



## BMW R90/6

All The Little Things That Have Bothered Us In The Past Have Disappeared. Does That Make The New BMW A Perfect Motorcycle?

**I**N THE PAST few years, there seems to have been a leaning toward the old saying "the bigger the better." While this logic doesn't always work out, it is infallible when applied to BMW's latest offering, the R90/6. Here's a machine that is no larger physically than the other machines in the BMW line-up, stops better than any of its predecessors, and goes like blazes as well.

The new BMW R90/6 is so exciting it's difficult to find a point at which to begin describing it. The horizontally opposed engine has been with BMW since its first model, built in 1923, but has gone through many changes since that time. The latest /6 series machines share many of the features of the recent /5 models, including the same basic crankcase casting and the same stroke; only the cylinder bore has been increased to 90mm to give an actual displacement of 898cc for the

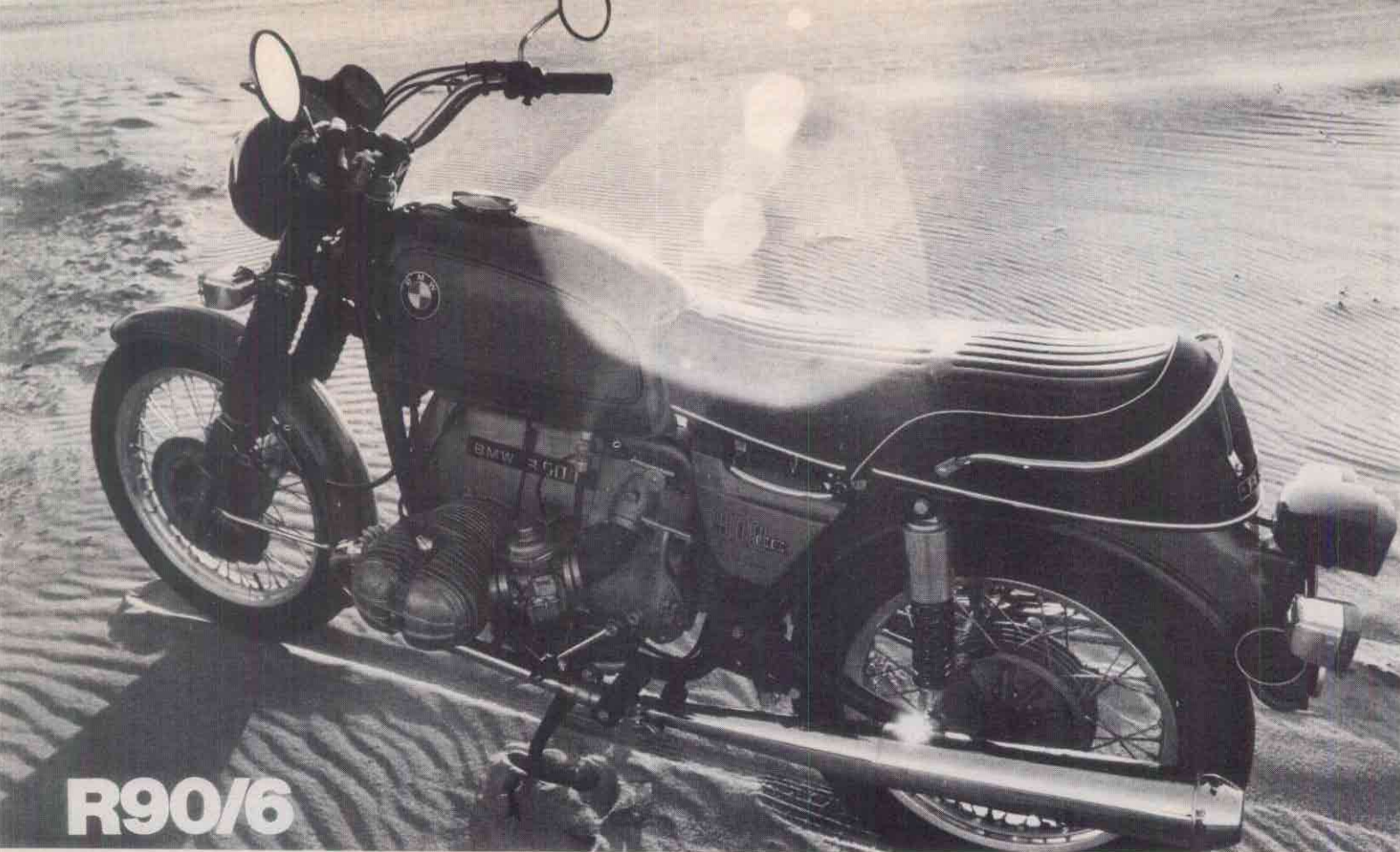
**Cycle  
World  
Road  
Test**

R90/6. The 70.6mm stroke is the same on all BMW motorcycles, from the 600cc R60/6 to the R90/6.

