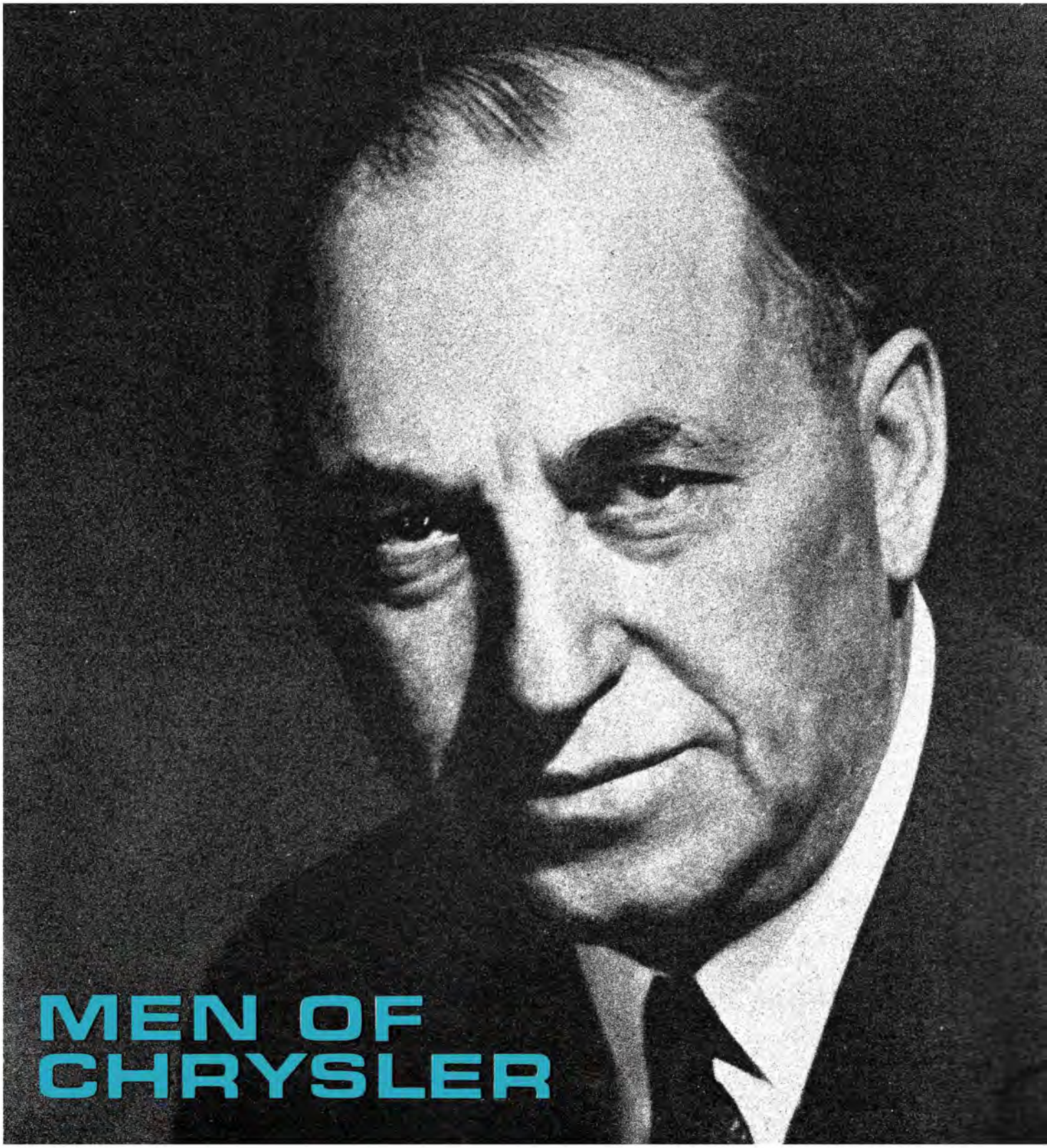


MEN OF CHRYSLER

WALTER P. CHRYSLER was founder of the corporation.

Fine Automobiles and a Vigorous Corporation were Founded on Engineering Genius

BY M. D. HENDRY

A "REVERENCE FOR Engineering" was how the detached, competent and critical business magazine, *Fortune*, once described the motivation of Chrysler Corporation. Certainly few concerns could match the consistently high standard of creative and applied engineering set by Chrysler in its first 25 years. While Chrysler ▶

CHRYSLER

made mistakes, its record of great achievements based on sound engineering decade after decade is remarkable.

Walter P. Chrysler was the creator and undisputed leader of the vast industrial organization bearing his name. That he was a trained machinist and locomotive engineer, not an accountant-cum-director, salesman, or college-trained administrator, probably explains the Chrysler "engineering complex."

