There have been many overhead valve conversions conceived and manufactured for the Model "T", Model "A" and Flathead Ford V-8 engines over the years. The ARDUN, a cast aluminum "Hemi" overhead valve conversion for the non-relieved version of the 1938-53, 24 stud V-8 Ford "flat-motor" was produced in far greater numbers than other conversions of the Flathead V-8 era. It also just happened to be arguably the best engineered of the group that included the Alexander, Birner, Cummings, Davies OHC, Moller-Adams, Riley, Stephens-Frenzel, Tornado and several others.

The ARDUN conversion was the brainchild of two Belgian-born, Russian raised brothers named Zora and Yura Arkus-Duntov. The story goes that when their mother remarried after a divorce, or being widowed, the brothers combined their family name with that of their step father, thus the hyphenated name.

Zora, trained in the highly advanced pre-WWII German engineering schools, had long been fascinated by the hemispherical combustion chamber engine design. During a stint with the Talbot Automobile Company, he became intimately familiar with the most advanced European valve gear and combustion chamber designs.

After World War II, at Zora's suggestion, the Arkus-Duntov brothers emigrated from Europe to the eastern United States and founded a small engineering research and development company. Using Zora's engineering experience, logical mind and superior capacity for problem solving, plus Yura's business and administrative skills, the brothers landed a job as an outside contractor for the Ford Motor Company.

Using the first letters of their complex last name (ARKus-DUN-tov), they called their company the ARDUN Engineering Company.

Sometime during the mid to late 1940s, Ford Motor Company's problems with the flathead Ford V-8s overheating and block cracking, while annoying in the passenger car line, were reaching epidemic proportion in the heavy truck line which also used the basic car cylinder block.

Through their association with Ford, the Arkus-Duntov brothers became aware of these overheating problems.

Zora, sensing an opportunity to put his theories about hemispherical combustion chambers to work, was soon involved in designing an overhead valve cylinder head conversion for the Flathead Ford V-8 that would eliminate block cracking, dissipate heat more efficiently and enhance breathing by placing the valves in heat treated cast aluminum cylinder heads.

The conversion, quite rudimentary by modern standards, had to be designed around the 1938 and later 24-stud cylinder head bolt pattern, employ a hemispherical combustion chamber, allow the pushrods to occupy the space formerly housing the Flathead valves and guides, seal the relief area
from the combustion chamber, and produce a suitable compression ratio without changing the pistons.

The resultant conversion had a rocker arm ratio of barely 1.2:1 (modern OHV V-8s enjoy a 1.5-1.75:1 ratio), heavy forged pushrods that had built-in angularity problems, valve springs that would coil bind if moderate cam lift was applied. A compression ratio of barely 6:1 using Ford pistons with a stock stroke crankshaft, and a “cartridge-fire” spark plug location that placed the electrode nearly 1/2 inch away from the combustion chamber, firing through a 5/16-3/8” diameter hole. (This spark plug location necessitated using at least 40 degrees of ignition advance and made starting and running a Ford distributor equipped ARDUN converted flathead quite a chore!)

The original ARDUN intake system consisted of two cast aluminum “log” type manifolds, one attached to each cylinder head, with a crossover between them. Atop the crossover sat a single Ford two-barrel carburetor. Needless to say, this setup did not breathe very well at all. With the flathead’s firing order, consecutively firing cylinders were drawing from the same end of the manifold system more often than not causing fuel starvation and mixture problems.

Shortly after initial production of the ARDUN, in late 1948, Ford Motor Company introduced the new 337 cu. in. Lincoln Flathead V-8 engine, which they then made available in their Heavy Duty F-7 and F-8 trucks. The availability of the Lincoln engine took away what the Arkus-Duntov brothers had hoped to be a sizable market, the converting of the passenger car engine equipped Heavy Duty Ford Trucks. Inasmuch as the ARDUN conversion would not fit on a passenger car without major chassis and sheet metal surgery, it was beginning to look as if the idea was destined for failure.

