

First Fuelie Found, Part Two

THE LEADING MEN OF MECHANICAL FUEL INJECTION

BY KEN KAYSER

The 1957 Corvette with Ramjet Fuel Injection caused quite a commotion when it debuted at the New York Auto Show on December 8, 1956. This was the first national auto show since before World War II. After WWII, General Motors began its own private auto shows known at the GM Motoramas.

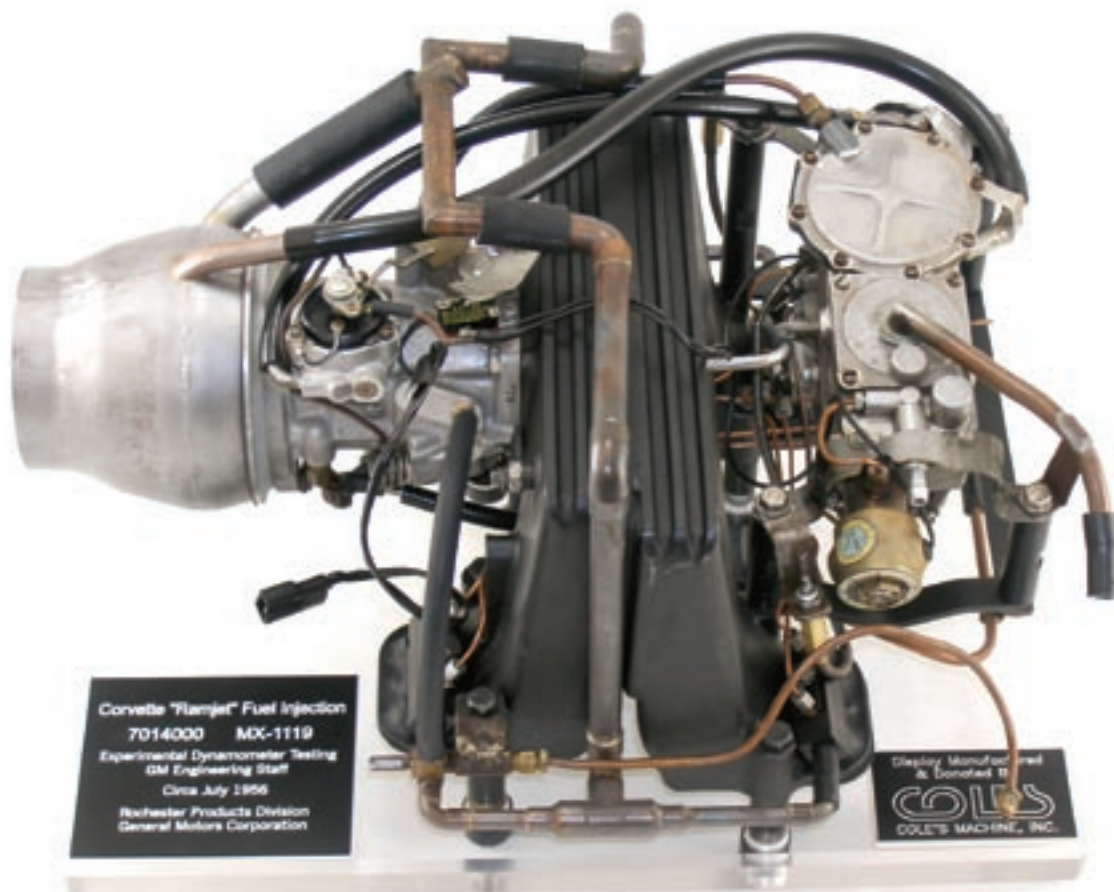
The 1957 national auto show was held at the brand new Coliseum in Manhattan and Harley Earl's 1957 Corvette Super Sport, featuring Ramjet fuel Injection, was center stage. GM Styling had customized a spectacular show car with white pearlescent paint, stainless steel side coves, and his signature Harley Earl bright-blue leather interior and matching racing stripes. The automotive press asked General Motors why it pioneered fuel injection and who were its champions, but in

typical General Motors fashion the answer was, "No comment."