Walter Percy Chrysler was born on April 2, 1875, in the Kansas hamlet of Wamego. In his teens, he joined the Union Pacific Railroad as apprentice machinist, then moved about the country as journeyman mechanic. Eventually he became roundhouse foreman in the Salt Lake City shops of the Denver and Rio Grande. Moving again, he became, after a course in mechanical engineering, superintendent of motive power at the Chicago and Great Western's shops at Oelwein, Iowa. At 33, he was the youngest man ever to hold the job.

Chrysler's interest in automobiles was aroused to such a point by 1908 that he bought a new $5000 Locomobile, which he completely dismantled and studied thoroughly before re-assembling it and taking his family for its first drive!

Chrysler's next move was to the position of superintendent of the American Locomotive Co. shops in the Allegheny region at Pittsburgh, followed by promotion to works manager. His efficiency at Alco was noted by one of the directors, James J. Storrow, who was also chairman of the finance committee of General Motors. GM then was seeking someone to reorganize Buick. Chrysler got the job as works manager. Later he became general manager, and finally, president of Buick.

CHRYSLER subsequently was promoted to vice president in charge of production in all GM units, then to executive vice president of the corporation. In 1919, at age 45, Chrysler retired—some say as a result of a clash with William C. Durant—but such dynamism could not be restrained for long. A banking committee persuaded Chrysler to attempt rehabilitation of the ailing Willys Overland Co. He found that $46 million was owed to banks, that unnecessary and uneconomic production machinery lost, instead of earned, money, that a huge office staff was living the life of Riley, wartime prices for parts and bodies still ruled among Willys suppliers and that the company was on its last legs.

With customary directness, Chrysler's first act was to cut president John N. Willys' salary from $150,000 to $75,000. (Willys then said, "I guess we've put our problems in the right hands.") Wholesale firings enabled sale of office equipment that brought in $150,000. Production efficiency was vastly improved.

In the midst of this tremendous task, Chrysler was asked to accomplish a like rejuvenation of the Maxwell Motor Co., which was in the same kind of mess as Willys—$20 million in debt, 26,000 unsold cars and a completely disrupted dealer organization. Chrysler formed a reorganization committee in 1922 and by 1923 the "New Good Maxwell" was on a sound basis, with Chrysler himself as president.

WHILE AT WILLYS, Chrysler had planned to produce a new 6-cyl. car in the Elizabeth, N.J., plant acquired from the Duesenberg brothers. The original Six that Willys intended to produce was a "mechanical boggle" in Chrysler's eyes. Hence he induced three engineers, then consultants to Studebaker, to design for him a superior Six for production. Their names were Fred Zeder, Owen Skelton and Carl Breer.

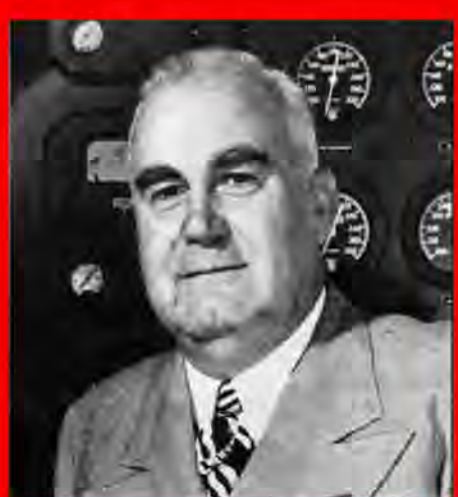
It had been intended to market this car as a "Chrysler" within the Willys organization, but when Willys was liquidated in late 1921 (to be reformed and revived by John N. Willys himself), the Elizabeth plant and the plans for the unborn Chrysler were put on the market. Chrysler wanted the car for Maxwell, but was outbid by his old chief, Durant, whose Durant Motors produced the car as the Flint. Before the sale of the Elizabeth plant to Durant, however, Zeder, Skelton and Breer had moved into the Maxwell firm with Chrysler and started work in the Chalmers plant on a new design tentatively known as the Zeder. Zeder had been working on the concept of an advanced, lightweight, medium-priced car capable of speed and performance hitherto found only in the high-priced range.

Although Chrysler lost his first car, he now was in a position to bring forth a second. The engineers had achieved his objectives. The name "Zeder" was supplanted by "Chrysler" and the new car was announced to the press.

The car was ready for the 1924 New York show, but it could not be displayed because no production models had been made and Automobile Chamber of Commerce rules stipulated that series models must have been built and sold. Chrysler's answer was to rent the lobby of the Hotel Commodore, a favorite with automotive men, and put his new model on display there. He stole the show, without his car entering the exhibition hall.

The Chrysler car was under way, and success was so great in its first year that the Chrysler Corporation was formed. The new company assumed all business and properties of the Maxwell Motor Corp., the Maxwell name was discontinued, and the Maxwell 25C was improved to become the Chrysler 58.

