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Pre-Flight

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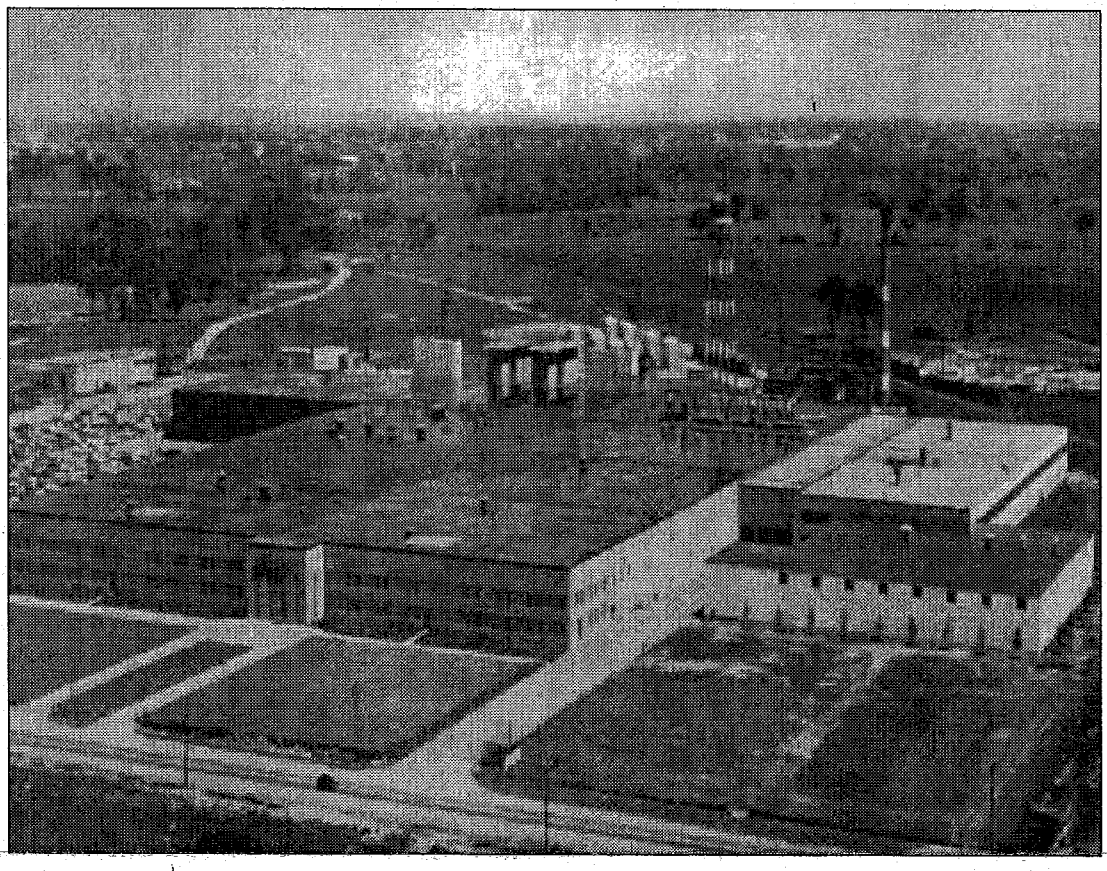

New plant changes Malton's landscape forever....

"Look what's happened to David Tomlinson's old cow pasture! Today, the 72-year old farmer, born on this land like his father and grandfather before him, quietly tends his remaining single acre and sometimes leans upon the fence to gaze at the spreading pile of brick and concrete that has burst upon the rural Malton landscape in little over a year.. It is understandable that Tomlinson's eyes reflect a little wonder. They, and those of his generation, have seen an almost complete cycle of strange, wonderful sights."

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President's Message

Well fall is fast approaching as I write this message. I trust you all had a great summer. In regards to the CASM. Discussions are still on going regarding the future of the Museum and the collection of artifacts. We trust this situation will be resolved to all's satisfaction.

In this issue of Pre-Flight please enjoy the conclusion of the History of Orenda. I have found it very informative.

The following was received from William Mellberg, Aviation Historian and friend of the AHFC. Neil Armstrong's Memorial Service was held in the National Cathedral on Thursday September 13th, at 10:00 am and it was carried live on NASA TV. Captain Gene Cernan delivered the tribute. There could not have been a more appropriate person. Neil and Gene were the first and last men on the Moon. But they were also old friends from their Purdue days. And, of course, they were both naval aviators as well as their buddy, Jim Lovell. We have lost a truly Great American and a truly good man.

I would ask all members to keep Jim Floyd and wife Irene in their prayers at this time.