Intensive research fifty years later now allows us to reveal just who was the inspiration for GM's fuel injection, who was its champion, who was its genius mentor, and who was the operational engineer that made it actually work on the Corvette... specifically for our feature car?

THE INSPIRATION: Harley Earl, GM Vice President of Styling, was the inspiration for GM's fuel-injection program, just as

he was for the Corvette itself. Harley was a connoisseur of European road racing and was acutely aware of fuel injection's increased horsepower and acceleration, displayed by the Mercedes SL300 and Enzo's racing Ferraris. Earl had considered fuel injection on his 1949 Buick LeSabre high-tech show car, but did not want to use a Bosch injection system and longed for a GM Research Lab equivalent. Harley was a close associate and staunch ally of Harlow Curtice, GM Executive Vice President of North America and the ex-GM Vice



One of the six prototype Ramjet fuel-injection units. The only remaining prototype of this group of six is this dyno unit, which is on display in the John Dolza Collection at Kettering University.

President for Buick who originally challenged Harley to design the Buick Y-Job. Harley Earl convinced Harlow Curtice that General Motors needed its own fuel-injection technology.

Harlow Curtice was the champion of General Motors fuel injection. In 1951, Harlow asked the GM Engineering staff to design and build a fuel-injection system for the new 1953 Buick 50th Anniversary "Nailhead" V-8 and to then follow it up with a second system for the Cadillac brand. If successful, it would migrate down the chain of command to Oldsmobile, Pontiac and Chevrolet. Harlow Curtice was also the champion of the 1953 Corvette Motorama Show Car and approved its production by Chevrolet Motor Division. Without Harlow's personal commitment, there would not have been a Corvette at all!

Harlow Curtice and Harley Earl were professionally acquainted with the creative expert engineer they

chose to head up GM's two fuel-injection projects, John Dolza. John Dolza had dual master's degrees from the prestigious Turin Polytechnic Institute and had started with Buick in 1927. Dolza had quickly distinguished himself with the Buick Straight-Eight engine and was soon the Buick Assistant Chief Engineer reporting to Buick's Chief, Charles Chayne.

During WWII, Dolza was assigned to GM's Allison Division in Dayton, Ohio, working on General Motors' U.S. Defense Department top secret programs. While at Allison, John made significant improvements to GM's aircraft engine fuel-injection systems, winning the prestigious SAE Manley Award for 1943. After WWII, John Dolza headed up GM's Engine Power Division at GM Engineering Staff, working again for Charles Chayne, its VP.