It is widely believed that initial production of ARDUN casting was done in the New York area. Cost factors supposedly caused the Arkus-Duntov brothers to move production to England, where the ARDUN caught the eye of Sidney Allard, the manufacturer of Allard Sports Cars, which had been previously equipped with Flathead Ford V-8 engines and running gear. Some serious negotiations resulted in the ARDUN conversion soon being offered in Allards instead of the previously available Flathead.

The ARDUN design, even though advanced for its time, needed much more R&D in order to successfully power a “daily driver” such as the Allard. The upper end oiling system was inadequate, the valves were too big, the valve train was not designed for longevity, the intake system was inadequate, the compression was too low using Ford pistons, the “cartridge-fire” spark plug location defied the 6 volt Flathead Ford ignition system, and cylinder sealing was a problem.

It wasn’t too long before some creative ARDUN Allard owner dropped one of the new Kettering Cad OHV V-8s into his car and started a trend that shortly came to the attention of Sidney Allard himself. Soon, Allard upgraded his cars’ powerplant to the Cadillac V-8, creating what would become known as the Cad Allard.

Somewhere during this period in time ARDUN Engine Company sold the remaining conversions and spare parts to the Stevens Motor Company of New York and the Arkus-Dunkov brothers washed
their hands of the project. Stevens wanted to push sales of the ARDUN conversion in spite of the impending emergence of several domestic OHV V-8 engines.

Reading thus far in this article, one might question the early statement about the ARDUN bring better engineered than most of its competitors. While the ARDUN needed many "bugs" worked out, it had as much or more potential than the other conversions previously mentioned.

Meanwhile, back in 1949, enter Don Clark and Clem TeBow (owners of C&T Automotive), Los Angeles performance pioneers, who, after seeing one of the ARDUN Engine Co. ads in a very early (1949) HOT ROD Magazine, knew they had to have one to experiment with.

At the time, Speed-O-Motive of Los Angeles had a couple of ARDUN conversions for sale, as did Bell Auto Parts. Racing camshaft pioneer Howard Johanson (Howards Cams) and pioneer race car and Lincoln-Mercury auto dealer Bob Estes each picked up a set but Don and Clem couldn’t afford the $500 price.

After scrounging, they came up with a couple of sets from an unclaimed freight outfit in Texas and were on their way to writing their own chapter in the book of performance.

Howard Johanson soon had his ARDUN installed in a track roadster and was winning races against C&T sno-nored cars, reportedly generating about 270 hp on straight methanol.

Bob Estes ARDUN equipped his #82 Indy car and averaged 124 mph in his 1950 attempt to qualify a stock block powered roadster for the Memorial Day Brickyard race. This figure stood for a dozen years as the fastest stock block effort at Indy.

With the aid of Tony Cappana’s (WIL-Cap Automotive) dynamometer, Clark and TeBow soon found out that making the ARDUN perform was not as simple as the "bolt-it-on-in-four-hours-and-get-a-70-horsepower-gain" installation instructions indicated.

To get the potential out of the conversion, domed high compression pistons (later offered by Stephens Motor Co.) had to be installed. The heavy forged pushrods were replaced by tubular ones and the woefully inadequate single carburetor induction system was replaced with a Crower “U-Fab” or a "cobbed up" 180 degree setup using an aluminum Flatehead racing manifold grafted to the ARDUN heads. The original valves, poorly matched to the ARDUN application, were replaced with some from a Chrysler V-8 and a magneto ignition was installed to fire the cylinders on time with a high energy spark.

After some more serious research and development, the Clayton dyno at WIL-Cap showed Clark and TeBow that the one Ford Flatehead block, equipped with ARDUN heads, Stu Hillborn’s newly designed fuel injectors, a Vertex Magneto, and massaged a little in the port flow department, could put out about 250 hp on gas, and, 300-400 hp with steroids (nitromethane) added.