FRED M. ZEDER was the leader of the "Three Musketeers."



OWEN R. SKELTON was the firm's transmission specialist.

Such, in brief, are the circumstances and the man that brought about formation of the third largest automotive corporation in the world.

"Mr. Chrysler was a practical man of high ambition, imagination and broad capabilities; his genius was in the organization of automobile production," said GM president Alfred P. Sloan in his book, "My Years with General Motors."

Ray Dietrich, the famous body designer, wrote that Chrysler's attributes were "bounding enthusiasm, constructive criticism and suggestions, ethical business methods and personal integrity, and keen sense of humor . . . he was stimulating, could be shown, but not pressured, his standards were of the highest, and he respected all creative ability."

Chrysler respected creative ability because he was a creator himself. Long before he undertook organization of multi-million dollar deals and trades of entire corporations, he was a creator. As an apprentice he could not afford to buy tools, so he made his own machinist's wrenches, hammers, calipers, pliers, scribers and precision depth gauges. All are on display in their original case, marked W. P. Chrysler, in the Chrysler Building.

Chrysler's ability to delegate authority and encourage talent was dis-

CARL BREER was the designer of the controversial Airflow.

cussed by *Everybody's Magazine* in 1925. At vice presidential conferences, another man usually acted as chairman, the magazine said, while Chrysler "sat on the sidelines and let them do most of the deciding." There must have been many rival executives at Dearborn who envied this situation.

Factors such as these help to explain the astonishing success of the Chrysler Corp. The "late entrant" in the industry rose within a few years to rival Ford and General Motors. Chrysler's own personality explains the exceptional loyalty of his engineering staff, many of whom came to Chrysler because there was "something lacking" in the companies they had previously served.

First are the "Three Musketeers," as Chrysler himself called them. These were Zeder, Skelton and Breer, a brilliant triumvirate.

Fred Morrell Zeder was born in Bay City, Mich., March 19, 1886, and went to work at age 11. By the time he had finished high school, Zeder was employed summers as a machinist. He attended college, though it meant working long hours after classes. In 1909 he was graduated in mechanical engineering from the University of Michigan with a bachelor of science degree. In 1913 he became consulting engineer to Studebaker and in 1914, at age 28, became chief engineer, the youngest in the business. He remained at Studebaker until 1920, when he formed, with his Studebaker associates Skelton and Breer, the Zeder-Skelton-Breer Engineering Co., which operated through 1921-24, with Zeder as president.

Owen R. Skelton started his engineering career with Pope-Toledo in 1905 after graduation from Ohio State University. He became a transmission specialist with Packard, after which he joined Studebaker, "for the enormous wage of 58 cents an hour."

CARL BREER, born in Los Angeles, Nov. 8, 1883, designed and built his first car at age 17. The car was a steam-powered buggy characterized by "fastidious workmanship and highest grade finish."

The car was completed in the fall of 1900 and during the next two years Breer added improvements such as steam pumps, a direct acting water feed on one side of the engine and an automatic air pump on the other.

Breer was in no position to put the car into production and only one car was made. Eventually, it was put on display in the Chrysler showroom in the main Detroit office, where, 45 years after he had built it, Breer delighted in showing it to visitors.

In 1905, Breer entered Stanford University, from which he was graduated in 1909 with a bachelor of arts degree in mechanical engineering. Breer then joined Allis Chalmers.

Breer and Zeder met at Allis Chalmers in 1909 and Skelton became associated with them in 1916 when all were at Studebaker. The close-knit relationship, indicated by Chrysler's collective nickname, began with the Zeder-Skelton-Breer Engineering Co., founded in 1921. The three men worked as a harmonious unit for three decades. (*From here on they will be referred to as ZSB unless specifically noted.*)

When the Chrysler Corp. was formed in 1924, Zeder became vice president in charge of engineering. Later he was made vice chairman of the board of directors. Skelton and Breer also became engineering directors in the new firm. Breer from 1925 headed engineering research until his retirement in 1949, after which he was retained as a consultant.

THE CHRYSLER 70 that established the corporation's name earned a reputation. The car was like the team that created it, brilliant, forward looking, harmonious, smooth running, well balanced and, above all, a unified whole.

"When the Chrysler car was first put on the market in 1924 it embodied many advanced features of automobile engineering," said *The Motor* of England for Nov. 14, 1951. "These included light alloy pistons, hydraulic brakes, high compression engine and an all-around performance substantially greater than other American cars of comparable size and price."