Frank Harvey

Malton's landscape ... continued

"Electric power has replaced his oil lamps and lessened and eased his hours of toil; his telephone connects him with the world; his radio brings him instantaneous news of it; TV aerials thrust into the country sky all around him; his kitchen cupboards stock once-rare, now-commonplace foods from distant corners of the earth. And sometimes, as he watches the great airliners thunder low overhead down the glide path to nearby Malton airport, he remembers that once he measured travel and speed by the fast-stepping pace of his chestnut mare; that now even those airliners are slow compared to jet travel. And to have the home of the Jet Age in Canada just over the fence, is something to think about. (Avro Canada Jet Age, Autumn 1952)

That home of the Jet Age was the "splendid" Orenda plant at 3160 Derry Road, that officially opened on September 29, 1952, twelve months after the federal government of the day made a decision to produce engines in a new plant. Because of the uncertain international situation at the time, Avro Canada had been given twelve months to build the plant and schedule the entire project in all its detail stages. Complete manufacturing facilities and the equipment required for production had to be selected, procured and delivered in that short period of time. The building was planned to provide flexibility, allowing for the rapid change from one engine model to another, or the manufacture of two or more models at the same time. As Earle K. Brownridge, Orenda's Vice-President Manufacturing, said, "We never minded setting up a system today and changing it tomorrow ...We wanted to be able to put changes on an engine going out the door, if necessary, and sometimes we do." Everything was newly built, for nothing but jet engines, and everything was built superlatively well. Remarkably, the work on the 750,000 sq.ft. plant was completed on schedule, despite a three-month interruption caused by outside strikes.

Well into construction the originally planned manufacturing output doubled and the construction had to provide for this without any change in the target dates.

Malton's landscape... *cont'd.*

As well as planning for manufacturing and all that those operations entailed, including test cells so quiet they cannot be heard from a few yards away, auxiliary utilities had to be considered. To accommodate the traffic of cars and freight in and out of the plant, new highways were needed and existing one had to be modified.

The plans for the plant include provision for future expansion to twice the initial size of the main manufacturing building, and a proportionate extension of the secondary utilities. The main manufacturing building included a self contained service unit of 50,000 square feet housing all the required auxiliary utilities. The plant itself was designed as a single storey floor area except for "very modern" washrooms which were elevated to save main floor space for the installation of manufacturing equipment. Daylight was eliminated to prevent heat losses; 13 miles of fluorescent lighting replaced the daylight and gave uniformity of lighting. Headroom throughout the plant was 22 feet. The steel structure was capable of taking a capacity of 3-ton cranes. The floors were of 12 inch double reinforced, dust-proof concrete. In the shop and the office, the internal partitions were mainly of steel frame with wire mesh or sheet metal panels that could be easily moved to accommodate layout changes.

AUXILIARY UTILITIES:

Electrical power transformer substation of 7500 KVA capacity. *Steam generating* plant of 60,000 lbs/hr output *Airconditioning* system of approximately 1200 tons of refrigeration. Precise air conditioning was critical because parts that go into a jet engine have to be made so accurately. *Supply and distribution* of 1,000,000 gallons per day of domestic treated and untreated water. *Compressed air* supply system of approximately 2000 cubic feet per minute output. *Sprinkler and hydrant* water supply and distribution system, with a reservoir capacity of approximately 1/2 million gallons. *Storm water and sewage* draining system with a modern disposal plant. *Separate chemical waste disposal. Modern fire alarm* system. *Vertical flow engine test house* installation with the most up-to-date silencers in the air intake and exhaust system, with 300,000 gallon capacity fuel tank farm, and appropriate *fuel unloading and supply* installations. *Industrial liquefied gas* station to supply the tool room and production heat treat departments with gas to the various types of furnaces of approximately 3000 gallons per week evaporation capacity. Very modern cafeteria, able to serve 1000 people at one sitting. *Incinerator* with waste disposal capacity of approximately 5 tons per day.

Material handling facilities, including large central and individual battery charging stations..*Internal road* system, operational yards and grounds *paved parking* lot for 2,000 to 2,500 cars.

