



CAR LIFE CLASSIC

WILLS SAINTE CLAIRE



TEXT AND PHOTOS BY WARREN W. FITZGERALD

IT IS A SAD circumstance that so little is remembered today of the man who contributed so greatly to the early success of the Ford Motor Co. Without him, Henry Ford's efforts would have been doubly difficult, indeed might have failed. Many early automotive engineers who are better known are less deserving of lasting fame. Possessed of tremendous energy, he worked night and day with nothing but catnaps, glasses of milk and sandwiches to sustain him. He was fascinated by the process of problem solving and practiced it incessantly. The mind that helped create the all-black Model T was intrigued by the effect of colored light upon plant growth. This man, who, in an attempt to build the ideal automobile, became a multimillionaire at 40 and lost everything before he was 50, remained a thoroughly delightful human being, loved by family and friends alike. His name was Childe Harold Wills.

Wills' parents emigrated to America and, upon reaching the East Coast, drove a herd of sheep across the country. They settled near what is now Fort Wayne on the shores of the Detroit River. Wills' mother admired Lord Byron and probably identified with the wanderings described in his first major work, an epic romantic poem titled, "Childe Harold's Pilgrimage." She named her infant son for the protagonist of this poem. Though Wills did

not use the unusual first name, preferring C. Harold instead, the name was fitting. Childe was a title used in 13th and 14th century England, applied to youths of noble birth who were awaiting knighthood.

Young Wills completed his primary schooling in Detroit and showed early promise as a cartoonist. He realized that this would offer a precarious existence and decided to become a mechanic. He found a firm willing to apprentice him and spent four years learning the mechanics' trade. The eight raises he had been promised did not materialize, so on the fourth anniversary of his apprenticeship he resigned. He soon found employment as a toolmaker. Putting his early bashfulness behind him, he worked with such diligence that three weeks later he was made foreman. Within three months he was promoted to superintendent and was paid \$50 per week. His mechanical bent appears to have been natural, for his Welsh father was a railroad master mechanic and young Wills was associated with machinery from an early age. Throughout his career he demonstrated a tremendous capacity for work and was always driven by a desire to attain perfection in any accomplishment. He was tall, very handsome and displayed an imposing, confident bearing.

Because he had attained a superintendent's position, he believed that he

had reached the top as a toolmaker and decided to look for another challenge. He read an advertisement placed by Henry Ford for a draftsman and, with a decisiveness that was to characterize his subsequent life's work, he resigned to seek employment with the then unknown Ford. Henry Ford was building his first experimental car and Wills worked with him for six months. When the venture ended in failure, Wills took a job with the engineering department of the Boyer Machinery Co., at his original toolmaker's rate of \$18 per week. Again he impressed his employers with his incredible energy and was promoted in the short space of a year to engineering assistant to the president. Now he was making good money, was unmarried and still sought challenge.

HE HADN'T forgotten his association with Henry Ford, and retained his faith in this visionary man who was still experimenting. He went to Ford and told him that even though he had a steady job, he would come in and work from 5-7 A.M., go to his regular job and come back at 7 P.M. and work till midnight for no salary. Wills had seen an opportunity and was determined to make the most of it. In the months that followed, the efforts of C. Harold Wills and Henry Ford were carried out in the face of considerable hardship. With the advent of winter, their finances were negligible and they could not even afford coal for the stove. They acquired boxing gloves and when they became so numb that they could no longer work over their drafting boards, they put on the gloves and boxed with each other until circulation returned. Through their combined efforts the first successful Ford automobile reached completion. Henry

***This 1922 A-68 Roadster Featured
An Overhead-Camshaft V-8
And Sophisticated Metallurgy***

WILLS

Ford never forgot the devotion and energy brought to him by C. Harold Wills.