The powerplant was a high-efficiency side valve unit, with block and crankcase in one iron casting for maximum rigidity. The engine carried a fully machined and counterbalanced 7-bearing crankshaft with vibration damper. It was designed for high speeds and high compression. With the 50–55 octane fuel then available, 4:1 was the ruling compression ratio in the industry. ZSB noted the work of Ricardo in England among others, carried out additional research and designed a scientific, "modified Ricardo" head which used a 4.7:1 ratio and was perfectly smooth and trouble-free in everyday use. This engine produced 68 bhp from 201 cu. in. (3.2 liters) which was 0.34 bhp/cu. in. or 20 bhp/liter, compared with an industry practice 25% lower. Later, this high specific output was reduced 10% to deliver better torque. The Chrysler 72 of 1928 developed 75 bhp at 3200 rpm from 249 cu. in.

Only three Sixes in the Chrysler 70 class in 1924 had seven main bearings. One, the Franklin, had separate air-cooled cylinders that provided no rigidity whatever. Another, the Westcott, went out of production in 1925. The third was the Flint, another product of ZSB. Even such high-priced cars as Mercer, HCS, Stutz and Templar used as few as three mains in their Sixes. Splash-fed bearings were normal design practice for the medium price range. The best of Chrysler's competitors probably was the Buick, a well-designed car with a good reputation.

Chryslers were not the first cars to be marketed with hydraulic brakes. ▶

CHRYSLER

Duesenberg put them in production on the 1921 Model A, after first proving them in the French Grand Prix.

However, the hydraulic system used by Duesenberg was not suitable for large quantity production. Thus 32,000 Chryslers were built in the first year as compared with approximately 650 Duesenbergs in five years. Chrysler used a simplified layout with horizontal wheel cylinders, external contracting brake bands and flexible, wire-wound, non-expanding hose connections. Duesenberg, on the other hand, employed an elaborate wheel mechanism with vertical cylinder and toggle-operated internal shoes. Duesenberg's drilled kingpins and steering knuckles were unsuitable because of leakage.

In 1928, the best points of both layouts were combined in the Lockheed internal system, which included a compensating master cylinder to eliminate the separate hand pump previously used. A new hydraulic brake fluid replaced the earlier mixtures of alcohol and glycerine.

Chrysler sales in 1925 were three times those of 1924 and, in 1926, sales doubled once again. By 1926 Chrysler had risen from 27th to fifth place in the entire industry. In 1927 Chrysler was fourth.

in markets familiar to Chrysler and Maxwell. The Imperial was something else. It aimed at nothing less than the lofty position that Cadillac, Lincoln, Packard and Pierce-Arrow had carefully built up. The Imperial had to be good to succeed. It was and it did. The car was a tribute to ZSB in that it was simply a scaled up version of their prizewinner of 1924.

Three new names were added to the Chrysler line in 1928—Plymouth, De Soto and Dodge—which helped Chrysler Corp. to rise to third place in the industry in 1929. The success of the firm in five years was phenomenal. Ford, after a number of failures which included the luxury market, attained success by putting everything into one car for 15 years. When Ford re-entered the high-priced market, it was by purchasing an established firm and model. General Motors, founded in 1908, went through two serious financial crises and reorganizations and, in Durant's time, picked up and discarded lemon after lemon. GM always offered two excellent cars in Buick and Cadillac, but it was almost 20 years before GM established itself on a sound basis —four times as long as Chrysler took.

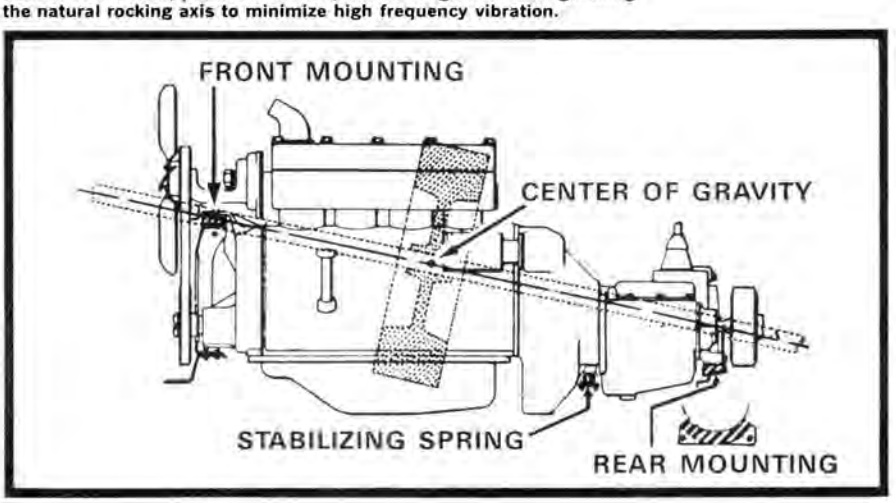
Of course, Chrysler's late entry enabled the corporation to profit by

novations during this period. Ethyl fuel, developed by C. F. Kettering and Thomas Midgley of GM, had been placed on the market a few months after the first Chrysler car. Other manufacturers since had equaled Chrysler combustion efficiency, but in 1928, these again were left behind by the new "Red Head" engine in the Imperial 80, with a compression ratio of 5.8:1 and a power output of 112 bhp from 309 cu. in., a net 0.36 bhp/cu. in.