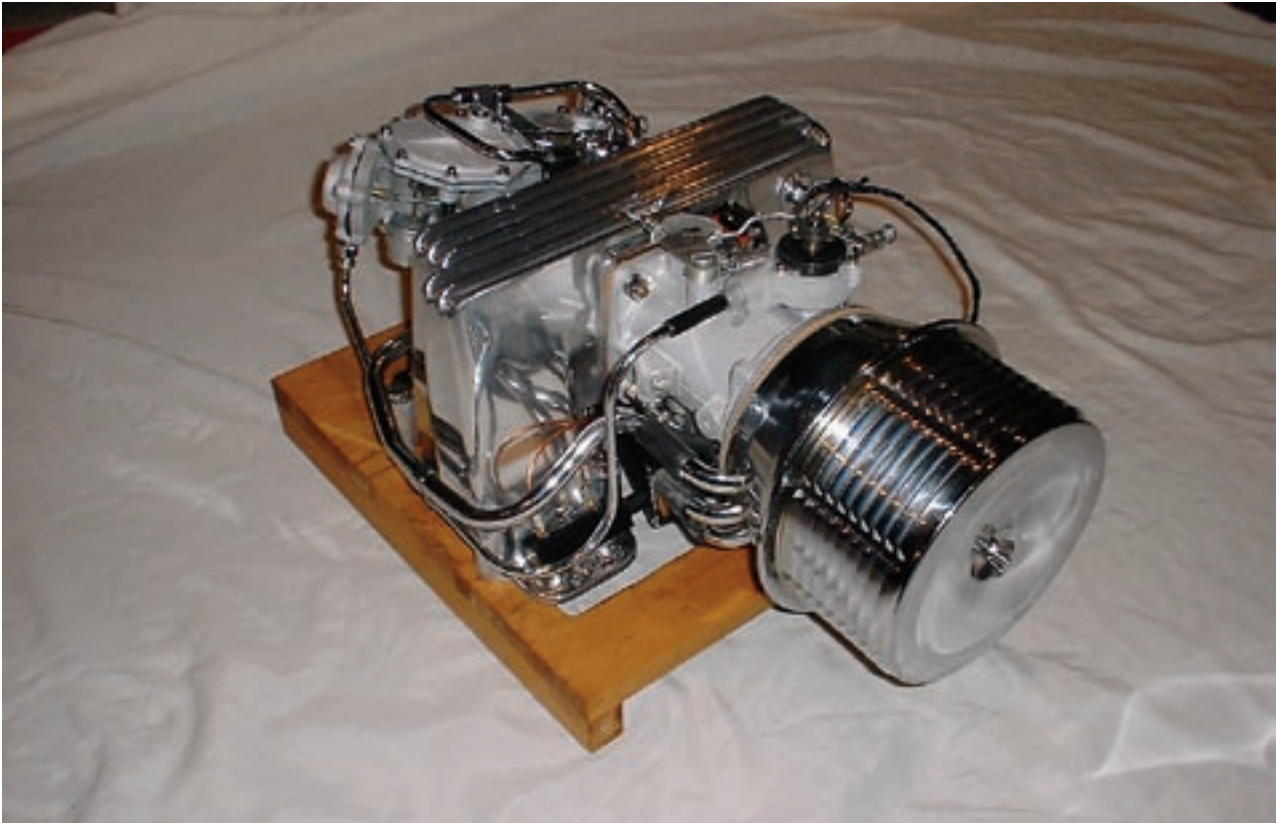
The GM fuel injection was designed to be a "timed" fuel-injection system very similar to the Bosch system used



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by Mercedes. A timed fuel-injection system employees a mechanical rotary distributor to squirt fuel precisely when

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The very first unit, Serial number 1001, went appropriately to Harley Earl.

needed in each cylinder, very similar to the ignition distributor providing a timed spark to each cylinder.

THE MENTOR: The assigned mentors for the GM fuel-injection system were the respective VPs of both Buick and Cadillac Motor Divisions. Neither were particularly interested in fuel injection and passed the responsibility down the chain of command to their chief engineers.

Cadillac's chief engineer at the time was Edward N. Cole. Shortly thereafter, Cole was transferred to Chevrolet as its chief engineer to develop the Chevrolet V-8 engine, which he enthusiastically endorsed. Ed Cole fell in love with Earl's 1953 Corvette Show Car at GM's 1953 Motorama and became mentor for both Chevrolet Corvette and the V-8 engine projects.

Zora Arkus-Duntov also fell in love with the 1953 Corvette Motorama Show Car. He wrote a letter to Ed Cole and was soon hired to engineer the Corvette and the V-8 engine. By January 1955, the GM fuel-injection projects were being considered for

production. Ed Cole assigned Zora full-time to the GM Engineering Staff to investigate the application of GM's fuel-injection projects to the Chevrolet V-8 and the Corvette as his main priority. This decisive action made Ed Cole the fuel-injection mentor.