To make more room for the 90mm pistons, the crankshaft flyweights have a smaller outside diameter and tungsten plugs are used to obtain the proper balancing figure. And as the R75/5 first felt to us, it seems as though the size and/or weight of the main flywheel has been reduced. This freer revving and decelerating of the engine is most likely caused by the heavier and larger diameter pistons, however.

BMW still maintains its tradition of mounting all the major turning surfaces inside the engine in plain bearings, which are three-layer affairs composed of bronze, lead and indium. Plain bearings generate more heat than ball or roller bearings of equivalent dimensions, which means that there must be a copious supply of oil at hand to carry away the heat. As in the /5 series BMWs, an Eaton-type trochoid oil pump is mounted to the flywheel end of the camshaft. This pump is, in reality, a four-bladed impeller revolving inside a five-chambered housing, capable of moving vast quantities of oil at high pressures. At 6000 rpm the oil pump on the R90/6 is capable of circulating 370 gallons of oil per hour!

As on earlier models, the large-capacity oil filter is retained, featuring a full-flow pressure-release valve. This feature permits only filtered oil to pass back into the engine. Pressures from the crankcase are dealt with using an anti-turbulence chamber which leads to a diaphragm in the inlet manifold. This not >



only helps reduce the BMWs emissions, but also helps keep oil from being forced passed the crankcase mating surfaces, dirtying the engine.

The only non-plain bearings in the engine itself are those used at the rocker arms: these are needle bearings, the value of which is, for a touring engine, questionable to us.

Besides increased physical size, and the changing of valve diameters, the only significant change to the cylinder heads has been to locate the carburetor mounting spigots some 6mm closer to the inlet valve. This moves the shin-banging Bing constant velocity carburetors that much farther away from the rider's legs.

Inspection of the engine's front cover, behind which are located the alternator, contact breaker points and some electrical equipment, will reveal five cast-in ribs and six slots. The ribs are placed there to help deaden any engine mechanical noises and the slots allow cooling air for the new 280-watt alternator to circulate through. Aside from the cover, the engine looks almost exactly like earlier models.

