Delays in reaching the target production rate for the Mark IV type were attributed in part to problems arising from tests and changes in design as compared with Mark III in order to accommodate rocket armament.

Production in the gas turbine division is still confined to Orenda engines. It was indicated that about one-half the output is used for installation in Sabre jets constructed by Canadair and the other half is installed in CF-100 aircraft produced by AVRO. It was stated that the target production rate of 100 engines per month was reached in April, the bulk of the present output being the one-spool type of engine although an increasing proportion of the two-spool engines is entering into output since production of this type was commenced several weeks ago.

It was indicated that the elapsed production time per engine now runs from 10 to 15 days. It was also mentioned that a total of 1,255 Orenda gas turbines had been produced during the period from the commencement of operations at the end of September 1952 through April 30, 1954.

A thrust of 7,500 pounds was stated to be the testing standard for current Orenda output. Owing to the comparatively small total of flying hours thus far accumulated by engines in service, overhauling inspection is at present being recommended after 100 hours but it was pointed out that this is a conservative figure which is open to extension in the light of increasing experience. It was also pointed out that the use of steel as a material in Orenda construction has been greatly reduced through replacement by alloys containing titanium and other high temperature resistent elements.

It was intimated the present output of the gas turbine division could be more than doubled in a relatively short time, if required. At present operations at the AVRO plant are being conducted on the basis of a five-day week of two shifts and the weekly hours of employment have recently been increased from 40 to 42. We were informed that approximately 14,000 persons are now employed at the plant, about 5,000 being assigned to the gas turbine division. The extimated peak of employment during the current year will be approximately 15,000 and will subsequently be tapered off to about the present level of some 14,000.

Conclusion

One added attraction during this year's visit was the inclusion of eight members of the party in a short demonstration flight of the prototype Jet transport developed at the Malton plant. It will be recalled that the development and production by AVRO of further aircraft of this type was stopped as a result of the Canadian Government's policy of concentrating on production of fighter aircraft by the company when hostilities broke out in Korea. However, AVRO is still interested in the possibility of receiving orders for commercial transports. We were told that to date the Jet liner has logged about 500 hours of flying time.

The extent to which operations have been improved at the Malton plant is reflected by a comparison of the current production rate with that prevailing on the occasion of the previous tour of the plant which took place just about a year ago. At that time the CF-100 Mark III was in production and an output of ten units per month was said to have been reached. It was further indicated that each Mark III represented 80,000 manhours but that this figure would be reduced to about 40,000 manhours in the case of the Mark IV to which production would be shifted in August. The target production rate for the Mark IV type would thereby be increased to one plane per working day. It may be added that expectations for such a speeding up of production and decline in manhours appeared to be based to a large extent upon the greater efficiency obtainable from the execution of a large order and the splitting up of the fuselage into a larger number of sections for assembly to permit greater accessibility to interior parts as well as more effective simultaneous operations.

With respect to Orenda engine output, production in April of last year was said to have been at the rate of approximately 60 units per month and it was indicated that future targets would be an output of 100 engines monthly by December 1953 and 125 per month in mid-1954. As has already been indicated the target of 100 units per month has now been reached after some delay which appears to have been due in part to circumstances beyond the control of the plant.

While it is evident that progress in reaching the present level of output

was not as speedy as had been expected, it would seem that the AVRO enterprise has now passed beyond the stage of major organizational and operational growing pains.

George J. Haering
Consul General

cc: Embassy, Ottawa (2)

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