Manufacturing Equipment Inventory 1963

42 Broaching machines, both horizontal and vertical, up to 20 ton capacity
8 Balancing machines
108 Buffers and polishers
84 Cutter grinders
55 Radial drills, of 3' to 7' range
81 Miscellaneous single- and multispindle drills
242 Grinding machines, including surface, cylindrical, internal, universal, cams, optical and contour
14 Gear Shapers, Hobbers
14 Horizontal Boring Mills
22 Jig Borers, Jig Grinders
78 Vertical and Turret Lathes, mainly Bullard Man au-Trols and King Tracers from 30" to 72" swing 20 Tracer and Copying Lathes, up to 60" swing, to Lathes, up to 60" swing, to produce internal and external contours 25 Turret Lathes of various sizes up to 36" swing 8 Instrument Lathes 26 Engine Lathes, from 8" to 48" swing, maximum bed length of 13' to 14'
36 Vertical Mills
139 Horizontal Mills
41 Special Mills
132 Miscellaneous standard machines: electrical discharge, duplicating, hand saws and other cutoff equipment; face and centre lapping machines
7 Presses, 300-600 ton triple action and pressbrake to 14' capacity
7 Shears, up to 14' capacity
29 Sheet Metal machines
5 Shapers and Slotters from 7" to 36" stroke
6 Tapping machines
17 Tube equipment, for cutting, binding, swaging tubes up to 2-1/2" diameter
54 Welding equipment, including spot and seam welders, Automatic Circumferential welders, hand welding equipment.

Modernization

The plant served its purpose superbly for a few years. By 1968, however, rapidly changing technology and design in the turbojet field required new manufacturing methods. The bulk of machine tools and other equipment was becoming or was considered obsolete and could not meet the changing demands of manufacture.

Malton's landscape ...*cont'd*

The growing computer industry contributed "automatic control" to the machine tool industry. New machine tools with numerical control were obtained from vendors in Canada, Great Britain, the U.S., France, Germany, Switzerland, Japan and other countries. The machines included the Canadian-designed and built Shanfield Numerical Control Rotary Table Special Slot Milling Machine, a Sciaky Automatic Fusion Welding Machine with 24 channel numerical control and a Lucas Numerical Control Horizontal Jig Bore.

A Sundstrand OM2 was one of newer and more modern machines introduced on the shop floor in 1968. This machine operated from predetermined instructions fed into the OmniMill via punched computer tape. At the touch of a button, the machine operated with consistent accuracy to ± 0.0005 inch on milling, drilling and tapping operations.

By 1968 the main production facility had undercover shipping and receiving docks with provision for accommodating trucks and railway cars. Pipe distribution gas systems for propane, argon, nitrogen, hydrogen and natural gas serviced the facility.

A number of test facilities allowed production run-up or development of both aeronautical and industrial engines. Test facilities are equipped with control instrumentation, acoustic silencers and a range of fuels to meet various customer requirements. Two test cells were converted about 1968 to accommodate J85-CAN15 engine testing.

Diesel generating equipment provided emergency lighting throughout the plant and power for such essential equipment as the fire protection system water pump, certain safety controls and special continuously operated test equipment.

At 6:00 a.m. on October 24, 1968, Orenda joined the battle for a cleaner Ontario, when the power house began burning natural gas under the steam' boilers. After 17 years of burning coal with the resultant smoke and pollution, Orenda had a cleaner breathing chimney.

The boilers in the power house at the rear of the main plant were converted for operation on either gas or oil When they were operated with coal,' waste products of combustion from 8000 tons of coal per year were emitted into the atmosphere. Conversion cost the company $65,000. Special facilities controlled effluents to prevent polluting the Mimico Creek.

We have now concluded *Malton's Landscape* and *Modernization,* we will be looking at the following: *Owners Orenda has known, Information needs and the Data Centre, Computer-Aided Manufacturing System (CAD/CAM).* We trust you will find these areas as enjoyable as the *History of Orenda.*

Members Matter

After a rather warm summer, we are almost back to the usual schedule of aerospace history. You have commented, as did our President, how much you have enjoyed the issues. Thank you for your comments.

Some of our members have also shown concern for the apparent disregard of the government for our aviation history. Understandably so. If we don't know about our mistakes, we are bound to repeat them. The concern was about what was planned for the historic buildings in Downsview Park.

John Daley, the director of the Smithsonian's National Air and Space Museum in Washington, knows how important are the lessons of history.

He publicly stated that the heritage of the Canadian Air and Space Museum be recognized. The building in question will be nearly totally demolished to make way for a four rink complex. It is from the original building that many of Canada's aviation accomplishments in the past 85 years have emerged. That was the reason for the CASM's being there.

There is one talk about the full-scale replica of the Avro Arrow might be displayed in one of the buildings at the Toronto International Airport. As to the other aerospace artifacts – that is another big question mark. We will keep you posted.

CANADA CELEBRATES 50 YEARS IN SPACE

The activity that has propelled Canada into the ranks of the world aerospace leaders is when it launched its first scientific satellite, Alouette-1, on September 29, 1962.

Mel Dorn