

FOR THE JOY OF RIDING

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For the Joy of Riding

Something New for the 50th Anniversary

When BMW introduced its first motorcycle at the Paris Auto Show in October, 1923, it created a sensation. Never had the motoring public seen a motorcycle with workmanship of such extraordinarily high quality, a "boxer" twin engine, and shaft drive to the rear wheel. This Fall, exactly fifty years later, BMW returned to the Paris Auto Show to create another sensation. The workmanship, the boxer twin and the shaft drive are still there. But now the strikingly new slash-6 BMW line, headed by the remarkable R 90 S, adds the refinements of fifty years of painstaking technical evolution.

For BMW and BMW enthusiasts it is an occasion for celebration. The new machines reflect their tradition, yet they contain a very skillful engineering blend of the very latest and soundest motorcycle technology. The highlights of these new models are outlined in this issue and you will be seeing them soon and reading about them in the magazines.

Besides new models and its 50th anniversary, BMW has more to celebrate. This year marks the 25th year or Silver Anniversary of Butler & Smith as the U.S. distributor of BMW motorcycles. It also marks the year in which BMW assembled its 500,000th motorcycle. In an age of mass-manufacturing, that number alone is unimpressive. But to the designers and workmen who for 50 years have been building machines to BMW—not "mass"—standards, it represents a considerable achievement.

Naturally there has been a predictable amount of pomp and circumstance surrounding the anniversary, but the spirit of Bavaria still prevails

at the Bavarian Motor Works. A surprising number of BMW's top men in both the automaking and motorcycle divisions are motorcyclists themselves. Before the factory took the press corps on a romp through the Alps recently, each machine had been thoroughly flogged by Messrs. Spintler, von der Marwitz and Lutz—BMW's worldwide sales manager, chief of motorcycle engineering, and executive vice president, respectively!

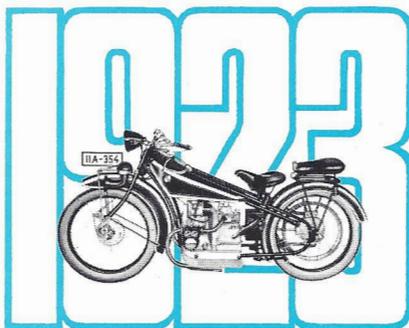
With all that brass on bikes, you can imagine the pressure on BMW's designers to deliver a top-quality product. It won't look good for the chief engineer if his boss gets smoked off on the Autobahn on his way home from work. And these guys aren't just commuters—as the press corps found out on those treacherous Alpine hill climbs. They like to get it on in the worst way. A good mid-morning dice enhances the hearty Bavarian appetite.

A hard rider in Germany can't get away with just speed or just handling because the Autobahns have no speed limit and the back-country roads are as serpentine as any you'll see. As one BMW exec conceded to a journalist, "If the chassis isn't up to the engine, then the power has no value to the rider." The stunning throttle response, cornering ability and stoppability of the new R 90 S make it an incredibly agile road machine and that, in Germany as well as here, is where it's at.

Another journalist expressed doubt that BMW would be able to preserve its well-known "tickover" at idle if it went to a high-performance sport version. But the biggest version idles as smoothly and quietly as the rest of the line and entirely lacks the characteristic harshness of most "cammy" big twins.

A few eyebrows went up when the price schedule of the new models was announced, but after an extended ride one of the most critical riders admitted that BMW's "are built up to a concept, now down to a price." Another added that the new machines "are worth every penny."

Fifty years ago the Bavarian Motor Works was best known as a builder of high-performance aircraft engines. But the company at the worst of the postwar crunch had few orders and its chief asset was probably a brilliant young engineer by the name of Max Friz (pronounced "Fritz"). Friz, as you'll see in the story on page 7, set about designing a most remarkable motorcycle. A pilot, a perfectionist, and a bit of an adventurer, he would have loved having a go at his beloved Bavarian hills on the BMW of today.



John P. Conway

*Front Cover: solarized
print highlights metal
surfaces on new R 90 S.*

*Back Cover: But it's
meant to go—and
it really does GO!*

Introducing the R 90 S and the New Slash-6 Series

Although there is some similarity in appearance between the slash-5 and slash-6 motorcycles, the new models have been extensively redesigned—so much so that the new series can truly be considered brand new motorcycles. The top of the line speaks for itself, the 900 cc R 90 S with 75 SAE hp; a sleek, cafe-racer fairing as standard equipment; and a fully-instrumented, space-age dashboard that includes, speedo, tach, tripmeter, voltmeter, clock and numerous indicator lights. Each R 90 S comes with a custom paint job in smoked-silver, a racing-style seat, and twin-disc hydraulically-actuated front brakes.