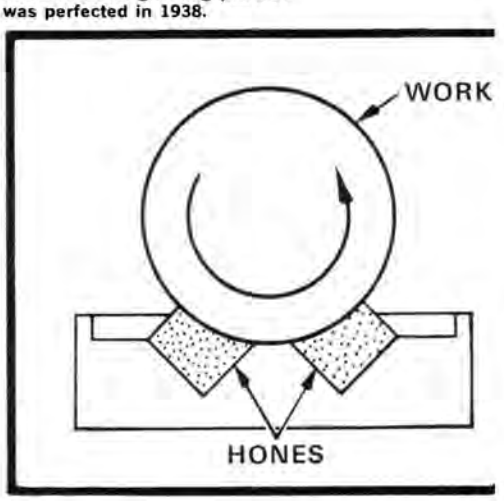
In August, 1929, the 70 and 77 models were announced—and were fitted with Stromberg downdraft carburetors, the most important carburetion development of the decade. Because the fuel mixture was assisted by gravity, instead of having to be lifted against it, manifolds could be designed larger for greater efficiency.

"Floating Power," patented in 1928, was used on all Chrysler products for the next three years. The principle was that an internal combustion engine has a natural rocking axis about which it tends to revolve when running. With conventional engine mounts placed at frame level, the mass lay well above its supports, which required rigid mounting. Rubber mountings had been used as far back as 1920, but in the conventional manner at frame level, thus allowing little flexibility. With Floating Power, the engine was suspended at two main points, at the front, above the timing chest and at the rear, below the transmission. A line drawn between the two mounts gave the natural rocking axis. The

FLOATING POWER, patented in 1928, located engine mountings along the natural rocking axis to minimize high frequency vibration.



SUPERFINISH grinding process was perfected in 1938.



IN 1926 FOUR new models appeared, the 4-cyl. series 50; a 6-cyl. series 60; the new series 70, an improved version of the original "A" 70 of 1924; and the big new Imperial 80. The 50 and 60 models were scaled down and improved versions of cars Chrysler previously had produced and competed

the mistakes of others. The Maxwell business was a start and purchase of the going Dodge concern was good business. But the fact that Chrysler made no mistakes, and ZSB made no dud cars, during this entire period is remarkable by any standards.

ZSB produced some additional in-

rocking tendency thus became a slow frequency rather than a high frequency, inaudible and almost imperceptible to anyone in the car.

SKELTON AND HIS transmission specialists also were hard at work during this period. In August, 1929,

the fruits of their labors arrived in the Multi Range transmission, contemporary with, and similar in principle to the 4-speed transmissions of Graham Paige ("Twin Top") and Stutz. All employed "internal/external" gearsets. These provided four forward speeds, with a silent, handy third gear and easy shifting—at a time when four speeds usually required expert skill and were anything but quiet. Compared with the contemporary Cadillac synchromesh, however, these 4-speed gears proved a dead end design and their complexity resulted in rather fragile first and second gears.

Dodge pioneered all-steel bodies, built under Budd patents, back in 1916. During 1930-32 the entire line of cars built by Chrysler Corp. adopted all steel body construction. Thus the firm can claim to be the innovator of all-steel bodies, both in point of time (Dodge Division), and from the standpoint of popularizing this advancement at all price levels.

In 1930, Chrysler created the Amplex Division to make and sell Oilite self-lubricating bearings. Chrysler Research, under Breer, had evolved "powder metallurgy," resulting in the low cost production of semi-porous metal for "no maintenance" bearings in water pumps, spring shackles and the like, as well as being suitable for such applications as fuel filters.

Finely powdered tin, copper and graphite in various proportions were high pressured, formed in molds to correct shape, heat treated, sized and impregnated in an oil bath in which the bearing material absorbed up to 30% of its own volume in oil. Under pressure or heat this oil was exuded, then was absorbed again when the load was released. This property could be varied to suit many applications. The metal since has had widespread use.

For some years, beginning in 1927, Breer had been involved in another great research project, which came to fruition in 1934 in the famous Chrysler Airflow car—long since the favorite target of superficial critics, who are, however, very careful to confine themselves to its appearance and avoid discussion of its engineering. It is doubtful whether there has ever before or since, been a car so advanced in so many respects and yet so practical for everyday use. It had four major features that put it in a class of its own. These were the 56/44 weight distribution, with inter-axle seating, the streamlined body, integral construction and overdrive.

The weight distribution greatly improved ride and stability, and was the result of careful scientific and mathematical research by Breer and his associates (*CL*, July '64).

The car's aerodynamics were developed in conjunction with Dr. Alexander Klemin of the Guggenheim Foundation for Aeronautics. Wind tunnel tests showed a substantial reduction in drag with the new designs, as compared to 1933 models (*CL*, Sept. '64).