For 16 years Wills was, in effect, the chief engineer of the Ford Motor Co. Because Henry Ford disdained use of titles, Wills never was listed as such in the records. He was a major contributor, possibly the strongest, to every Ford automobile designed between 1903 and 1919. Contemporaries have stated that it was impossible to ascertain where Ford's efforts left off and Wills' work began. When the Ford Motor Co. was incorporated Wills did not have money to invest. Henry Ford, in appreciation and recognition of his contributions, verbally agreed to give him 10% of his own dividends in addition to a salary. Later, when this amount reached 1 million dollars per year, a second verbal agreement was reached limiting Wills' share to that amount.

Most of this income resulted from the success of the Model T, to which Wills had made a vital contribution. The car was designed by a team of men that included Ford, Wills, C. J. Smith and Joseph Galamb. When they started work they closeted themselves in a room lined with blackboards and

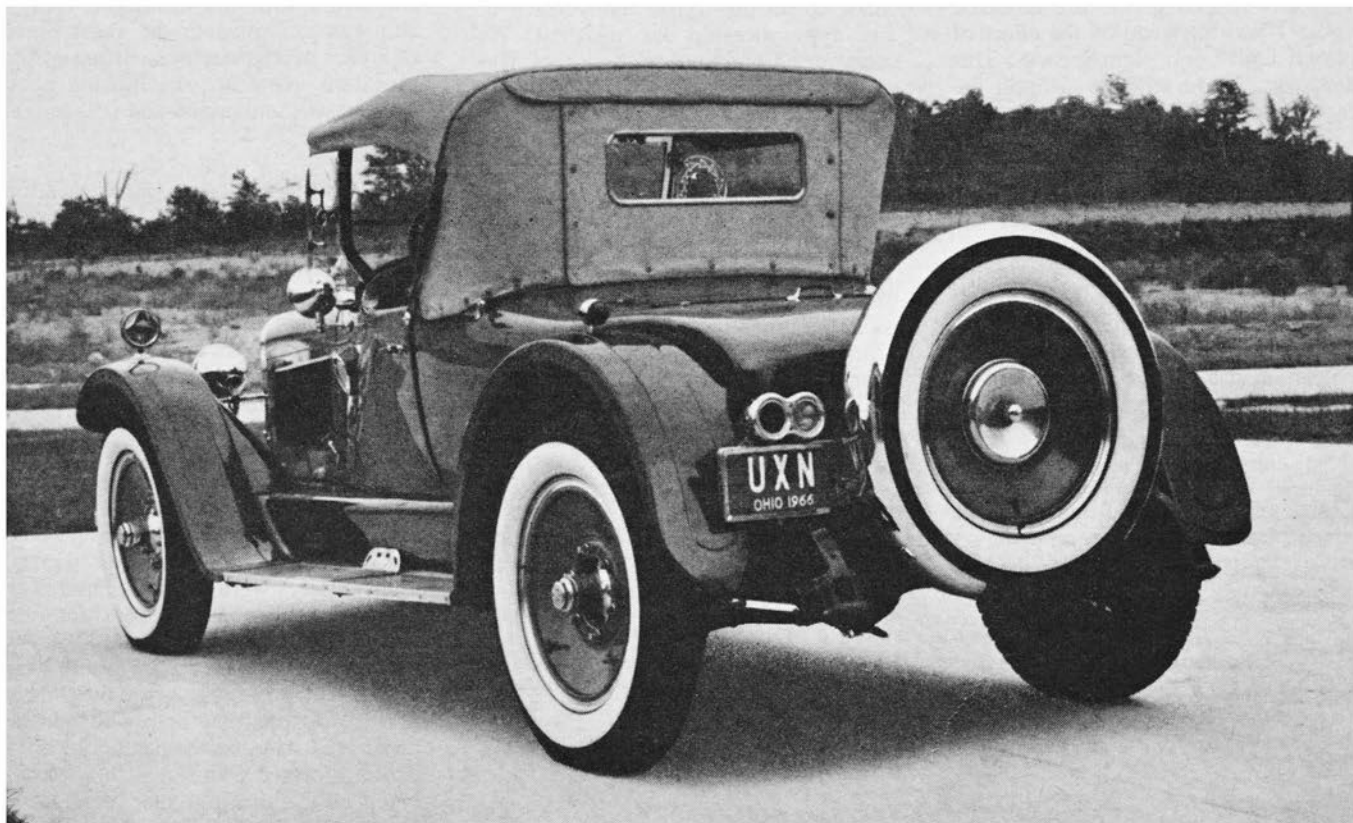
literally began with a clean slate. They had the idea that the railroad tracks running through town were the result of much engineering thought and they decided that the tread of their new car should match the width of the tracks. So they sent a man out on Trumbull Ave. to measure them and this dimension was placed first on the blackboard. The second dimension was that which was required to load an automobile through the door of a boxcar and the same man was sent out to measure one.