Next come the R 90/6 with 67 SAE hp, the R 75/6 with 57 SAE hp and the R 60/6 with 46 SAE hp. There is no 500cc model in the slash-6 series. New features common to all models are a five-speed gearbox; separate speedometer and tachometer; a hydraulic steering damper; much-strengthened crankcase castings and frame; larger 280-watt 12-volt alternator; redesigned, quick-service color-coded wiring system; 25 amp-hour battery; and a brilliant 60/55-watt quartz iodine headlight.

As with the previous series, the slash-6's share a common frame, front forks and crankcase castings. The piston stroke of each model is the same at 70.6 mm and differences in displacement are determined by variations in bore. All models share a common rear brake: a single-leading shoe stopper of 200-mm diameter and 30-mm width. The cast-iron drum is pressed into a light-alloy hub which has been specially designed for straight spokes that give added strength and require fewer adjustments.

There are several differences between models beyond engine displacement and power output. Most conspicuous are the brakes, fairing, tank and seat of the R 90 S. The fuel tank holds 6.4 gallons as opposed to the 4.8-gallon tank on other models (5.8-gallon tank optional). The R 90/6 and R 75/6 are equipped with single-disc front brakes and the R 60/6 with a twin-leading-shoe (200mm x 30mm) drum brake. The two 900's and the 750 have alloy cylinder finning bonded to the cast-iron cylinder liner by the "Alfin" process for maximum heat dispersion. Both 900's are fitted with H-type high-speed tires rated for 120-plus mph. The others have S-type tires rated to 120 mph. While the R 90/6 and R 75/6 use the same 32-mm Bing vacuum-type carburetor, the R 60/6 has a 26-mm slide-type and the R 90 S a special 38-mm dell'Orto slide-type carburetor.

Choosing a motorcycle is for some riders as personal a matter as choosing a wife. Since BMW's product managers can't pretend to know the idiosyncrasies of every rider, all they could hope for was to provide some interesting alternatives. The R 90 S and each of the slash-6 machines are eminently streetable motorcycles with outstanding performance, braking and handling. They are fast, quiet, smooth-running and very advanced technically. Though they are similar, each has a personality of its own. So, like a suitor who must choose between four beautiful sisters, a prospective owner must do some soul-searching. Among the new BMW's—whatever your riding style and life-style—one is almost certain to be right for you.



