

# BROKEN ARROW

## FLIGHT INTO DISASTER

### the AVRO ARROW story

by Hal Carey

CAREY

CANADA'S aviation industry is still smarting from the fierce and savage blow dealt it three years ago by the Conservative Federal Government.

In a single stroke Prime Minister Diefenbaker not only destroyed Canada's basic aviation industry but he wiped out as well our air defense.

He did this by suddenly and without warning scrapping the Avro Arrow. To the industry, few acts of legislative folly match this one. For, industry sources say, this decision not only brought grief and hardship to literally thousands of workers, it also put dozens of small aviation companies out of business, drove the "cream" of the world's aeronautical engineering talent out of the country and left Canada's defense at the mercy of the U.S.

Today the Air Industries and Transport Association — the backbone of Canada's aviation industry — is still backed against the ropes.

Says one AITA man: "Canada needs a strong aircraft industry, but today that industry is scratching around wondering what the future will hold. Current contracts will run out in a few years, and nobody is quite sure what will happen then."

Frank H. Ellis, Canada's senior living pilot, says in his book *Canada's Flying Heritage*: "The machine was

probably the finest aircraft ever built in Canada. To have it relegated to the scrap heap almost overnight was the greatest blow ever experienced by Canada's air industry."

People in the field say it could have been a very different story. If the Arrow program had gone ahead, they say, our aircraft industry would be as strong as any in the free world. It would not only be respected, it would also be called on to produce airplanes for the world's air forces. Instead it has to depend on foreign plane builders for small sub-contracts — the "scraps" of the industry.

FEW aviation people are willing to be publicly quoted on what they think about the Government decision to cancel the Arrow—they are too dependent on the Government contracts they need just to keep their heads above water.

But off the record they will tell you that scrapping of this fantastic airplane was a criminal act unmatched in the history of Canadian aviation.

The Arrow was first conceived in the uneasy days of 1953. Then, as now, Canada was extremely vulnerable to attack over the far-flung undefended reaches of its northland. Recognizing this threat, the Defense department in Ottawa drew up a set of specifications for an airplane that

was to be able to intercept any enemy bomber within minutes of its crossing our border.

Avro Aircraft, which had gathered together 2,000 of the world's best aeronautical engineers, took up the challenge. It put its team to producing what was to be the finest airplane the world had ever seen.

The Arrow — or CF105 as it was to be known in the RCAF — was to be an all-weather fighter-interceptor that could fly at twice the speed of sound (about 1,200 miles an hour), have a combat range of 250 miles and be able to get up into the high reaches of the atmosphere near 60,000 ft, where the attacking nuclear bombers would be.

Thirty-seven were wanted in a hurry to plug the obvious hole in our northern defenses.

This was a tall order. To produce an airplane that would meet these specifications meant a totally new engine would have to be designed.

Avro's sister company, Orenda Engines, took on this job. It conceived a brand new power plant — the Iroquois — which was to generate 30,000 lbs. of thrust, more than enough to put the Arrow streets ahead of anything else flying.

ON March 25, 1958, just four years from the day the

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ense department called for this fantastic airplane, the Avro team had it in the air. And test flights over the next six months proved it was well up to all that the Defense department required of it. In fact in many respects it was even better.

But less than 12 months later the Government scrapped the program and threw 16,000 people out of work.

There is much speculation as to why it did this. Some say it was because of a personal feud between Prime Minister Diefenbaker and the then head of Avro, Crawford Gordon.

Others say the Arrow program was just too rich for the Government's blood.

A third more likely theory is that the Conservative Government did not at all like inheriting an expensive defense program instigated by its Liberal rivals before it came to power, and determined to start a new — and different — program of its own.

Officially, the Government scrapped the Arrow for three main reasons. When Diefenbaker stood up in a hushed Commons on Feb. 20, 1959, to lower the boom on the Arrow, he said he was doing so because:

- it was too expensive for the Canadian taxpayer;
- it didn't have enough range; and
- the day of the manned interceptor was over and with the age of missiles almost upon us,

the Arrow would be obsolete by the time it was in squadron service.