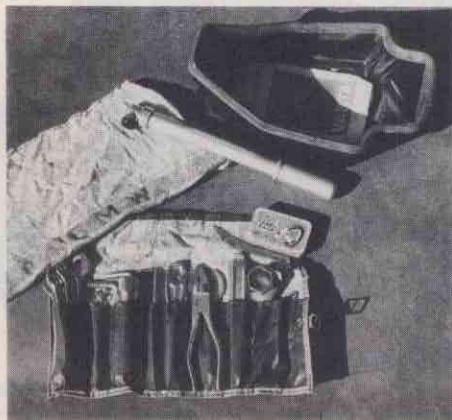
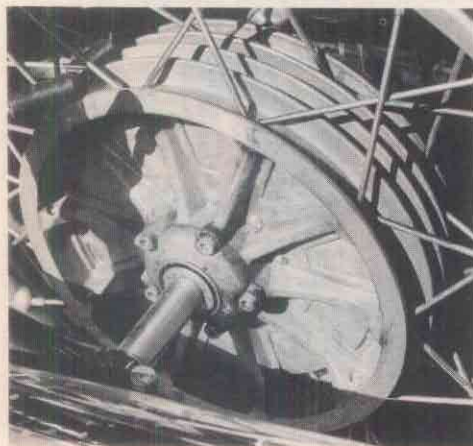
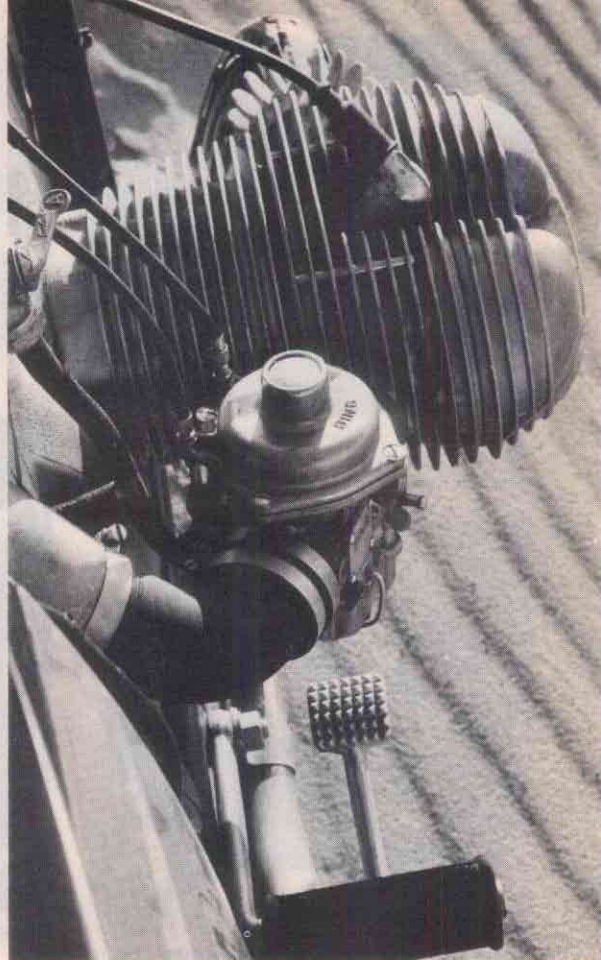
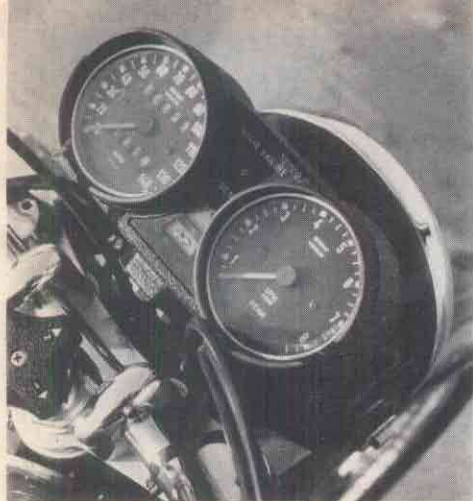
BMW's have had a reputation for noisy gear changes ever since we can remember. Well, that's a reputation that has been destroyed with the new, five-speed transmission, a unit now on par with many of the slick shifting Japanese gearboxes. Both transmission shafts are supported on enormous ball bearings and a newly designed gear selector quadrant slides the gears smoothly into engagement. First, 2nd and 5th gears are located on the mainshaft while 3rd and 4th gears ride on the layshaft.

Gone is the dreaded "clunk" during gear shifts: only a pleasant "snick, snick" is now heard, with the exception of a slight "snock" when down-shifting from 3rd to 2nd and 2nd to 1st. No more will motorists look over at you when you're shifting, expecting to see your transmission lying out in the middle of the road!

The dry, single-plate automotive-type clutch and diaphragm spring are retained, and even aside from design considerations, it's easy to see why. Ultra-smooth starts may be made and complete disengagement during gear shifts is assured. Clutch lever pressure is slightly higher than before, but will go unnoticed by most. Final drive remains unchanged. The driveshaft runs in an oil bath within the right hand swinging arm member and a universal joint is employed at the transmission output shaft to compensate for the swinging arm's up and down movement. Slight changes in the length of the driveshaft are compensated for by curved, helical teeth in an internally splined coupling shaft. Aside from infrequent oil changes, the drive mechanism is virtually maintenance free and is much cleaner and quieter in operation than an exposed chain, used on most of today's motorcycles.

The Bing carburetors are actually very precise in their operation, which depends on manifold vacuum, engine speed and a butterfly valve which controls the opening of a slide which is connected to a tapered needle. No matter how far the butterfly, which is the throttle valve, is opened, the slide and needle won't raise higher than to admit the maximum fuel/air mixture the engine can use, so flooding the engine by overambitious throttle twisting is impossible.

At the other end of the motorcycle are a pair of the largest and most efficient mufflers to be found on a two-wheeler. These have been slightly redesigned from the /5 series machines for silence with a minimum loss of power with the larger engine. Even though they emit a slightly more "nasal" sound, BMW claims that the total noise output of the R90/6 is still a very quiet 76dbA. Part of the pleasure of riding a BMW is cruising by traffic without disturbing anyone. Even your average "Upjohn Dewey" recognizes the fact that the BeeEm is one hell of a quiet machine.