Wills is credited with the conception of the planetary transmission in the Model T, an idea that grew in his mind as he lay soaking in a hot tub of water at 5 o'clock one morning. These early morning soakings became an important part of Wills' creative process over the years and he told his son his best ideas were developed in these bathtub sessions. He also deserves considerable credit for the introduction of vanadium alloy steel, used extensively in the Model T, though J. Kent-Smith, a British metallurgist, and John Wanderinger also had a part in its introduction. The detachable cylinder head, conceived as a cost reducing measure, has been credited to Wills. The majority of the ideas for the Model T must be attributed to Henry Ford himself, but it is correct to say that much of the early success of the Ford Motor Co. was derived directly from the intellec-

tual curiosity and immense capacity for work brought to the firm by C. Harold Wills.

There is evidence that as time passed Wills became restive in the Ford firm. Henry Ford was a very forceful person and, as the company grew, he became more and more domineering. His resolve to run things his own way was completely crystalized with a law suit brought by the Dodge brothers for the distribution of dividends to the stockholders in response to Ford's intention to expand and build the River Rouge plant. Ford's anticipated treatment of the Dodge brothers was cited by C. Harold Wills to his family as the primary reason for his leaving the company. He could not agree with Henry Ford that this was the correct thing to do. Others appeared to concur and in March, 1919, key executives Norval Hawkins and John R. Lee, with Wills, resigned.

WILLS WAS NOW a multi-millionaire, just past age 40, in the prime of life and brimming with ideas. His desire was to build his own automobile. He had sailed from Lake Huron down the St. Clair River to Detroit on many occasions and from shipboard had been attracted to the area near Marysville, Mich. Just 54 miles north of Detroit, it was to Wills a beautiful spot to establish an automobile manufacturing firm. He was, above all, a humanist



and the degrading aspects of city life upon automobile workers was distasteful to him. He determined to build at Marysville an ideal community in which to produce his ideal car. He envisioned a complex of related industries that would transform the sleepy little river village into a thriving community.

He established C. H. Wills & Company with John R. Lee as his chief lieutenant. Other officers of the company were Kirkland B. Alexander, vice president; Charles Morgana, vice president; Ferris D. Stone, secretary; Frank P. Book, treasurer; and George S. Anderson, assistant secretary-treasurer.

Wills originally had planned to be in production by August 1, 1920, and projected a series of 10,000 cars selling in the \$2000 price bracket. His search for perfection and problems with development of prototypes postponed marketing of the Wills Sainte Claire until March, 1921. By the end of that year, only 500 cars had been built and the price had risen about \$1000. Late in 1922, with some millions of dollars in short term notes due, the company was forced into friendly receivership. This move, a result of the sharp, vicious economic depression of that year, was intended to prevent raiding of the firm's assets until refinancing could be accomplished. All of this was in the face of a claimed strong consumer demand for the Wills Sainte Claire.

The firm was reorganized and recapitalized as the Wills Sainte Claire Co. on July 30, 1923. The firm of Kidder, Peabody & Co. was the principal backer. These Boston bankers, friends of Harold Wills, had been original financiers and had submitted the highest bid for the assets of the company at the receivership sale. They asked for increased participation in the management of the firm and got it. At this time, John R. Lee, Wills' right-hand man, resigned, it was said voluntarily and with good will.