Of these reasons only that of its expense stands up today — and even that is questionable. In fact the Government has pumped almost as much money into alternate defense systems and into paying off cancellation clauses in Arrow program contracts as it would have cost to put the Arrow into action.

The Arrow's designers say it did have the range required of it — 50 per cent. more than was specified in fact. And Canada's defense today depends on 33 technically obsolete U.S. aircraft . . . all manned interceptors inferior to the Arrow.

This is why aviation experts say axing of the Arrow was criminal.

**T**HE Arrow, they say, was the best airplane of its kind in the world — and still would be. They say it was better than anything in its class now flying either side of the Iron Curtain, including the much-lauded Lockheed F104 Starfighter with which Canada's forces in Europe are to be equipped.

Since the Arrow was scrapped, several top U.S. service chiefs have bemoaned the fact that the airplane is not available for Western defense arsenals. The U.S. Air Force was so impressed with the Arrow it offered to take over the costly business of flight testing for free and to provide

some of the expensive U.S. components in the aircraft.

Other experts have been equally enthusiastic about the Arrow.

Jan Zurakowski, the man who put it through its paces in test flights, says the Arrow was, and would still be, a better airplane than any other nation has at this time.

"No matter what anyone says, there is still room for the manned interceptor in our defense plans," Zura says. "Russia has a terrific number of bombers which are still the best way of delivering atomic bombs. The only effective way to stop those bombers is with manned interceptors."

Zura says it's all very well to talk about missiles and radar protection — they can be jammed.

"But nothing can beat an airplane with a man up front who can get up there, find out what IS going on, and report back," he says. "Missiles can't do that."

Zura also says the Arrow was the "most exciting" airplane he ever flew. "It handled beautifully," he says. "It was better than the technicians ever predicted or hoped. From a control point of view it was terrific. And those people who keep saying it didn't have enough range have rocks in their heads — it had 50 per cent. better range than was called for in the specifications, and could have had even better with the addition of an extra gas tank."



*Graveyard of the "Arrow"; assembly line material and molds being broken-up for scrap in Waxman's junk yard in Hamilton, Ontario.*



3 JAMES A. CHAMBERLIN, the technical genius who engineered the Arrow says that it proved to be a better airplane than he ever expected.

"It was terrific," he says. "It met all the requirements laid down by the Defense department, and even exceeded some of them. I don't know whether it would completely fill today's military requirements, but it would come closer to doing so than anything else in the air."

Chamberlin, incidentally, is one of the dozens of brilliant technicians who were driven out of Canada by the decision to scrap the Arrow. He, like most of them, was snapped up by the U.S. and now heads the U.S. program to put a man on the moon, Project Gemini.

Fred Smye, who as executive vice president of Avro's aeronautical division fought bitterly to keep the Arrow alive, also has strong feelings on the subject.

He says it was "criminal" that the program was cancelled, but even worse was the decision to smash up the five airplanes already nearing completion.

"We don't even have one of them to install in a national museum, let alone to use in the country's defense," he says. "Instead they were sliced up with blow torches and sold to some junk dealer in Hamilton.

There were tears in the men's eyes as they chopped up the airplane they had helped grow from an idea in a man's mind to a glowing symbol of Canadian craftsmanship."

Air Vice Marshal Johnny Plant, who was general manager of Avro Aircraft when the Arrow was being built, says it never should have been scrapped.

"If it had been finished Canada today would have the best airplane in the world," Plant says. "We had a pretty successful piece of equipment—it was going to do better than was required of it."

Plant says he warned the Government at the time that in spite of all the American talk about missiles, if the Arrow was scrapped Canada would find itself within two years either having U.S. fighter squadrons based in Canada, or having to buy U.S. airplanes itself.

"This is precisely what has happened," he says.

THE day of the manned interceptor, far from being over, is with us more than ever today. And it is with us at considerable expense to the Canadian taxpayer.