When Zora Arkus-Duntov arrived at GM Research to investigate GM's fuel-injection design and hardware, he was well aware of Bosch's fuel injection which was used in European racing, and he was eager to perfect it for the Corvette V-8. Within weeks, Zora was impressed by the GM fuel-injection system's promise, but deeply concerned with the lack of robustness it displayed. Zora wrote a several-page letter to Ed Cole, citing each of the weaknesses he observed with the GM prototypes and offering suggestions to address each concern. Zora also recommended a parallel development of a non-timed fuel injection with a mass flow air meter (MAF) where the fuel nozzles would flow continuously. Ed Cole shared Zora's report with C.F. Arnold, his replacement at Cadillac, who conferred and agreed with Zora's assessment.



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Chevrolet and Cadillac asked the GM Engineering staff to develop a "continuous flow fuel-injection system with mass air flow" and John Dolza agreed. In less than eight months, John Dolza and Zora Arkus-Duntov had a functional working prototype assigned



Earl eagerly assigned fuel-injection serial number 1001 to his styling staff for polishing and chrome plating befitting of the Corvette Super Sport show car for the New York Auto Show debut.

to the Rochester Products Division for mass production responsibility.

John Dolza was content with the traditional non-descript and unglamorous approach to under hood GM fuel-injection design. Zora on the other hand wanted to “sex it up.” To Zora, fuel injection had to look as good as it performed! Zora personally oversaw Chevrolet’s design of the signature finned aluminum doghouse, and Zora received a U.S. Patent for its design and the application of the tuned length runner concept to ram air into the cylinders when the intake valve opened, hence known as Ramjet Injection.

CHEVROLET’S TESTING:

Rochester Products Division (RPD) was unprepared for such a large undertaking as fuel injection, but covered up their shortcomings so much that Zora could not get injection units to properly develop the application to the Corvette V-8, much less passenger cars too. In May of 1956, there were only three

Chevrolet Engineering fuel-injection test cars; two 1956 Chevy passenger cars #6201 and #6202 and one lone 1955 Corvette #5950. Harry Barr, Chevrolet’s Chief Engineer, was forced to get involved and negotiate with RPD.

In June 1956, Barr told RPD that Chevrolet Engineering needed eight fuel-injection units. RPD agreed that Chevrolet Engineering could purchase only six final prototype fuel-injection units at the staggering cost of \$2,500 each. Chevrolet then changed its requirements; two units for dyno testing and four for vehicle testing. RPD stated it could only produce and ship one per week, starting in July. RPD’s statement proved to be a serious omen of the scarcity that would soon be known to all of General Motors.

One of these six prototype Ramjet fuel-injection units was secretly fitted to a 1956 Corvette race car with the Duntov camshaft and was tested by Dr. Dick Thompson and Mauri Rose. The only remaining prototype



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Zora Duntov proudly shows off the first production fuel-injected Corvette to Tom McCahill at the Chevrolet Engineering Center. The third Model 7014360, serial number 1003, went to Chevrolet Engineering, where it was mated up with the first hand-assembled RPO-579C (PN 3741697) fuel-injected 283hp V-8 engine, stamped F826EL. This car (E57S100010, a.k.a. number 10) was selected for a road test demonstration at the Long Lead Press Preview. It was re-fitted with this very special fuel-injection engine and is, thus, forever dubbed "The First Fuelie".

PRODUCTION OF THE RAMJET FUEL INJECTION:

Rochester Products started production of its Model 7014360 exclusively for the Chevrolet Corvette in late August 1956. The very first unit, Serial number 1001, went appropriately to the inspiration of GM's fuel injection, Harley Earl. Earl eagerly assigned it to his Styling staff for polishing and chrome plating befitting of the Corvette Super Sport Show Car for the New York Auto Show debut.

The second Model 7014360, Serial Number 1002, went to GM Photographic for the necessary photo shoots for publicity and technical materials needed to support fuel injection at your local Chevrolet dealer. The whereabouts of this unit are unknown.

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Last month we covered the chassis through the restoration process and will continue to document the restoration of this significant automobile, right up to the point where we will have it in our booth at this year's Corvettes at Carlisle on August 28-30. ■



In less than eight months, John Dolza (shown) and Zora Arkus-Duntov had a functional working prototype assigned to the Rochester Products Division for mass production responsibility.