The Model A-68, as introduced in March, 1921, was advertised with eight salient features. The first of these was the use of molybdenum steel. In fact, the first advertisement shown was a picture of the then-unnamed automobile in front of a mountain of molybdenum ore at Climax, Colo. The alloy, found extensively in the new Wills automobile, imparted distinctive physical properties to its components. Pictures showed molybdenum steel axle housings twisted up like rubber bands without rupture.

The second strong point in Wills advertising was the single overhead cam V-8 engine that developed 60 bhp at 2700 rpm. The third talking point concerned the use of overhead valves fab-

ricated from three kinds of steel. The camshaft was the fourth feature cited in Wills advertising. Its overhead location reduced reciprocating mass, its gear drive eliminated belts and pulleys and it was equipped with an ingenious automatic lash mechanism, which Wills created, for quieting the customary overhead cam clatter associated with such engines.

The fifth feature was a de-clutching fan. Wills detested wastefulness in any area and claimed that the maximum power that could be used by this fan was only 2 bhp. The sixth feature was the use of silent gears, specially designed for quietness. Wills fabricated his gears by pressing two steel rings together with paper damping rings between.

Seventh was the lighting arrangement. The headlamps featured Mangin magnetic mirror reflectors that depressed the headlight beams when a button was pressed. In addition, a white backup light was located next to the stop light in the rear and was lighted when the transmission lever was placed in reverse. Wills' son relates that this innovation was prompted by his father's propensity for backing into fire hydrants at night.

THE EIGHTH FEATURE given attention in Wills' advertising was a unique courtesy light that was placed on the left side of the cowl. It illuminated the car while on the road, reducing the effects of headlight glare and enabling the driver of an approaching car to see exactly how much room he had for passing. It also assisted passengers alighting at the curb. Wills' analytical mind had determined that there were three ways by which one saw things—by direct illumination, by reflected light, or by silhouette. This was an attempt to enhance vision based upon this thinking.

The Wills Sainte Claire engine can best be characterized as years ahead of its time. Today, single overhead cam V-8s are used in many high-performance applications. Wills' thinking in this area undoubtedly was influenced by his aircraft engine experience, as was that of his contemporaries. It reflected the highest state of the art in 1921. He used a 180° crankshaft and a 60° included angle between cylinder banks in an attempt to overcome periodic vibrations then associated with V-8 engines. In this he was not entirely successful. His intentions were well founded, but his experience here was limited and some owners of Wills Sainte Claire V-8s of the period stated that vibration was a problem. The damper at the end of each camshaft seems to have eliminated low speed chatter and undoubtedly improved the engine over previous attempts with this

FORD ARCHIVES, HENRY FORD MUSEUM



CHILDE Harold Wills carried on a lifetime search for perfection.

layout. The valves operated directly upon the cam lobes. Their heads were silicon chrome steel, their stems were 30% nickel steel and their tips were made of an even harder alloy. Pistons were ground diagonally and three piston rings were used, two at the top and one at the bottom. The crankcase was cast of aluminum, in two pieces, then heat treated to remove stresses. The 3-main bearing crankshaft was forged of molybdenum steel. This crankshaft featured the early use of drilling for passage of lubrication to the connecting rod bearings. The practice appears to have been initiated with the Liberty aircraft engine and came to Wills' attention when he worked on that project for Ford during the years of World War I.

Behind the engine was a multiple plate dry clutch with 12 discs. The facing of the six driving discs was woven asbestos cord. This was claimed to be "unburnable and this construction will last the life of the car." The transmission was a 3-speed unit without synchromesh, again using chrome nickel molybdenum steel for its components. The gear teeth were chamfered to reduce noise when shifted. The service brakes, located only on the rear wheels, were mechanically actuated. A dual exhaust system also was standard equipment.