Last year the Government committed Canada to a complicated defense swap deal with the U.S. under which Canada will undertake the expense of maintaining U.S. radar bases, and at the same time fork out \$155 million for 66 second-hand — and second-

rate — U.S. F-101 Voodoo manned interceptors.

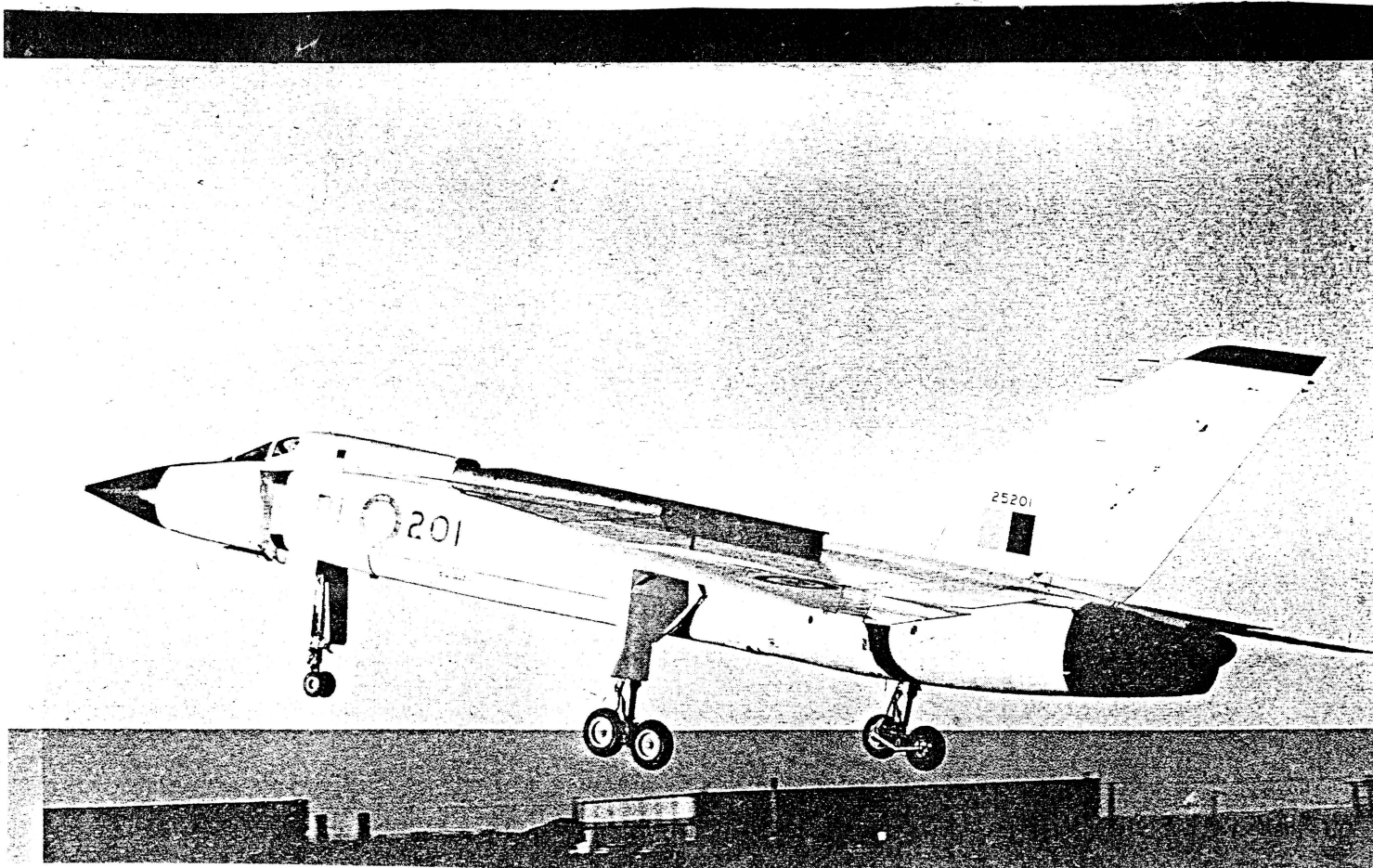
It has also committed Canada to acquiring 222 Starfighters at the enormous price of \$420 million. Actually current estimates place the ultimate cost of these airplanes at nearer \$450 million — and their production program is already running five months behind schedule.