Letting the Engineers Have Their Day

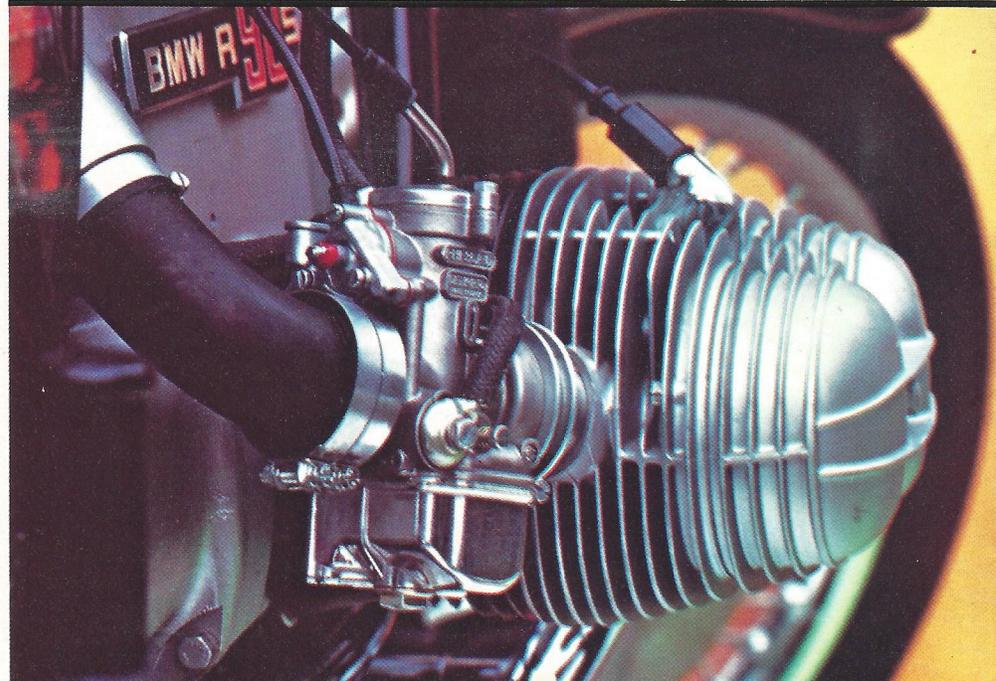
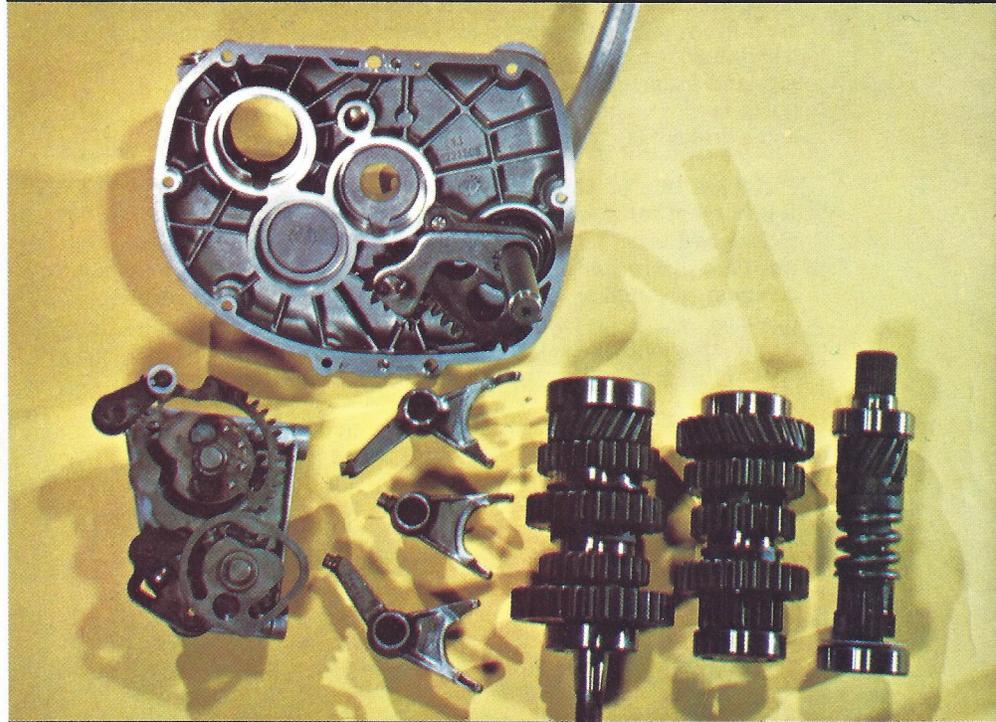
Although the new models show some modifications in appearance and styling, the major changes are improvements to performance, reliability and roadability. Increasing power output alone, for example, requires strengthening the frame, forks, brakes and internal drive-train components. The goal of the engineer is to integrate the entire mechanical package so that all parts complement and supplement one another. In the paragraphs that follow, we will illustrate how thoroughly and painstakingly BMW's engineers worked to fulfill this goal.