Four models were cataloged for the original A-68 Wills Sainte Claire. These were a 5-passenger touring car, a 4-passenger roadster, a 4-passenger coupe and a 7-passenger sedan that featured two auxiliary seats. Departing from Henry Ford's averred policy that the customer could have any color as

WILLS

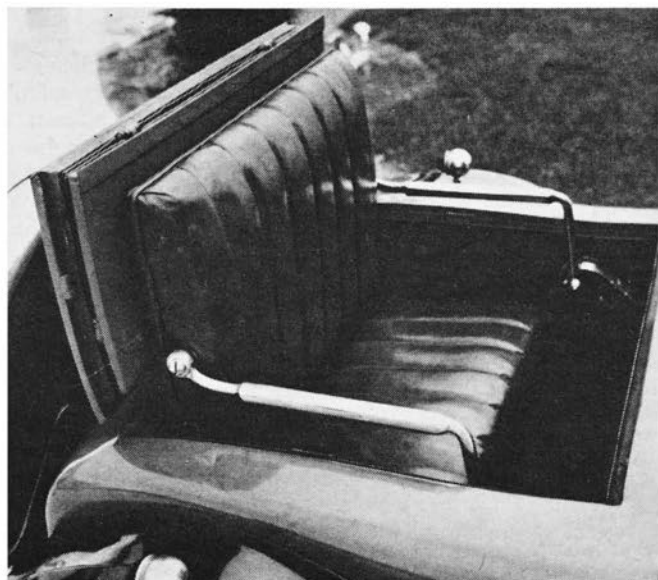
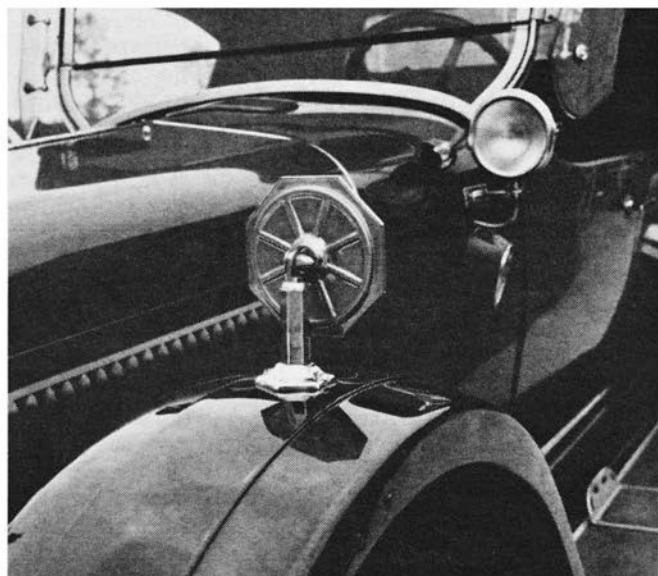
long as it was black, Wills offered such colors as Lady Mary Maroon, Newport Blue and Liberty Green. Shortly after introduction of an Imperial sedan with a glass division, a town car and a limousine were added to the body styles. Closed bodies were built by the Fisher Body Co. In January, 1923, two more open models were added. One was a 7-passenger touring car and the other was the 4-passenger, sporty Gray Goose Special touring car.

In January, 1924, the improved model B-68 Wills Sainte Claire was introduced. Changes to it were highlighted by an increase of 6 in. in wheelbase from 121 to 127 in. The engine was improved by a rearranged firing

order that smoothed out power impulses. It was now rated at 65 bhp, though this was advertised earlier and was apparently realized for the A-68 engine. The Zenith Duplex carburetor was replaced with one of special design, which included a pre-heating feature. New cam drive gears were incorporated to reduce noise. A new, single plate clutch was added and the lubrication system was revised to apply a more general flow of oil to the bearing surfaces instead of the former jets of oil. New headlamps were adopted. The old, straight-side cord tires were replaced by 32 x 6 balloon tires and even more important was the change to Lockheed hydraulic brakes on all four wheels. To compensate for the increased wheelbase and to improve ride, the rear semi-elliptic leaf springs were enlarged from 54.5 in. x 2 in. to 58 in. x 2.25 in.

