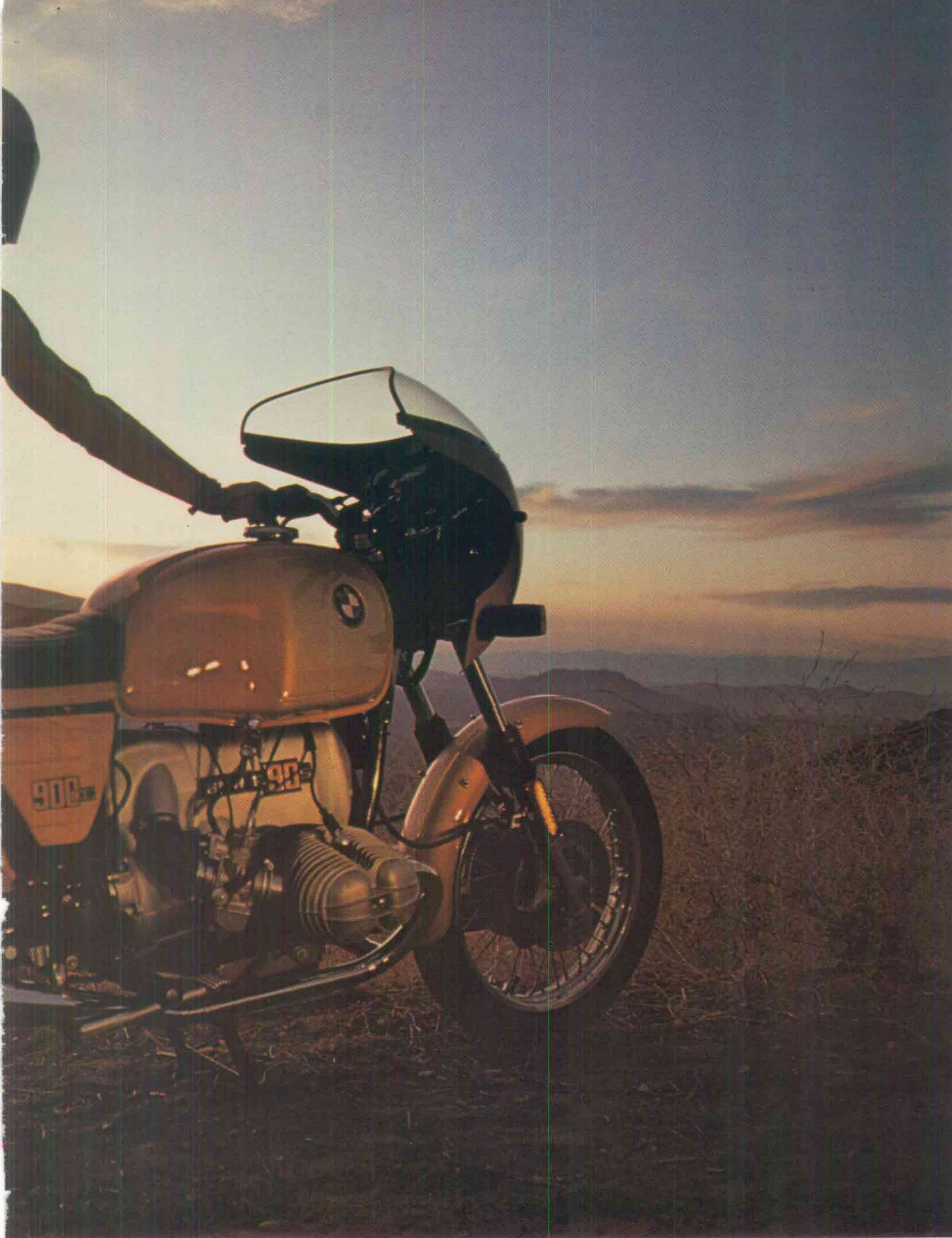
BMW R90/S

Breath-takingly priced, but also lavishly endowed with quality and the kind of performance that makes you wonder why everyone has to travel so slowly.

● As somebody once said, the law is a crude instrument. Here we are, obliged by inelastic law to travel at speeds no greater than 55 mph, and that is presumed to be without exception the right and moral thing to do. Lowered highway speeds, we are told, bring about a critically important reduction in the average American automobile's fuel consumption—if only down from the obscene to being merely grotesque. We also are told that this originally-economic legal stricture now has moral force because our traffic safety record is not quite so dismal at the lower limit, and that may even be true. Vehicles with a demonstrable reluctance to stop or turn collide with less frequency, or at least with less force, when driven at 55 than they did when streaking the Interstate highways at speeds up to 80 mph.

But then something will come along to demonstrate that Churchill had it right when he commented that "the law is an ass." For us, that demonstration is the new BMW R90S, which isn't decently in stride unless it's moving fast enough to give a highway patrolman apoplexy. And none of the rationalizations offered up by all the law makers and enforcers will keep the BMW from making the law itself look arbitrary and silly. They want to argue about energy conservation? The BMW can't be hammered hard enough to make it eat gasoline at a rate much worse than 45 mpg. Safety? Nothing capable of motion is entirely safe, but if they want to talk about one area in which safety-related vehicular performance can be quantified there is the fact that the BMW R90S can be made to stop at the rate of 0.9G, while the average passenger car will be straining a brake hose to get 0.6G. Thus, the BMW actually is less likely to become a participant at the scene of an accident when whistling along at 80 mph than is the typical sedan moving at a sedate, lawful 55 mph.