In other words Canada is STILL buying manned interceptors — and ones that are a poor second best to the Arrow, incidentally — that it will be lucky to get by the middle of next year. Had the Arrow not been scrapped, it would have been in full squadron service with the RCAF 12 months ago!

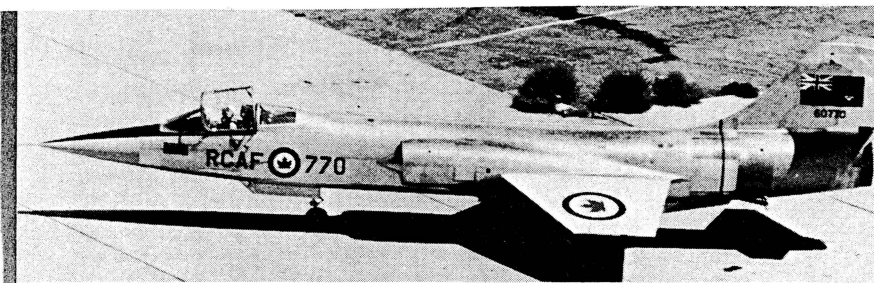
Fred Smye says the Starfighter deal points up the incongruity of Canada's present day defense thinking. He says: "We have no real defense at home, yet are plunging feet first into an aggressive role in Europe.

"When we scrapped the Arrow we discarded our ace for dealing with the U.S. in matters of defense. It was the means by which Canada could become an equal partner in the defense of North America rather than the hapless stooge of the U.S., subject to the whim and fancy of U.S. military chiefs.

"With the Arrow in our pocket we could have demanded the respect of the U.S. and the free world. Instead we are reduced to beggars."







This is the CF104 Starfighter.

Speed: Mach 2.

Ceiling: 90,000 ft.

Combat range: Classified.

Straight range: Classified.

Powerplant: One General Electric J79 with afterburner, produces 15,000 lbs. thrust.

Ordered: 222 for RCAF NATO forces in Europe.

Produced: 90 (so far).

Cost: Approx. \$2 million each.

In tests Starfighter has proved excellent interceptor, has hit 1,500 mph and broken climb records. But is short on range unless fitted with extra "tip tanks" which reduce performance. Normal fuel capacity is only 390 gallons, thus actual range is estimated at considerably less than Arrow.



This is the F101 Voodoo.

Speed: Mach 1.8 — Mach 2.

Ceiling: 50,000 ft.

Combat Range: Classified.

Straight Range: Classified.

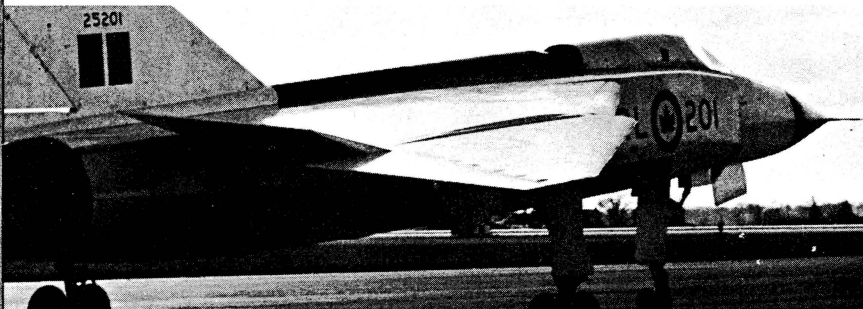
Powerplant: Two J57-P-13s with afterburners, produce total 15,000 lbs. thrust.

Ordered: 33.

Delivered: 33.

Cost: \$2.3 million cash each, PLUS indeterminable cost of maintaining U.S. radar bases in Canada under complicated defense swap deal.

Conceived 12 years ago, Voodoo is now considered obsolete despite relatively fast speed, long range (estimated at 2,000 miles).