New body styles were introduced across the line and they may have been designed by Locke & Company, for sketches done by the late John Tjaarda for the Wills carry the Locke emblem. In July, 1924, an improved model was added to the line and called the Gray Goose Traveler. This car had higher sides than the preceding Special and was painted in Wills Sainte Claire Gray, accented with carmine stripes and black fenders, frame valance and undercarriage and top.

On January 1, 1925, a 6-cyl. Wills Sainte Claire was introduced. C. Harold Wills Jr. was asked if his father's intent was to produce a cheaper, more easily maintained engine with the W-6 model. He replied that the senior Wills' primary motivation was to produce a better balanced engine than he had achieved with the V-8. The 6-cyl. powerplant had a bore and stroke of





3.25 x 5.5 in. and displaced 273 cu. in. Its rated taxable horsepower was down from the V-8's 33 to 25.35, but its developed bhp was 66 at 3300 rpm, a decided improvement. The engine was remarkably clean in exterior appearance and, like the V-8, featured a single overhead camshaft and shaft-driven accessories. The crankshaft ran in seven main bearings. The chassis used full Hotchkiss drive at the rear. Firestone Cord Balloon tires were standard, which necessitated an increase in tread from 56 in. to 57 in. All of the chassis improvements that had been incorporated a year earlier for the B-68 were carried over for the W-6.

The Wills Sainte Claire Six was a sound automobile, as demonstrated early in 1925 by the remarkable endurance drive of Louis B. Miller, manager of the Pacific Coast Division of the Victor X-Ray Corp. He picked up his Wills roadster at Marysville and broke it in while driving to Jersey City, N.J. Then, with C. I. Hansen as co-driver and mechanic, he set out for San Francisco to establish a new transcontinental record. This he accomplished by driving 102 hours and 45 min. straight through, lowering the old mark by 7 hours, 44 minutes. The car required no mechanical repairs and no water was added to the radiator during the journey.

Also in 1925 a deluxe C-68 "Vogue Series," sharing bodies identical with the Six, was added to the B-68 line of V-8s. A roadster, 4-door brougham, 5- and 7-passenger sedans, and an en-

closed-drive limousine were listed. The latter, at \$4285, was the highest priced Wills Sainte Claire.

In 1926 an improved version of the Wills Six, the T-6, was introduced. It was produced concurrently with the W-6 chassis and featured a 6-bladed belt driven engine fan instead of the 3-bladed gear driven fan. An Auto-Pulse fuel pump replaced the Stewart-Warner vacuum tank fuel feed system used on the W-6. In all, approximately 1200 of this last model Wills Sainte Claire were produced.

A survey commissioned by Kidder, Peabody & Co. reported in 1926 there were some 19 million cars on the road and continued financing of the automobile industry would be ill advised, as consumer needs were well met. The recession of 1926 combined with the pessimism of this report contributed significantly to the demise of the Wills Sainte Claire.

The Wills Sainte Claire remained in active production through the 1926 model year and into the early part of 1927, when it then faded from existence. C. Harold Wills stated that there were two fundamental reasons for his failure as an independent automobile producer. The first concerned timing. His infant firm was insufficiently established to weather the sharp depression of 1922 and the subsequent recession of 1926. The second reason was his failure to surround himself with technically educated associates who could have prevented him from exploring so many blind alleys in the development of his automobile. Wills was a brilliant

engineer, but he came to recognize the limits of his background of practical experience only.

LATE IN 1929 what was left of the Wills Sainte Claire Co. was purchased by the Yellow Truck and Coach Co. The Gray Goose was no more.

C. Harold Wills did not bemoan his failure. He often said to his sons, "That was yesterday and we can't make any money from that." He busied himself in his small laboratory, but his great fortune had run out. He had lost at least 13 million dollars in his attempt to produce the ideal automobile. He devoted himself to the development of new alloy steels and in doing so, became quite close to the Timken Roller Bearing Co. He served as a consultant to many firms, among them the New Era Motors Co., which produced the short-lived Ruxton.