Another new item on the /6 BMWs is the alternator which has increased in output from 200 to 280 watts and a larger battery which has grown in power from 18 to 25 amp/hr. This unit is larger and heavier than the older batteries, but its increased power is well worth the weight. The electrics on the BMW are still among the finest in the world. A healthy 0.5 bhp (DIN) starter spins the engine over effortlessly, even on the coldest mornings, and a switch in the transmission is connected to a switch on the clutch lever to prevent the starter from being actuated if the motorcycle is in gear and the clutch lever isn't withdrawn.

Also improved is the headlight featuring the excellent beam patterns of before, but it's a tad larger at 7.09 in. in diameter.

You can't believe how well it lights the road on a dark night. And BMW has finally given us a separate speedometer and tachometer (time for celebrating!) with needles which don't flail wildly about while you're riding. Between the main units is a small dash panel full of vertically arranged idiot lights which warn of low brake fluid, low oil pressure, no alternator output, a neutral indicator light and a turn indicator light. The neutral light is not to be trusted, as it sometimes glows when the BeeEm is still in gear. BMW has finally done away with their "standard" ignition "plug" (like the one everybody else with a BMW has) and has replaced it with a proper ignition key, inserted on the left hand side of the headlight shell. The same key locks both saddle and steering head for theft protection.

Underneath what is probably the most comfortable seat in the industry is a plastic trough containing a wonderful assortment of tools, quality tools besides. There's even enough extra room for a pair of gloves, a camera lens or what-have-you. On the inside of the top, left-hand frame rail is a hand tire pump; to our knowledge, the only mass produced motorcycle to be

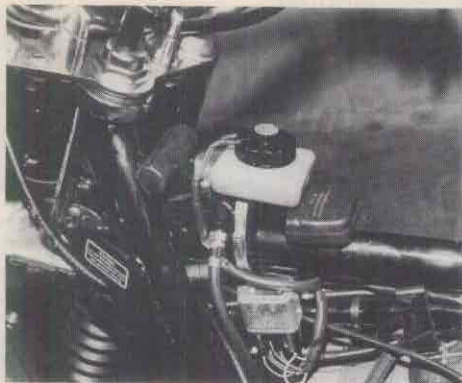
still so equipped.

It should be mentioned that the speedometer and tachometer are fitted with glare resistant lenses, a boon on sunny days, but nighttime illumination could be improved; they're a little on the dim side. Clutch and front brake levers and their supports are now finished in a matt, glare-resistant black instead of polished aluminum, another small touch.

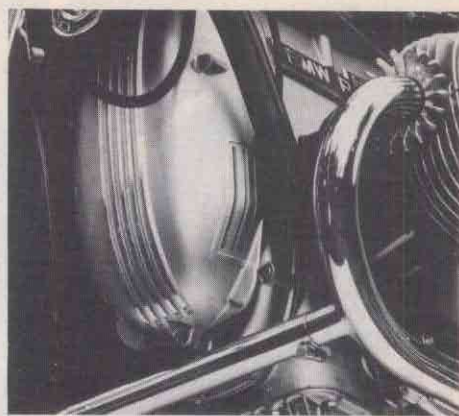
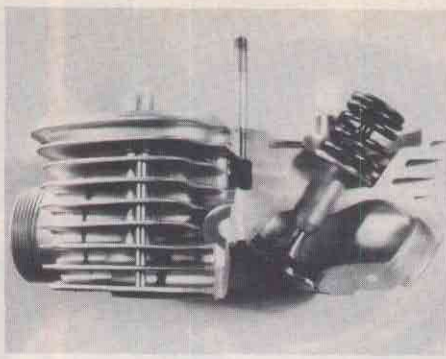
If you'd asked a rider about the handling qualities of a BMW just a few years ago, you'd have probably gotten a smile and assorted wisecracks. But with the introduction of the /5 series BMWs in 1970, BMW started turning people's heads with their, vastly improved handling qualities. To underline that feeling, Reg Pridmore on the West Coast, and Kurt Liebmann on the East Coast, have been winning production road races on BMW R75/5 machines with amazing regularity. The /6 models have what is basically the same frame, but it is strengthened significantly in the steering head area. Gusset plates and long welded seams are still featured at critical areas, and yet the frame's weight is still down in the neighborhood of 30 lb. The massive swinging arm is still carried in adjustable, tapered roller bearings.