C&T Automotive’s name soon became synonymous with performance engines, beginning with the ARDUN flathead. They ran an ARDUN powered sprinter that often beat cars powered by the emerging De Soto V-8s, set early records at Bonneville with their Moller-Adams OHV converted Flatehead Ford in the Hill-Davis streamliner and ran all over the competition at the local road races with their ARDUN powered fiberglass Devin sports car on a 1940s Ford chassis.

In 1951, Clark and TeBow went to Bonneville with their 284 cu. in. (3 5/16” x 4 1/8”) ARDUN installed in Don’s fenderless ‘32 HiBoy Roadster and set a new Class “C” record of over 162 mph. After returning from the salt, they ran the ARDUN powered Roadster at the old Saugus Drag Strip one night turning 110 on the 18 inch Indy tires, pulling high gear only with 3:52s in the Halibrand quick change. By then, the engine put out 303 hp on the WIL-Cap dyno, running at 5250 rpm on 25% nitro with a Herbert roller cam and a Vertex mag.

ARDUN converted Ford Flateheads soon began to make their mark at the drags Bonneville and El Mirage Dry Lakes meets. Paul Sylva’s 268 cu. in. ARDUN powered modified roadster turned 154.7 at Bonneville in 1952, then took top time at the 1953 Russetta El Mirage meet with a 154 mph pass.

Charles Scott, owner of Scotty’s Muffler Service, made a 201 mph pass in his ARDUN powered belly tank at the 1953 Bonneville meet. Then made a 140 mph run at Santa Ana Drag Strip with the same car and set up. Bill Burke pushed a C&T ARDUN to 167 mph at Bonneville in 1953. Art and Lloyd Chrisman went 160 mph with a Harry Duncan prepared ARDUN in their modified rear engine coupe and in 1955 LeRoy Neumayer gained
These photographs detailing an Ardun Conversion on a flathead V-8 were provided by Ron Love of Portland, Oregon. They clearly show the valve train conversion which would allow the pushrods to occupy the space formerly housing the flathead valves and guides, seal the relief area from the combustion chamber, and produce a suitable compression ratio without changing the pistons. Note additional oil line (top right) for lubrication purposes.

Fueling and proper carburetion was an inherent problem. Newly manufactured dual plane, 180 degree crossfire intake manifold rectifies problem and will accept one 4-barrel, three 2-barrel or S.C.O.T. Blower.

entry into the Grant Piston Ring 200 MPH Club with a 205 mph blast in the Reed Brothers and Neumayer tank (the one with Moon wheel disc ads.)

Other racers such as Belmont SanChez, Clark Cagle, Alex Xydias, Buddy Fox, Tom Ruddy and Marty Weinstein, Dave Marquez (Ventura Motor Monarchs), Joaquin Arnett (Bean Bandits), Chuck James (Safeway Sandblasting), Don Yates and Cramer-Taylor contributed to the ARDUN legend between 1951 and 1955, winning and setting records at the drags, Bonneville, and El Mirage Dry Lakes meets.

Weak points of the Flathead and the ARDUN were the crankshaft, connecting rods, main bearing caps, and the center main bearing support web of the cylinder block. The 21-A, 29-A, and 8B-A rods were fine for the original 85-115 hp, or even up to 200 plus horsepower. Above 250 hp, rod, crankshaft, and block breakage were constant problems.

Some racers “boxed” the stock rods by welding on additional side gusset plates or adapted heavier, late model connecting rods such as the 292 Chevrolet 6 cylinder. This only moved the weak spot to the cast crankshaft and center main bearing support web. The web would pull out of the block, breaking the crankshaft and camshaft, and usually causing the driver to run over his engine’s innards, which were by then lying on the track.