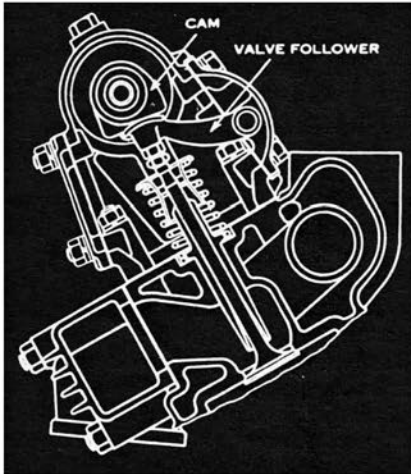
In 1932 he was hired by Walter P. Chrysler at the salary of \$5000 per year, a pittance for a man who had earned as much as 2 million dollars in a similar period. He was given office space with two other men in the Chrysler plant. Though no assignment was forthcoming, he was furnished a small silver pass that allowed him into any area of the company. A man of Wills' temperament could not be content to sit and do nothing, so he promptly exercised the authority of his pass and embarked upon a series of extended walks through the sprawling Chrysler complex. He made notes of what he saw and his agile mind formu-

WILLS

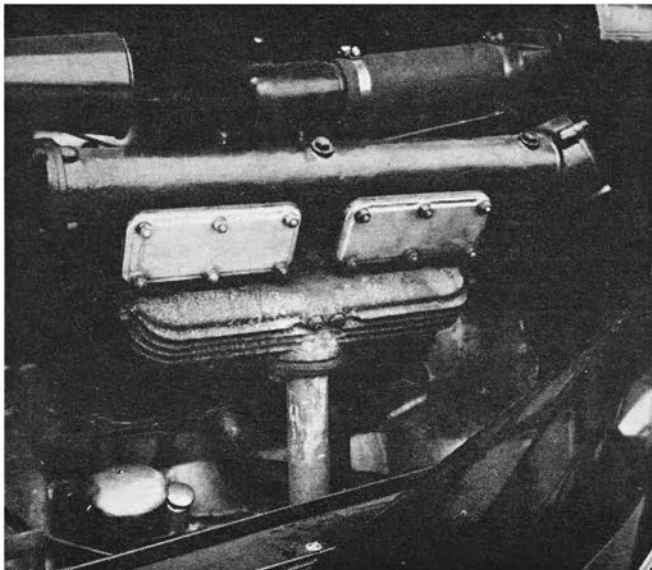
lated solutions to problems he uncovered in a number of areas. He walked until his legs swelled painfully and then finally sat down to write a long report to Walter Chrysler. His recommendations, which resulted in savings of \$350,000 the first year, were heeded and immediately his two office mates were assigned other quarters. In their place came draperies at the windows, a carpet on the floor and another desk. His long-time secretary was summoned from Marysville to work with him. He concerned himself with metallurgical problems for Chrysler, one of which was the development of Oilite bearings, pioneered by that firm, and he spent a happy eight years with the company.

Unknown to his family, Wills suffered from diabetes. One day in 1940,

SOHC design was influenced by Wills' aircraft experience.