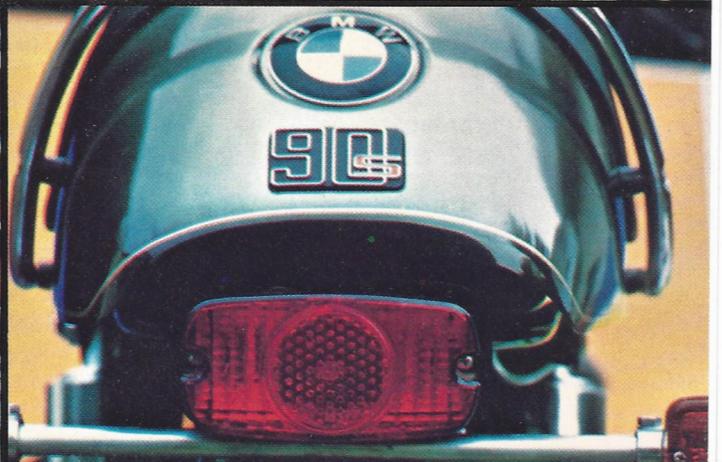
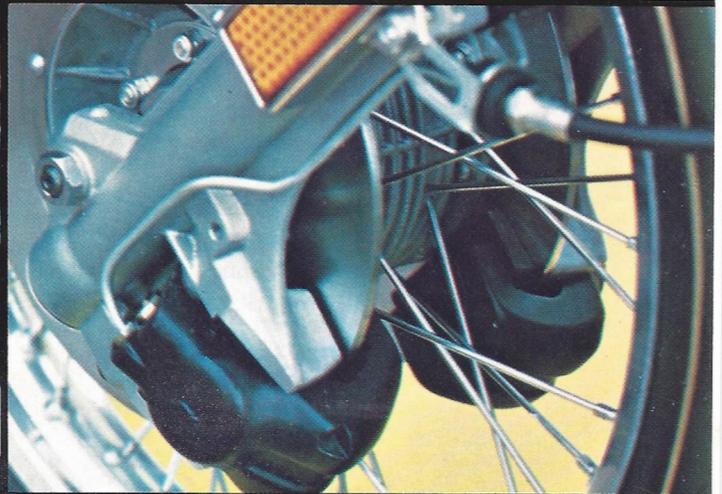
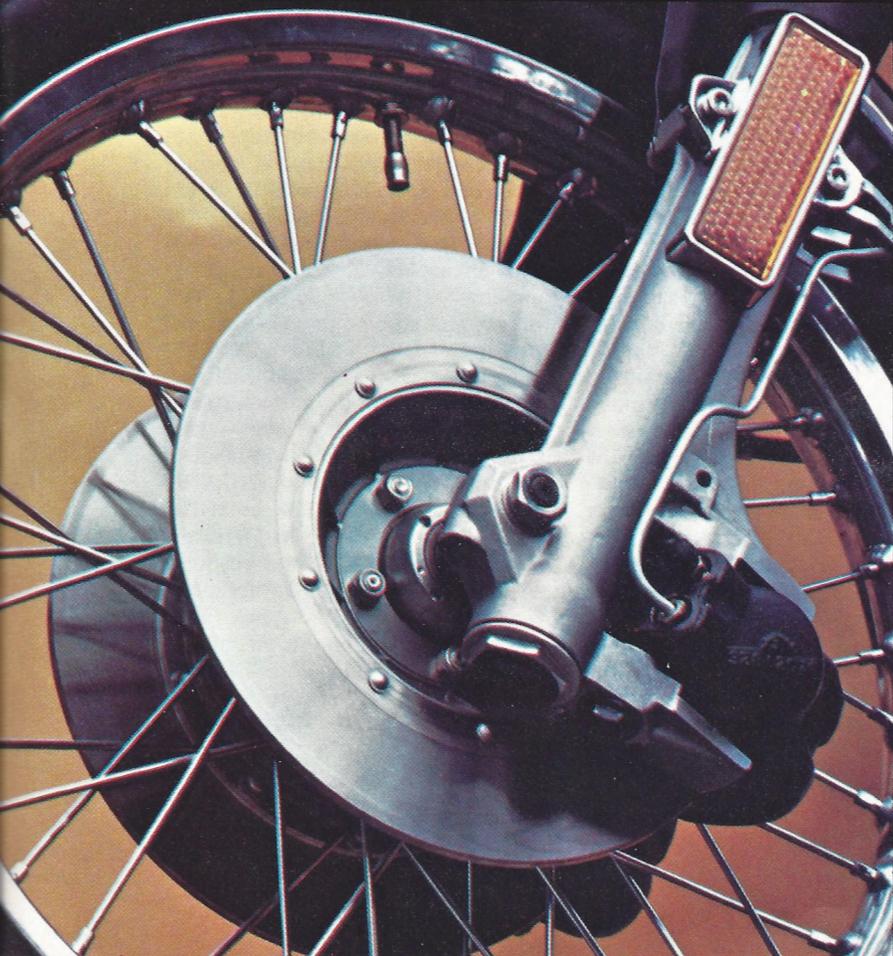
Let's begin with the engine, which is now offered in the larger, 900-cc size. To accommodate the extra power, the crankcase castings were reinforced. Although not evident from the outside, a look inside the cases shows more material at key stress points, particularly around the front and rear main bearings. The crankcase opening has been reduced.