This WAS the CF105 Avro Arrow.

Speed: Mach 2 (about 1,800 mph).

Ceiling: 60,000 ft.

Combat range (calculation of distance to combat area, time in it, distance back to base): 250 miles.

Straight range: Never officially released, but estimated at 1,500 miles.

Powerplant: In early tests U.S. J75s rated at 15,000 lbs. thrust. Was to have Orenda Iroquois (rated to produce 30,000 lbs.) for actual squadron service.

Ordered: 37

Produced: 5 (all scrapped).

Cost: Difficult to determine since program never completed. Various estimates at between \$3 million and \$4 million each.

Although actual figures were never released officially, reliable sources say Arrow actually flew at 1,500 mph, had considerably better ceiling and range than called for. Also could double as nuclear bomber. Performance would have been vastly improved by lighter, more powerful Iroquois engines.

And Smye says the prestige and respect Canada won around the aviation world with the development of its amazing fighter, has gone down the drain with it.

Worse, he says, we have driven out of the country the greatest single team of technical minds ever gathered under a single roof for a single purpose.

THE people involved in the Arrow program are no more willing than the rest of the industry to speak publicly today on what happened to their airplane. They too are dependent on Government decisions that vitally affect their businesses.

But off the record, they will tell you what they say is the "real story" of the Avro Arrow. They will tell you, for instance, of the trouble they had with the "amateur experts" within the RCAF who couldn't make up their minds which weapon and weapon control system they wanted to arm the Arrow.

Avro, after exhaustive research, recommended the U.S. Falcon air-to-air missile and the Hughes fire control system that was mated to it. This had been accepted by the USAF for installation in the F102 and F106 — both now in service — so Avro figured its use would be a big boost for the Arrow . . . the three airplanes would have interchangeable weapon systems.

However, the Avro men will tell you, the Defense department, after much argument, shot this down. It decided instead on the Sparrow II missile and an unknown fire control system that was to be designed in the U.S. by RCA.

The Sparrow II was subsequently abandoned by the U.S. Navy as unsuitable. But Canada's defense experts figured they could make it go anyway, and a contract was let to Montreal's Canadair Ltd. for this work.

This part of the Arrow program, incidentally, cost the taxpayers \$27,439,902, the last of which was paid off just this January.

The Avro men say it was hassles like this that unnecessarily jacked up the cost of the program as it went along.

But even with the increases, an Avro study done after the Arrow program was scrapped showed that the 37 airplanes called for could have been turned out over a five year period at less cost per year than was involved in building the now obsolete CF100s for the Korean War.

FINALLY in August of 1958 — four months after the Arrow first took to the air — the then Defense minister George Pearkes went to



Washington to talk about defense policies. There he was told about the "wonderful" work that was being done with new ground-to-air missiles. There he picked up the makings of Canada's defense policy of today.

Then on September 23, Prime Minister Diefenbaker put the wind up Avro with his Commons announcement that the whole Arrow program would be subjected to a complete review in six months.

Newspapers at the time correctly interpreted this to mean the airplane was to be scrapped. But Avro management was not so sure. To find out, it sent its top management team to Ottawa.

But Prime Minister Diefenbaker was not in — he and brother Elmer were off on a grand world tour.

Instead the Avro team met with key cabinet members, and returned to Malton with the assurance that the press reports were wrong. They told Avro employees that the Prime Minister's statement was meant to be taken literally — the program would only be REVIEWED the following March. There was as much chance it would go on as that it would be axed.

Thus Arrow flight testing went ahead. As one former member of the Avro management team put it: "Their word was good enough for me. If we had thought they were going to scrap the Arrow we never would have allowed a test pilot near the plane from September on — it would have been an unjustified risk of life."

Zurakowski continued to fly the Arrow and its performance got better and better as the initial bugs that are to be found in every new airplane were ironed out.

Then the roof fell in.

On Feb. 20, 1959, Prime Minister Diefenbaker announced that the Arrow was finished. No more Government money was to be spent on it.

At Avro they got the details of the Prime Minister's speech from a press wire service.