Suspension has always been a strong point with BMW. Even with the older Earles-type front fork, which provided better comfort than steering, the BMW has always been a luxury touring machine. The /5 and /6 models are no exception in the comfort department, except that the telescopic front forks, which provide almost 8 in. of well-damped travel, add immeasurably to the handling qualities, especially over rough roads. And the superior action of the 5 in. travel rear shock absorbers do their part in making the BMW one of the better handling big-bore street machines available today.

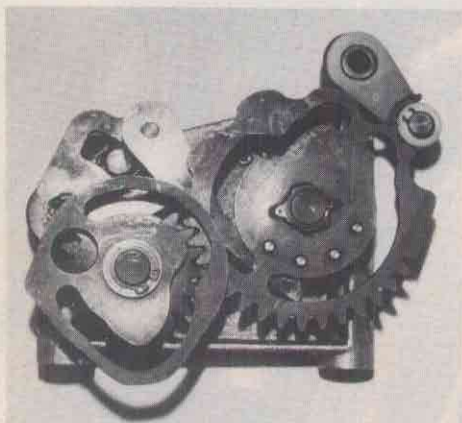
At lower speeds the rider is well aware of the fact that he is riding a large motorcycle; and that feeling pretty well remains >



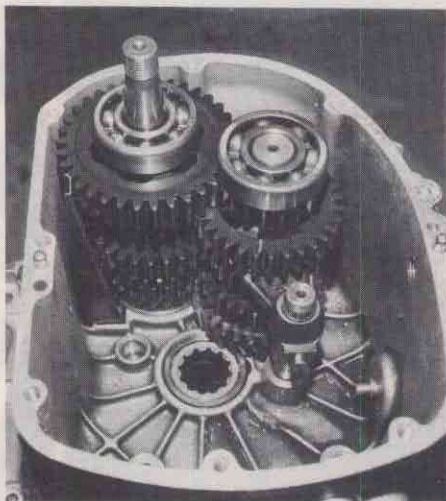
Front brake master cylinder is located beneath the fuel tank. Note substantial gussets on frame in the area of the steering head.



Engine front cover has five cast-in ribs to help deaden engine noise and six slots (three of which are visible) to allow cooling air to circulate around the 280-watt alternator.



Improved gear selector mechanism helps obtain crisp, positive shifts every time.



Transmission contains a set of large, strong gears, and the main casting is smaller and lighter than older models.



Back side of instrument panel shows easy to replace lamps and a printed circuit board instead of wires.

even when covering ground at a rapid rate. You don't "flick" a BeeEm from side to side through a series of "S" turns as you would a 350 Yamaha. Instead, the rider has to sort of force the BMW out of a straight line of flight. And yet, on the right road, the 900 can cover ground equally as fast as the smaller, more nimble machine. Add a few more variables such as potholes, ripples and lots of miles, and the BMW rider arrives at the destination sooner and far more relaxed and less tired than the fellow on the smaller bike. But the BeeEm doesn't have to pick on smaller machines; it'll raise havoc with the best of the Multis as well.

Previously using a friction-type steering damper on the /5 models, the /6 models feature a hydraulic steering damper with a three-way adjustment. But the new BMW steers so steadily that we almost felt the steering damper to be superfluous, except in tough crosswinds.

An area that BMW has previously not been overly strong in is the braking department. The brakes were adequate, but just barely for such a high speed machine. Now they've added a 10.4-in. diameter stainless steel brake disc and ATE caliper to the front wheel. The brake's master cylinder is out of sight under the fuel tank. Front brake actuation is provided by cable from the handlebar lever to the master cylinder, and hydraulic pressure takes over from the master cylinder to the brake caliper on the front fork leg.

Although the brake caliper unit is a single acting unit, it is permitted to "float" slightly in order to align itself with the disc, and it is mounted on an eccentric screw so that it may be adjusted to compensate for wear of the "dead" puck.

All motorcycles manufactured after Jan. 1, 1974 and sold in the United States for road use will have to have some

method of checking the condition of the brake linings without removing the wheel. This is easy to do on a motorcycle equipped with disc brakes, but a conventional drum brake presents more of a problem. We've already seen some Japanese machines with indicator pointers attached to the brake cam pivot spindles, but this method isn't entirely foolproof because it is easy to change the indicator to a more favorable position although the brake lining is worn past limits.