Despite the relative frailty of the Flathead’s lower end and emergence of the Kettering Olds and Cad V-8s between 1951-54, the ARDUN and Flathead Fords remained a significant factor in the field of performance engines for several years. This was partly attributable to the fact that in the beginning, not much speed equipment was available for the new V-8 overheads and tires, transmissions and clutches were not adequate to contain this new generation of engines. The Flathead Ford V-8 powered Kenbz-Leslie streamliner consistently set Top Time at the annual Bonneville, Utah race with speeds in excess of 220 mph (two Flatheads) including an all time best of over 270 mph powered by three Flatheads.
Prior to 1955, the Flathead Ford was still just hoping he would get to the lights before the Chrysler and Cadillac/Olds powered dragsters late V-8 powered "Gene's Brake Shop Special" against since the early 1950s, tells of racing his Flathead. The Flathead would then build a good lead and by the end of the 1/4 mile, hearing and feeling the thundering overhead coming after him, John was just hoping he would get to the lights before the OHV V-8 flew past at half again his little Flathead's speed!

In 1955, the Bakersfield Smokers Drag Race Club sponsored a big fuel drag met at Minter Field in California, attended by this writer. In those days, the promoter lined up all of the fuel dragsters at the starting line for a photo opportunity prior to eliminations. In the line up of 10-12 cars at that particular race there were several Chrysler powered dragsters, a couple of Chevrolet powered carts, and three ARDUN converted Flathead Ford V-8 powered dragsters. Top Eliminator of the day was won by the car that not being a fuel dragster wasn't invited to take part in the photo opportunity. That car was the legendary Fiat Competition Coupe of Jim "Jazzy" Nelson, powered by a Ford Flathead V-8!

Prior to 1955, the Flathead Ford was still "King of the 1/4 Mile." Many drag teams were experimenting with the new Chrysler and General Motors OHV V-8s but when they showed up at an important race, the trusty Flathead Ford could be seen sitting in the back of their tow pick-up, waiting to be installed when they needed to win.

The final nail in the coffin of the Flathead Ford as a racing engine came indirectly at the hands of the ARDUN's creator, Zora Arkus-Duntov.

After selling the ARDUN inventory to the Stevens Motor Company in the mid 1950s, Zora went to work for the engineering staff of General Motors Chevrolet Division and changed the original six-cylinder powered, Powerglide shifted, plastic runabout to the most versatile and ferocious Grand Touring car made in the United States.

The Small Block Chevy, introduced in 1955, had by 1958 become a dominant force in all types of racing, taking over the throne occupied for nearly 25 years by the Flathead Ford V-8. Zora Arkus-Duntov was one of the inventors of the Small Block Chevrolet and he is recognized as the father of the high performance Corvette.

The 331 cu. in. Chrysler "Hemi" V-8, introduced four years prior to the first Chevy V-8, soon became the standard power plant for some types of racing. It has never however, even approached the overall popularity of the Small Block Chevy.

Rumor has it that when the Chrysler engineers were working on the design for their legendary "Hemi" in about 1950, they had a pair of ARDUN heads on the drafting table as well as the lower end from a Kettering Cad V-8. Close comparison of an ARDUN to a set of early 50s Chrysler, DeSoto, or Dodge "Hemi" cylinder heads reveals many striking similarities in design.

Back to ARDUN and the early performance Ford. In 1955, about the same time that Zora Arkus-Duntov was hiring on at Chevrolet, C&T Automotive obtained the entire unsold ARDUN stock left in America and offered it, including several sets of V-8 60 ARDUN conversions, for sale at $375 per set, down from the original $500 price. Up until that time, C&T, Bell Auto Parts and Speed-O-Motive had been the west coast ARDUN dealers.

The number of ARDUN conversions produced has long been a topic of speculation among Flathead performance enthusiasts. Most of those involved in collecting, restoring and racing the ARDUN agree that somewhere between 250-350 sets, including spare parts, were produced between 1947 and 1949 for the standard size Flathead Ford. The number of V-8 60 ARDUNS produced was somewhere between 6 and 25.

By the mid-1950s the chassis, clutch, tire and transmission technology was finally catching up with the tremendous power and torque available from the new generation of OHV V-8s. The Flathead seemed relegated to the history books.

As it became obvious that the vintage engines could not compete with the new generation of OHV V-8s, drag race promoters created a new "D" engine class for the older engines and the Southern California Timing Association (SCTA), created "X" engine classes for the old style engines competing at Bonneville and El Mirage Dry Lakes meets.