In addition to the Airflow, 1934 brought another engineering revolution at Chrysler, but this time shared with another American concern.

Independent front suspension was used on the earliest cars, in Europe on the Bollee in the 1890s, in the U.S. on the Christie front-drives built from 1903 onward.

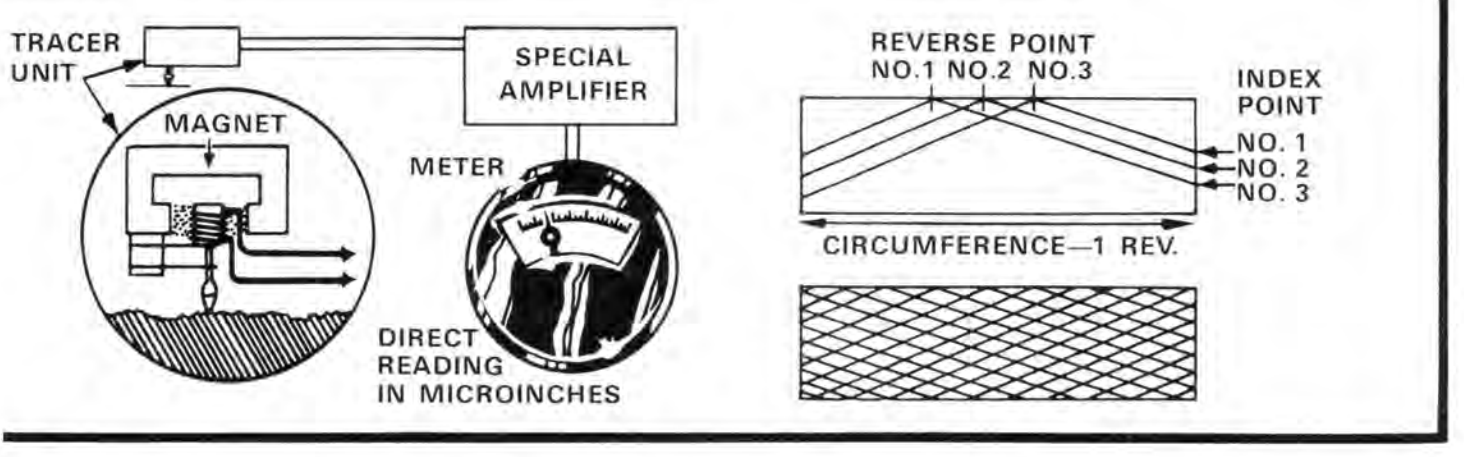
At Chrysler (and GM) the need for a softer ride was apparent. It was discovered that for the best results the softest springs should be in front. At the same time—it was determined that a straight front axle was hard to control with such springs. Research at Chrysler and GM showed that wishbone/coil arrangements were best and after experiments in 1932-33 both firms adopted s.l.a. coil suspension for 1934.

Chrysler and GM, however, using their own designs, were in full-scale production at all price levels from December, 1933, with a type of front suspension that marked a great advance over anything previously marketed and which later became by far the most widely used.

AFTER MORE THAN 10 years of presiding over the corporation, using his combined talents of organizer, merchandiser, financier and manufacturing expert, Walter P. Chrysler relinquished the post of president on July 22, 1935. He continued as chairman of the board, however, until his death five years later. In 1937, his autobiography, written in collaboration with Boyden Sparkes, was published. It carried the simple, but expressive title, "The Life of an American Workman." The death of Mrs. Chrysler, in 1938, affected Chrysler deeply, his health faded to the point where *Time* noted he just sat ailing at his home on the shore of Long Island's Little Neck Bay, seen no more around the docks where he had loved to tinker at his motorboat engines with his derby awry and his white shirt rumpling up under his suspenders. His quick laugh was heard no more in any of the 24 Chrysler plants. The great, dynamic "Walter P." was burnt out. He died on August 18, 1940.

Succeeding Chrysler as president in 1935 was Kauffman Thuma Keller, who had joined the organization in 1926, and who had known Walter P. Chrysler since 1916 at Buick. "K.T." came from Mount Joy, Pa., where he was graduated from high school in 1901, subsequently putting himself through business school with money earned at a variety of jobs. He gained ▶

TRACER UNIT transmits reading of metal surface irregularities to amplifier which produces readout on millionths of an inch scale. Diagram, right, shows the pattern described by hones on crankshaft journal during Superfinish grinding.



CHRYSLER

varied experience in the Metal Products Co., Hudson Motor Co., Northway Motor Co. and Cole Motor Co. of Indianapolis, Ind. before he was taken on at Buick by Walter P. Chrysler. Keller directed Buick's war-time production of the Liberty aero engine. Shortly after Chrysler left General Motors, Keller was placed in charge of all manufacturing activities at Chevrolet and was executive vice president and general manager of General Motors of Canada Ltd.