BMW has solved this problem neatly by removing the chrome "hub cap" from the rear wheel. This permits the inspector to merely look inside and measure the thickness of the brake lining without removing the wheel. During the first few miles we rode the R90/6 the rear brake was a little insensitive, requiring a greater than usual pressure to make it operate properly. However, as the miles built up, so did the rear brake's effectiveness. Using the weight of the machine with a 160-lb. rider on board, (620 lb.), there is a very low brake loading of 5.5 lb. sq./in. Much fast riding in hilly country two-up was performed during our test and the brakes took the punishing treatment without a whimper. A machine that is capable of running as fast as the BMW R90/6 should be capable of stopping, relatively speaking, just as fast. This one does.

One amazing feature of the R90/6 is fuel economy.

In this day and age of gasoline shortage and possible rationing, it's nice to ride a vehicle that delivers 50 miles per gallon! Lower speed limits be damned. Take people out of their Eldorados and Continentals and put them on motorcycles and it'd help immeasurably.

Following recent tradition, BMW supplies its motorcycle with a ribbed tread pattern on the front tire and a more >

# BMW R90/6

## SPECIFICATIONS

|  |                                 |
|--|---------------------------------|
| List price                                 | \$2950                          |
| Suspension, front                          | telescopic fork                 |
| Suspension, rear                           | swinging arm                    |
| Tire, front                                | 3.25-19                         |
| Tire, rear                                 | 4.00-18                         |
| Brake, front, eff. dia. x width, in.       | 10.08 x 1.52                    |
| Brake, rear, dia. x width, in.             | 7.87 x 1.18                     |
| Total brake swept area, sq. in.            | 112                             |
| Brake loading, lb./sq. in. (160-lb. rider) | 5.5                             |
| Engine, type                               | ohv opposed Twin                |
| Bore x stroke, in., mm                     | 3.54 x 2.77, 90 x 70.6          |
| Piston displacement, cu. in., cc           | 54.8, 898                       |
| Compression ratio                          | 9.0:1                           |
| Claimed bhp @ rpm                          | 69 @ 6700                       |
| Claimed torque @ rpm, lb.-ft.              | 52.8 @ 5500                     |
| Carburetion                                | (2) 32mm Bing constant velocity |
| Ignition                                   | coil and battery                |
| Oil system                                 | gear pump, wet sump             |
| Oil capacity, pt.                          | 4.75                            |
| Fuel capacity, U.S. gal.                   | 4.74                            |
| Recommended fuel                           | premium                         |
| Starting system                            | electric, kick                  |
| Lighting system                            | 12V alternator                  |
| Air filtration                             | dry treated paper               |
| Clutch                                     | single-plate, dry               |
| Primary drive                              | none                            |
| Final drive                                | shaft and bevel gear            |
| Gear ratios, overall: 1                    |                                 |
| 5th  | 4.64                            |
| 4th  | 5.16                            |
| 3rd  | 6.40                            |
| 2nd  | 8.84                            |
| 1st  | 13.60                           |
| Wheelbase, in.                             | 57.7                            |
| Seat height, in.                           | 32.0                            |
| Seat width, in.                            | 12.0                            |
| Handlebar width, in.                       | 28.5                            |
| Footpeg height, in.                        | 12.0                            |
| Ground clearance, in.                      | 7.0                             |
| Curb weight (w/half-tank fuel), lb.        | 460                             |
| Weight bias, front/rear, percent           | 45/55                           |
| Test weight (fuel and rider), lb.          | 595                             |
| Mileage at completion of test              | 1150                            |