**A**T first, the Avro men will tell you, they didn't believe it. Then when an official telegram finally arrived from the Government saying it was indeed true, they didn't know quite what to do.

"There were 16,000 employees at Malton working under contracts that involved complicated long service and seniority clauses," says one Avro man.

"The Government telegram said simply the funds were cut off. From that moment on no more Government funds were to be available for the program. The wire didn't say what we

were supposed to do with all the people working on the program, or where we were supposed to get the enormous payroll we were faced with paying out the following Monday."

The only thing Avro could do on such short warning, this Avro man says, was to give notice to literally everyone on the spot, pay them off, then sit down over the weekend and work out the complicated seniority clauses to see who could be reinstated.

"It was a helluva way to wind up a vital national defense program," he says.

But what had to be done was done, and 16,000 stunned employees stumbled dazed from the Avro and Orenda plants that Friday afternoon — "Black Friday" they now call it — not really sure what had happened.

However Avro was not willing to give up easily the end product of 15 years work which began with the purchase of the "white elephant" Government aircraft factory at Malton just after World War II.

First it pleaded with the Government to reconsider its decision. The answer was no. The Avro men will tell you that when it became obvious the Arrow program could not be rescued, they tried to save the five existing airplanes. The answer was no.

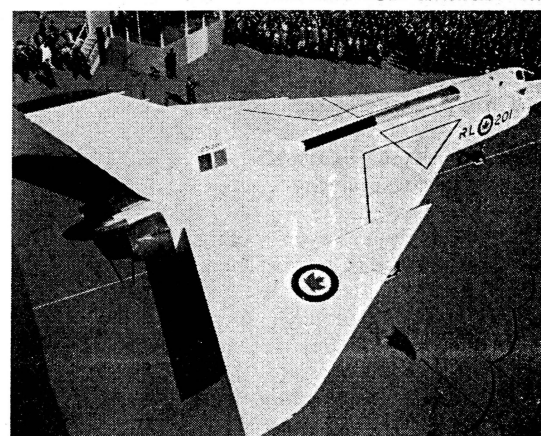
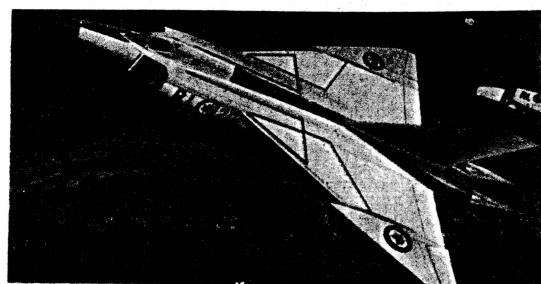
**F**INALLY, in a desperate effort to keep the brilliant Arrow and Iroquois technical team in Canada, the company came up with a number of other programs, including one to produce a Viscount-replacement for Trans-Canada Air Lines.

This, too, was rejected, as was another scheme to produce the Republic Aviation F105 Thunderchief in Canada under license using the Iroquois engine. Republic was keen, but the Canadian Government was not. The answer was no — to everything but Bomarc missiles.

Thus today Canada has one harmless Bomarc B — harmless because it has no nuclear warhead — and two partly completed Bomarc bases. And defense experts hasten to correct anyone who believes these are for Canada's air defense — they aren't. They are in Canada to plug the hole in the U.S. northern defense line.

Our air defense rests on 33 Voodoo manned interceptors which despite the spit and polish of their gleaming shiny fuselages are next to useless, and a handful of derelict CF100 fighters left over from the Korean War.

As one aviation industry official puts it: "We certainly have a lot to thank the Government for!" □



Hallmark of Canada's progress, the Mach two Avro Arrow

The first Canadian-designed aircraft to achieve supersonic speed in level flight was the Avro CF-105 Arrow. Designed as a twin-engine all-weather interceptor, it was to have replaced the CF-100, then in service with the RCAF.

The Mk. 2 Arrow was to have been equipped with the Orenda Iroquois engine—the largest jet engine developed in Canada, but the project was cancelled in February, 1959.