Since the early 1980s nation wide, several racing promoters have been sponsoring Nostalgic Drag Races catering to drag cars of the type competing prior to 1970. Many of these races have a "Flathead/Inliner" class for the old engines.

At these races it is not uncommon to see normally aspirated nitromethane burning Flathead Ford powered dragsters turning 1/4 mile times of 150 mph in less than 9 seconds flat while supercharged Flatheads and ARDUN converted Flatheads post times just under 160 mph and elapsed times in the mid 8 second range.

Performance such as this can be attributed to the adaptation of current OHV technology such as forged chrome moly connecting rods, forged aluminum high compression pistons, chrome moly billet crankshafts, high-flow fuel injectors, extensive cylinder head flow improvement and modern camshaft and valve train technology. The development of block support girdles that strengthen the
center main bearing web and steel main bearing caps to replace OEM cast iron units have kept the crankshaft and rods in their intended proximity to the engine block.

With this technology, today’s ARDUN converted Flathead Ford V-8 is capable of producing and withstanding 500 horsepower on steroids (85% nitromethane, 15% alky.)

Today, in SCTA Land Speed Racing (Bonneville Salt Flats and California’s El Mirage Dry Lake), the 1954 and earlier Inliners (straight sixes and eights), Model A. B and C Fords, the Flathead Ford and Mercury V-8s and the ARDUN still have their own (“X”) engine group classifications which are becoming more popular every year.

Within this group the normally aspirated Flatheads, as well as supercharged Flatheads and ARDUNs, have posted single engine records of over 230 mph!

The oldest SCTA Bonneville and El Mirage Dry Lake record on the books is in fact 201 mph, set by Cramer and Taylor in 1969 using an ARDUN Ford powered 1927 Model “T” Roadster. This ARDUN, equipped with OEM Ford connecting rods, crankshaft, no block support girdle and inhaling a diet of straight nitromethane, was reportedly a candidate for the scrap heap after completing the mandatory two way record pass over the five mile Bonneville race course.

about the author...

Doug King is a 62 year old retired commercial pilot. He started out in cars with a 1930 Model A at age 14, followed by a 1949 Ford at 16. By 17, he had a bored and stroked 286 cubic in 59-A powered 1933 Ford 3-Window Coupe.

Following college and a stint with pre-1916 Horseless Carriages, he succumbed to his roots and returned to what by then was vintage engine Land Speed Racing and nostalgia drag racing.

The dragster (shown here) is a 120” wheelbase replica of a 60’s Dragmaster Dart, originally made in Carlsbad, California. It is powered by a 295 cubic inch 1949-53 FoMoCo 8BA block equipped with Ardun heads, forged Cunningham connecting rods, SCAT billet chrome moly crankshaft, DeLong camshaft, custom fuel injectors, Scintilla Vertex magneto and King main bearing caps and block support girdle. Horsepower is estimated at 500.

Best 1/4 mile time on a mixture of nitromethane and methanol is 161 mph in 8.37 seconds. The car weighs 1600 lbs with the driver and is equipped with a Ford Mustang differential and Ford C-4 automatic transmission.

His 170” wheelbase rear-engine Bonneville Lakester is also powered by an ARDUN converted 8BA block with the same equipment as the dragster. Best time for the Lakester is 183 mph at Bonneville on gasoline and 194 mph on methanol at the 1.3 mile El Mirage Dry Lake.

Doug’s ARDUN converted flathead engines hold or have held records at Bonneville Salt Flats and El Mirage ranging from 143 mph in the Vintage Engine Street Roadster class to 212 mph in the Vintage Engine Gas Streamliner class.

His current cars include a flathead powered 1940 Ford 1/2 ton pickup, a Nailhead Buick V-8 powered 34 3-Window coupe, a Cragar OHV converted 1928 A Sedan Delivery, a Rajo OHV converted 1914 T Speedster and a 1927 T Track Roadster powered by a Ardun converted 59-L flathead Ford.