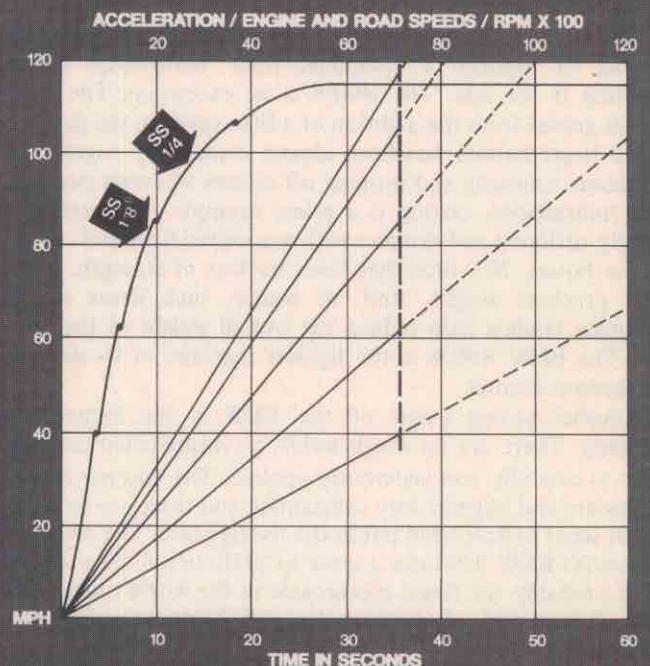
## TEST CONDITIONS

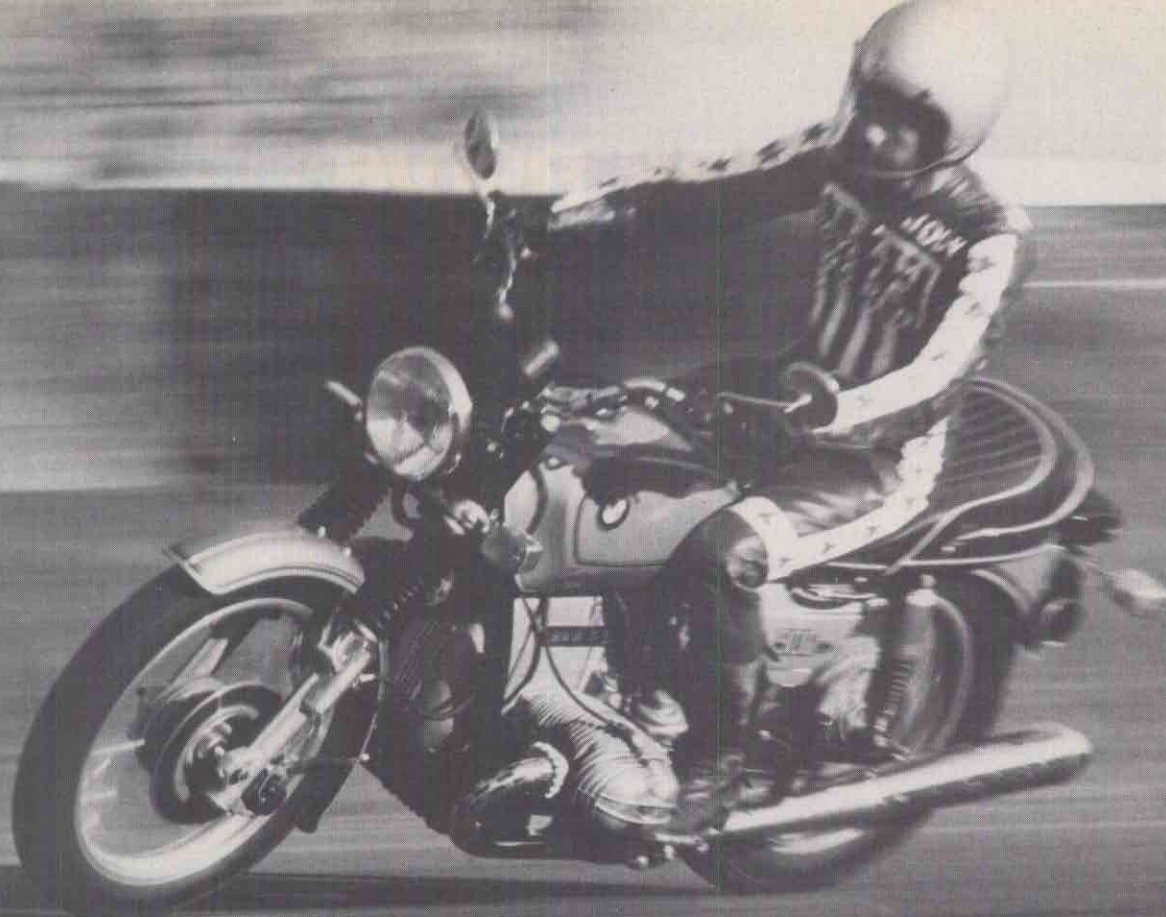
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|------------------------------------|-------|
| Air temperature, degrees F         | 62    |
| Humidity, percent                  | 41    |
| Barometric pressure, in. hg.       | 29.99 |
| Altitude above mean sea level, ft. | 383   |
| Wind velocity, mph                 | 4-6   |
| Strip alignment, relative wind:    |       |