SUBSEQUENTLY, CHRYSLER hired Keller as Chrysler Corp. general manager and after directing the conversion of Dodge Brothers into Dodge Division of Chrysler in 1928, K.T. became president of Dodge within a year. Chrysler described him as "a great production man," a title borne out by his achievements at both Chrysler and Dodge.

Commenting on his elevation to company president, however, *Time* for Oct. 16, 1939, pointed out that, "Keller had shown more than production genius and executive ability. Competent, profane, full of studious curiosity, he had handled the complex problems of the Dodge plant—sales, labor, the thousands of trivia that pour over the desk of a big corporation executive—in his unruffled stride."

Keller's chief assistant in the 1930s was Herman L. Weckler, who later became vice president and general manager of the organization. His career at many points paralleled that of Walter P. and K.T. He was born in Pittsburgh, Aug. 31, 1888. He started work as a draughtsman at the Jones and Laughlin Steel Co. for $15 a month and while there attended night classes in engineering at Carnegie Tech for five years.

After becoming assistant superintendent at Jones and Laughlin, he joined American Locomotive as shop engineer in 1908, and here he met and became friends with Walter P. In 1911, Weckler went to South America as a surveyor of gold mine and water power sites for a Pittsburgh syndicate. ("An exciting experience, although no gold," he said.) Returning to the U.S. he joined Buick at the time Walter P. and K.T. were there. After a term as mechanical superintendent, he became general manager. He shared with Keller and Chrysler the responsibility for the vast increase in production that took place at Buick (from 20 to 550 cars per day). Weckler, however, remained at Buick for some years after Keller, then resigned in 1932 to join Chrysler as chief assistant to Keller. In 1936 he laid out and built the new plant for DeSoto and, in 1937, became vice president and general manager of DeSoto. Later he was made chief of industrial relations at Chrysler. Next he became vice president and general manager of the Chrysler Corp. and, in 1940, was elected to the board of directors.

In 1936, the work of Keller and Weckler reached a climax as Chrysler Corp. production exceeded one million units.

For decades, the industry had worked to the high level of precision first set by Henry M. Leland at the turn of the century (*CL*, Aug. '65). Now, for the first time, a generation later, these standards were to be substantially surpassed by Chrysler engineers.

In 1937, the company received numerous complaints of bearing failure in the rear axles of its cars. Mechanical, chemical and physical conditions were investigated without a clue appearing as to the root of the trouble. It was then discovered that all the cars involved had been delivered by rail over distances of hundreds or more miles. The regular impact of the rail joints, at dozens per mile, had "brinelled" the rollers into their races, and with the bearings stationary, had induced surface conditions that led to the failure later in service.

Microscopic investigations of the bearing surfaces indicated need for additional research. The "Profilometer" was developed to make super-accurate measurements of the profile of bearing surface. This instrument detected variations beyond the scope of the most accurate micrometer and revealed that far from being smooth, as had always been believed, a ground shaft was full of hills and valleys presenting a profile similar to that produced by a seismograph in an earthquake. Similar conditions were noted in all machined and ground surfaces on all parts.

CHRYSLER ENGINEERS did not let the matter rest. Methods of manufacture were devised and, in 1938, the company announced its "Superfinish" method of finishing metal surfaces with scratches no more than one millionth of an inch deep. This process was as great as an advance in grinding methods, as the latter had been over ordinary turning. Longer bearing life, lower friction, closer tolerances and fits, and reduction or elimination of lengthy "running in" were the rewards of this Chrysler development.

The guiding spirit behind Superfinishing was David A. Wallace, vice president in charge of manufacturing, Chrysler Division, at the start of the Superfinish program, and later, president of the Chrysler Division. Wallace was born on a farm near Castleton, Kan., on March 1, 1888. At age 20, he was a machinist and tool designer at Buick and later handled sales and service assignments in Texas for the company. After World War I, Wallace joined John Deere Plow Co. in Waterloo, Ia. During the next decade, he advanced from master mechanic to superintendent and works manager.

In 1929, Wallace joined Chrysler Corp. as master mechanic under K.T. Keller, and in 1930, became vice president in charge of manufacturing. He became president of Chrysler Division in June, 1937. In 1938, following the lead of Chrysler, some 100 firms in the U.S. adopted Superfinish, though

K. T. KELLER succeeded Walter P. Chrysler as president.

in Europe it was little known until after World War II.

In 1939, Chrysler installed fluid couplings in some models and, two years later, the Vacamatic semi-automatic transmission was added. The fluid coupling was used under license from Vulcan-Sinclair in Europe.