To pass through the new opening during installation or removal, the crankshaft had to be reduced in overall diameter. The crank webs now measure 130 mm in diameter. Smaller size meant less balancing material, so the crankshaft is now balanced by attaching heavy metal inserts.

Most engine changes, such as the new castings, apply to all models to simplify parts interchangeability. An exception are the connecting rods, which are made of a special high-tensile forged steel for the 900-cc models. The 900's also get special four-layer main and rod bearings in place of the three-layer material used for the R 60/6 and R 75/6. Like the 750, the 900's use "Alfin" bonding between the cylinder lining and aluminum cooling fins. On the R 90 S these fins are black anodized for greater cooling efficiency.

Although the 750 and the 900's use the same, 308-degree camshaft, the 900's have two-mm-larger exhaust valves, increased to 40 mm. The cylinderheads on the two 900 models are similar, though the S-model has special polishing and porting. Compression on the S-model is set at 9.5:1 and on the R 90/6 at 9:1. Besides compression and porting, the main source of power differential between the 900's is the slide-type dell'Orto carburetor with accelerator pump on the "S". The 900's also have a unique rocker-arm assembly which pivots on needle *(continued overleaf)*





bearings and which has more width, eliminating the spacers and bushings common to the 600 and 750.

Because all of the new BMW's feature more powerful alternators (up to 280 watts from 180 watts), the alternator and timing-chain covers were redesigned. Higher wattage requires more cooling to the electrical components, hence improved venting and finning. Coupled with the new 25 amp-hour battery (up from 15 amp-hrs), this new system has ample reserve for cold-weather starting and for feeding popular accessories.

Another electrical system improvement is the new color-coded wiring system that includes a space-age printed-circuit board. This board, similarly coded for the wires that connect to it, serves as a central junction box in the headlight. The headlamp shell also houses a new key-type ignition switch to replace BMW's old "horseshoe nail". The headlamp itself, a 60-watt/55-watt quartz-iodine unit, throws an astonishingly bright asymmetric beam down the road for high-speed night riding. The illumination offered is actually 70% higher than BMW's older (and already good) 45/40-watt headlamp.

To produce an extra margin of safety for the higher output from BMW's new 900-cc engines, BMW's engineers strengthened the clutch. Most of the new heavy-duty clutch components have been carried over to all models. The throwout bearing, which was formerly a ball bearing, is now a needle bearing. The all-new five-speed gearbox standard on the new models was designed not only to give riders a broadened choice of ratios but also to deliver exceptional reliability through sturdiness and simplicity of design. The famous BMW gearshift "clunk" has been practically eliminated and the gearbox features a new shift lever and kick starter.

Even BMW's virtually fault-free rear-drive unit received some redesign. The 50-mm increase in drive-shaft length introduced several months ago has been continued and a new-type DTNP bearing has been used for the ring gear. Because of their varying power and torque curves, each new model has a different rear-drive ratio, as follows: R 60/6 3.36, R 75/6 3.20, R 90/6 3.09, and R 90 S 3.00.

The generous suspension travel of about 8-inches at the front and 4½-inches as the rear has been retained for the new machines so that their performance advantages can be realized on even the roughest roads. The front forks have been modified externally to accept the new disc brakes. Internally, the seals and fittings have been modified to make the forks even more sensitive and more controllable on uneven roads.

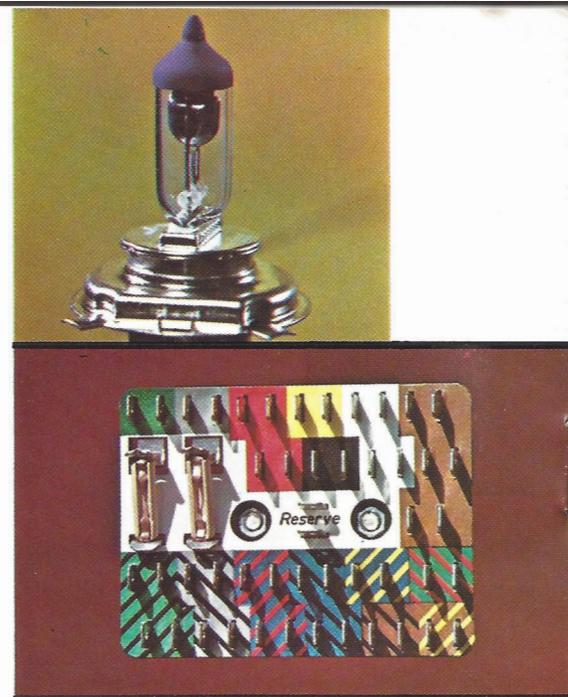
The hydraulic steering damper now standard on all models features a three-way adjustment such that it, too, can accommodate a variety of riding styles and road surfaces.