## PERFORMANCE

|  |       |
|--|-------|
| Top speed (actual @ 7020 rpm), mph             | 115   |
| Computed top speed in gears (@ 7200 rpm), mph: |       |
| 5th  | 118   |
| 4th  | 106   |
| 3rd  | 85    |
| 2nd  | 62    |
| 1st  | 40    |
| Mph/1000 rpm, top gear                         | 16.4  |
| Engine revolutions/mile, top gear              | 3679  |
| Piston speed (@ 7200 rpm), ft./min.            | 3325  |
| Lb./hp (160-lb. rider)                         | 8.99  |
| Fuel consumption, mpg                          | 50    |
| Speedometer error:                             |       |
| 50 mph indicated, actually                     | 46    |
| 60 mph indicated, actually                     | 54    |
| 70 mph indicated, actually                     | 64    |
| Braking distance:                              |       |
| from 30 mph, ft.                               | 34    |
| from 60 mph, ft.                               | 132   |
| Acceleration, zero to:                         |       |
| 30 mph, sec.                                   | 2.8   |
| 40 mph, sec.                                   | 3.8   |
| 50 mph, sec.                                   | 4.9   |
| 60 mph, sec.                                   | 5.8   |
| 70 mph, sec.                                   | 7.2   |
| 80 mph, sec.                                   | 9.0   |
| 90 mph, sec.                                   | 11.5  |
| 100 mph, sec.                                  | 14.9  |
| Standing one-eighth mile, sec.                 | 9.55  |
| terminal speed, mph                            | 83.63 |
| Standing one-quarter mile, sec.                | 13.45 |
| terminal speed, mph                            | 97.27 |





## R90/6


“blocked” tread pattern on the rear tire. The tires, incidentally, have an H rating, which means that they are capable of sustained running at speeds of 130 mph. Other tire designations include the R rating, good for sustained speeds of 90 mph; the S rating, for speeds of 110 mph; and the V rating, which is for racing tires.

The Germans have rarely done anything halfway, preferring instead to produce a complete, *final* motorcycle before releasing it for sale. The R90/6 is no exception. The extra weight gained from the addition of a fifth speed in the gearbox and a larger battery has been almost completely negated by judicious trimming and pruning off ounces wherever possible. The transmission casting is a prime example. The casting is slightly different and slimmer with less material around certain of the bosses. No, there has been no loss of strength, just a little precious weight. And, of course, such items as the fiberglass fenders help reduce the overall weight of the bike, too. The BMW R90/6 is the lightest machine of its size and horsepower around.

Another strong point of the BMW is the immaculate detailing. There are no rough welds, no mismatched castings; paint is carefully and generously applied. The chrome plating is flawless and appears very substantial, and there are no items which seem to have been put in the wrong place. The owner of a /6 series BMW will have a sense of pride in knowing that he owns probably the finest motorcycle in the world today. And with the myriad of motorcycles still being manufactured, that's saying a lot.

It should also be mentioned that the BMWs are available in

several colors, but the large, 5.8-gal. fuel tank, preferred by many touring riders, will only be available at extra cost on the blue and black machines.

A look at the performance figures will show you that BMW is serious in its intentions of producing the lightest, best handling Superbike around. The R90/6 was one machine we really hated to return, and we look forward to testing the sport model, called the R90S, when one becomes available. 

### PARTS PRICING

|                           |                  |
|---------------------------|------------------|
| Warranty                  | 6 mo./6000 miles |
| Major Tuneup              | \$28.50          |
| Air Filter Element        | \$7.50           |
| Rear Tire (standard)      | \$33.38          |
| Headlight Bulb            | N.A.             |
| Taillight Bulb            | N.A.             |
| Turn Indicator Bulbs      | 50 cents         |
| Battery                   | N.A.             |
| Clutch Cable              | \$5.55           |
| Throttle Cables (each)    | \$6              |
| Brake Cables              | \$5.45           |
| Ignition Parts            |                  |
| Points                    | \$3.95           |
| Condenser                 | \$3.10           |
| High Tension Coils (each) | \$19.85          |