As with independent front suspension, Chrysler and General Motors transmission improvements proceeded concurrently. Both corporations evolved excellent designs that set standards for the remainder of the industry. Oddly, Chrysler used a foreign design for its fluid coupling, though the

first such device for automobiles was built in the U.S. by the Radcliffe Turbine Drive Co. and exhibited in 1919-20 on a Studebaker chassis. The Radcliffe coupling, however, as far as is known, was not used on any production car.

WORLD WAR II saw Chrysler setting production records in tanks rather than automobiles. Many of these tanks were powered by an engine derived from the standard Chrysler Six. Five of these banks were mounted on a single crankcase to produce a 30-cyl. powerplant. Total production for the war was 22,000 medium and heavy tanks in 13 models.

In 1942, Chrysler built, equipped and operated a plant for production of the Wright Cyclone 18 engine used in B-29s and turned out over 18,000 engines, reaching a peak of over 1700 units in June 1945.

Many other wartime activities engaged Chrysler engineers and production men, including a vital part of the atomic bomb project.

Postwar, the corporation upgraded, enlarged and built new facilities. Between 1947 and 1950 eleven plants were erected, announced for construction or purchased.

He was elected to the board of directors in 1937 and a contemporary interview by veteran industry reporter, David J. Wilkie, said this of him:

"Breer, of average build and an attractive personality, possesses what his friends describe as 'an independent outlook' and idealism whose practical function is to translate the experience of the past into the commercial realm of the future; to find in the laboratory the answer to the problems of today, tomorrow and the day after tomorrow."

Chrysler installed Ausco-Lambert disc brakes on the 1950 Crown Imperial. These were probably the most elaborately engineered disc brakes ever applied to a production car. With the spot-type disc of Crosley (Hawley-Goodyear), the Chrysler-Lambert disc marked the beginning of the postwar or modern era of disc brakes well ahead of European application of the principle to the four wheels of passenger cars. While Chrysler discs showed a 30% advantage in lining and swept area over drum brakes of similar diameter, required less pedal pressure due to an ingenious self-servo design, and showed an appreciable improvement in fade-free qualities, they were very expensive to manufacture and there was no public demand for brake improvement at the time. Consequently it languished for 2-3 years while, paradoxically, disc development began to boom in Europe.

When Fred M. Zeder died at age 64, on Feb. 25, 1951, obituaries described his death as a major loss to the industry. An editorial in the *Detroit Times* said, in part: "Fred Zeder's name deserves high and lasting place in the annals of American industrial science.

"Henry Ford once said, 'He'll always be one of the best because he loves his work more than the money it gets him. Most engineers want to be financial men when they start getting rich. Fred just wants to keep on learning.'"

So passed the chief of Chrysler's "Three Musketeers."

In January, 1951, came the announcement of the new 180-bhp Firepower V-8, which in addition to the already established disc brakes, had a hemispherical combustion chamber, short stroke engine, a new automatic transmission, power steering and a new type of shock absorber.

A writer noted that the new V-8 showed an increase of 33% in maximum horsepower, 15.5% in torque, 30% in specific output as compared with the previous Chrysler straight-Eight, yet "these very substantial improvements have gone hand in hand with a substantial reduction of weight and bulk."

Viewed retrospectively, the 1951 Chrysler was as important as the 1924 models and the Airflow. Its engine is credited by some as really setting off the "horsepower race," although Cadillac pioneered the modern high efficiency V-8. Power steering since has become normal on all large cars.

In charge of these developments was the man who might well be called the "Fourth Musketeer," James C. Zeder.

James Churchill Zeder was born April 17, 1900 in Bay City, Mich., a younger brother of Fred M. Zeder. Shortly after he was graduated from Bay City High School in June 1918, he enrolled in the engineering school at the University of Michigan and subsequently graduated with a bachelor of science degree in mechanical engineering in June '22. Joining the organization that soon was to become Chrysler Corp. in April 1924, he became chief engineer of Plymouth and De Soto when they were formed in 1928 and was assigned by ZSB to manage the corporation's engineering laboratories in 1933. In 1931 he had been one of the founders of the Chrysler Institute of Engineering, and in 1947 he became president of this institute, which is a chartered university with the power to grant degrees.

HE BECAME first chairman of the Chrysler Engineering Board, from 1946 to 1950, and then served as director of Engineering and Research from 1950 to 1956. He was a vice president and a director of Chrysler Corp from 1951.

A life member of SAE, he served as its national president in 1950. A member of numerous technical committees, councils, associations and foundations, he received various awards in recognition of his engineering achievements, and additionally was active in various Michigan civic affairs.

These, then, were the men of Chrysler's first quarter century. In engines and transmissions, in bodywork and weight distribution, in braking, steering and suspension, in manufacture and production, they made engineering history. ■

H. L. WECKLER became Keller's chief assistant in the 1930s.

JAMES C. ZEDER was first chairman of the Chrysler Engineering Board.