Another element vital to good handling are the brakes, and BMW's new stainless-steel-disc units are designed with more than just stopping in mind. The calipers are mounted at the rear of the fork legs, close to the steering axis to minimize angular momentum in turning. The calipers are mounted low to complement the machines' already low center of gravity. They can be aligned precisely with an eccentric adjuster and they are black-anodized for better heat dispersion and resistance to corrosion.

For the same reason, the discs are stainless steel. The R 90 S has a twin-disc unit and the R 90/6 and R 75/6 have single-disc units. The discs are of relatively small (10¼-in.) diameter to minimize the unsprung weight of the wheel.

In a unique departure from more common motorcycle practice, BMW's designers mounted the hydraulic master cylinder not on the handlebar but on the frame under the gas tank. This arrangement with its cable link from the hand lever is more expensive to manufacture, but the brake cylinder is well protected from minor accidents. Its weight is kept at the centerline of the vehicle and does not contribute to the angular moment of the fork assembly. A plastic float mounted in the cover of the brake fluid reservoir contains an electric sensor which triggers a dashboard warning light if the fluid level ever gets too low.

The new BMW's all carry the well-proven, mechanically actuated drum brake at the rear and the R 60/6 has a twin-leading shoe drum brake at the front. The chrome covers have been eliminated from these hub units for better cooling and to provide for easy inspection of



brake-shoe wear (the latter required by U.S. regulation).

The running gear, too, has received major and minor improvements. The sidestand has been strengthened and the center stand has increased contact area for improved parking stability. Dual mirrors, a safety-helmet lock and adjustable passenger footrests are now standard on all machines. The size of the waterproof tool box has been increased and the R 90 S has an additional under-seat compartment.

BMW's mufflers have been redesigned externally and internally for increased lifetime expectancy. Changes in the baffling now permit the condensation to run forward to the hot exhaust pipe to be vaporized. The new mufflers have a deeper, throatier sound, yet still retain BMW's impeccable manners.

The vast majority of these improvements have been aimed at making the BMW ride better, look better, and stop better. Straight-line performance is thus an incomplete index. We can list the approximate quarter-mile times and trap speeds for the new models: R 60/6—15.9 sec at 86 mph; R 75/6—15.1 sec at 91 mph; R 90/6—14.0 sec at 97 mph; and R 90 S—13.4 sec at 102 mph. But the BMW is not just a street sprinter; it is a total machine. With its 5-speed box and other modifications the new series has much more snap, much more throttle response—but also better handling and roadability. The real proof lies in a ride for yourself.