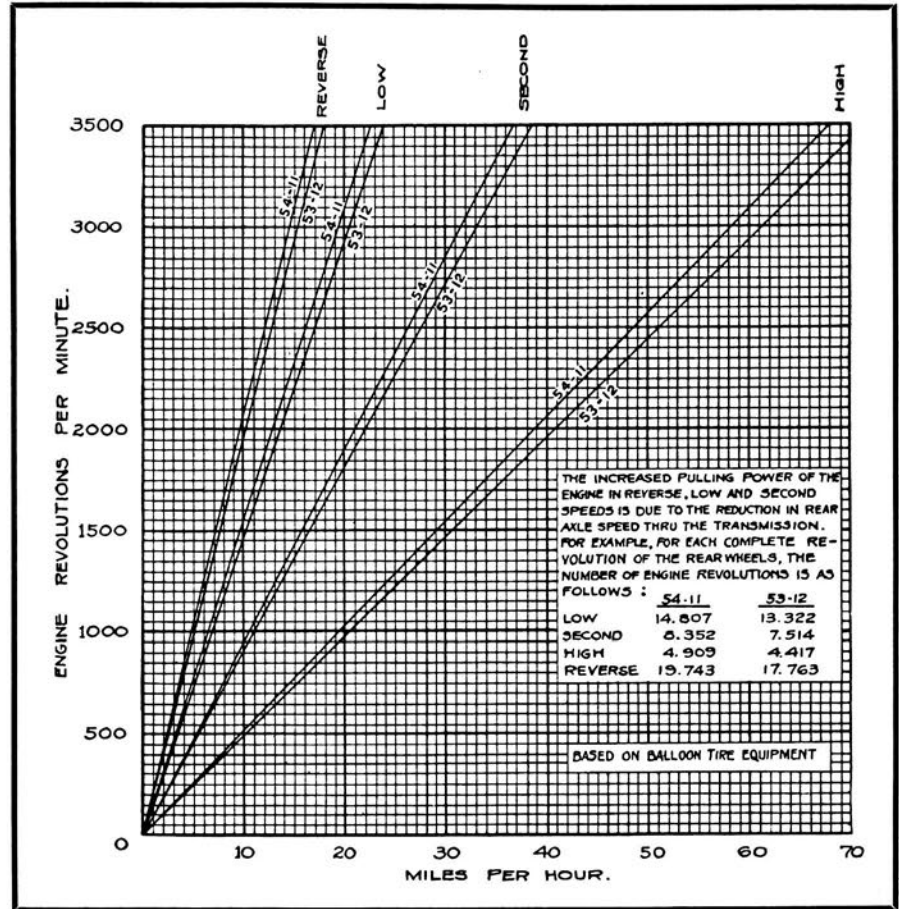
STURDY CASTINGS of cam covers and exhaust manifolds are evidence of Wills' penchant for strength, clean design.



at the age of 62, he leaned over a stairwell in an attempt to fix a lamp, and fell, striking his head. He was rushed to a hospital, and because his doctor was out of town, no one knew of his diabetic condition. He was treated for concussion, though he was actually in a diabetic coma and he died two days later.

It is unfortunate that of the approxi-

mately 15,000-18,000 Wills Sainte Claires thought to have been built, only about 70 are known to exist today. The *CAR LIFE Classic* is a 1922 Model A-68 roadster, from the comprehensive "Classic Era" collection of Al Rodway, Cleveland Heights, Ohio. The restoration was accomplished by Wendling Bros., well known professionals in Macungie, Pa. ■



TECHNICAL SPECIFICATIONS WILLS SAINTE CLAIRE AUTOMOBILES

	A-68	B-68	W- & T-6
Engine	60° V-8	60° V-8	1L-6
Valve operation	sohc	sohc	sohc
Main bearings	3	3	7
Bore x stroke, in.	3.25 x 4	3.25 x 4	3.25 x 5.5
Piston displacement, cu. in.	265	265	273
Firing order	1-8-3-6-4-5-2-7	1-8-2-7-4-5-3-6	1-5-3-6-2-4
Compression ratio	4:1	4:1	n.a.
Taxable horsepower	33	33	25.35
Brake horsepower, rpm	60 @ 2700	65 @ 2700	66 @ 3300
Fuel capacity, gal.	18	18	18
Oil capacity, qt.	8	8	10
Coolant capacity, qt.	26	26	26
Suspension			
Front: Semi-elliptic leaf springs, in.	36 x 2	36 x 2	36 x 2
Rear: Semi-elliptic leaf springs, in.	54 x 2	58 x 2.25	58 x 2.25
Wheelbase, in.	121	127	127
Tread, in.	56	56	57
Tires	32-4.50	32-6.00	33-6.00
Shipping weight, for roadsters, lb.	3035	3240	3410