Inspiring the First BMW Enthusiast

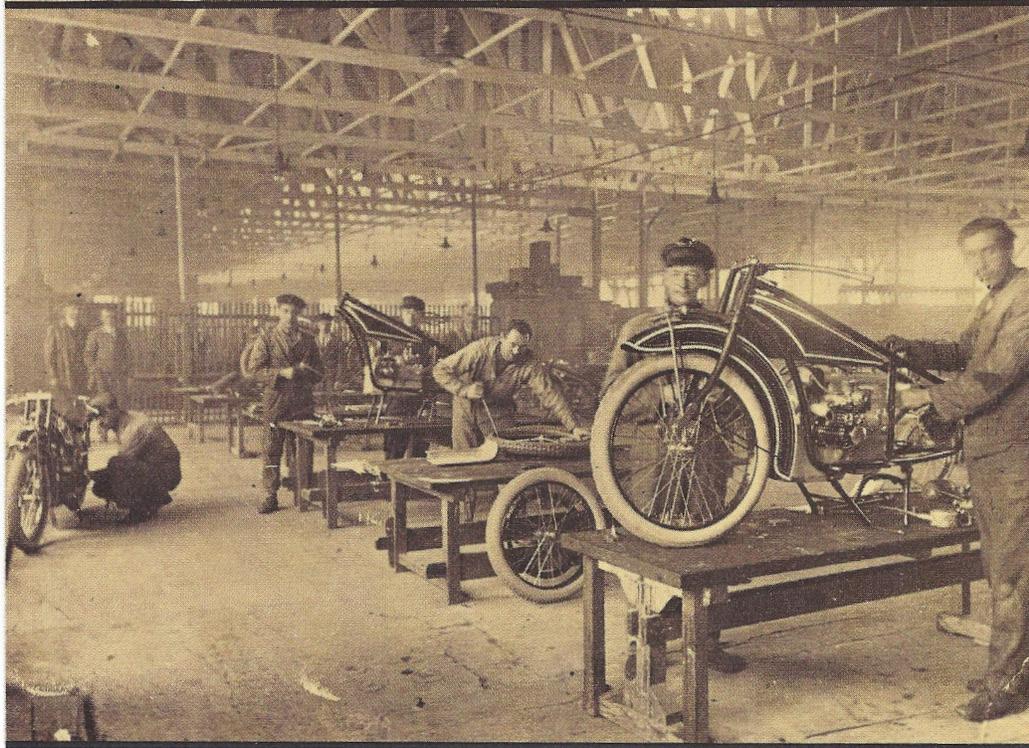
Fifty years is more than just so many days one after the other. In fifty years, the concentrated effort of a group of men to achieve a single goal can gain considerable momentum. Yet the beginnings of such an enterprise often include a curious combination of historical readiness, genius and chance. So it was for the Bavarian Motor Works and the enterprise which has produced some of the world's finest and most distinctive motorcycles.

The historical readiness lies in the fact that the Bavarian Motor Works, renowned for its production of high-performance, high-altitude aircraft engines—was virtually idle after World War I. Much of its machinery had been dismantled and confiscated. Europe was caught in a vast economic depression and BMW, faced with hard times, had to move from its modern plant to a drafty old factory.

The genius required resided in the mind of a young engineer named Max Friz. Friz had come to the firm in 1917 brimming with ideas. Almost singlehandedly he designed in rapid succession a series of engines that were to astonish the world. When military pilots told him that safety lay in the ability to overfly opponents, Friz designed an engine capable of breathing freely at 6000 ft, not at runway level. When pilots refused to fly his unconventional engine, Friz jumped in the plane himself and accelerated to 6000 ft. faster than any plane ever had.

That was still in 1917. In 1919, after the war and though it was forbidden by treaty, the irrepressible Friz secretly designed a supercharged airplane engine that on its first flight set a world high altitude record of 29,000 ft. There was no question that this young man was an inspired designer.

Chance was to enter not long after, when, in 1922, young Friz was called into the front office and asked his opinion of the "Helios" motorcycle. Although Friz had designed its engine, he stated quite frankly that he thought the motorcycle itself



abominable. He argued that a complete redesign from the ground up was necessary.

But management had made commitments for the manufacture of the machine and already owned a stock of parts and materials for it. BMW's president, Karl Popp, had to persuade his obstinate genius to make the Helios workable. He was at a complete loss until Friz complained that he couldn't do any designing anyway: the old factory was so cold and drafty he could not hold a drawing pen in his hand.

Karl Popp saw his opportunity and offered this proposition: if Friz would improve the Helios within the constraints of existing material and parts, Popp would see that he got an iron stove for his office. Friz agreed. Within a week he had improved the frame, suspension, and engine.

He also made history, for this early work kindled his enthusiasm for motorcycles. He was soon to suggest to Popp that BMW design its own motorcycle and manufacture it under the BMW marque. In a mo-

ment of inspiration, he had already sketched out his ideas—according to legend—on a beer coaster.

Any new idea was something of a long shot in those lean days, but BMW took the gamble. Friz turned the fore-and-aft opposed engine from the Helios sideways in the frame with the cylinders now jutting out into the airstream. He designed an entirely new frame and suspension, plus a sensational new feature: shaft drive to the rear wheel. The BMW engine developed 8.5 hp at 3,300 rpm and the motorcycle was designated the R 32.

Max Friz himself was the first aboard and he even entered some races with the unknown bike before its official introduction at the Paris Auto Show in October, 1923. That curious combination of historical readiness, genius and chance had delivered its progeny. It was the beginning of a tradition of bold engineering innovation that is today reflected in BMW's brand new R 90 S and slash-6 series.

—Volker Beer



PHOTO: VOLKER BEER