Cycle Test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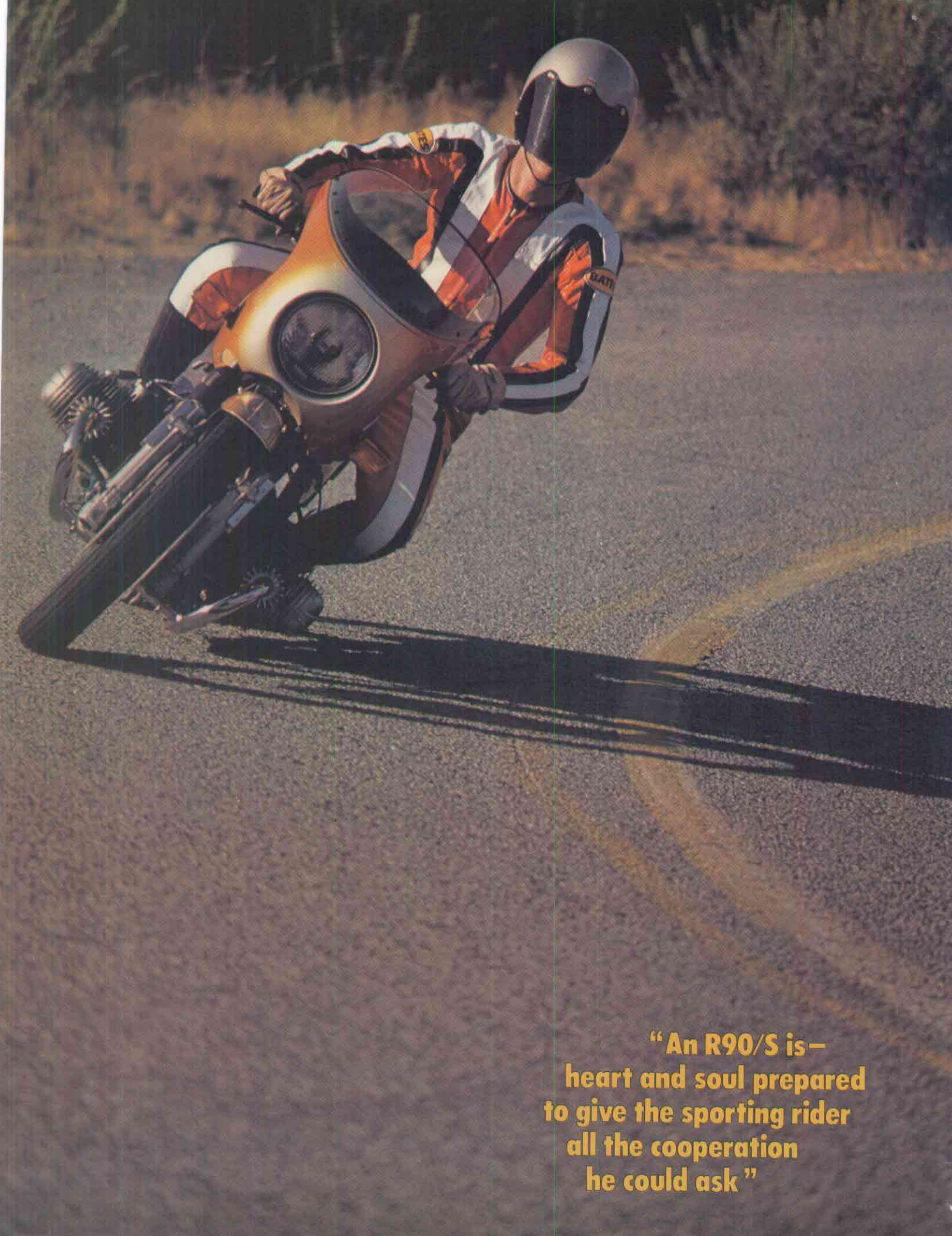
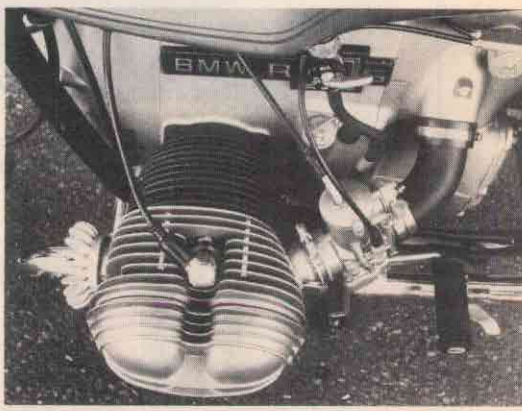


"An R90/S is—
heart and soul prepared
to give the sporting rider
all the cooperation
he could ask"

BMW R90/S

The abbreviated fairing isn't streamlining; it deflects the wind from the rider's body.



BMW's opposed-twin engine layout, with air-cooled cylinders and air-warmed toes.

Don't bother relating any of the above to the police or the courts; their first allegiance is to law, not reality. The law assumes that there is absolute equality among passenger vehicles, and conversation about fuel consumption rates and stopping distances will avail you naught. Acknowledged or not, the reality is that the new BMW R90S is comfortably, inspiringly unequal to most other road-going vehicles. Unequal, and unlike even its fellows in the world of motorcycles. Other bikes have twin-cylinder engines, the opposed-piston configuration isn't unique, nor the twin-disc front brake, nor shaft drive, and the offset-axle fork design has been around for years. But BMW's technological shopping list always has been peculiarly its own, and today's R90S is a motorcycle of strongly individual character, with a usefulness that extends well beyond the essentially futile gesture of making the law look silly.

No small part of the BMW's usefulness stems from the fact that it is a comfortable fit for its rider. One of the things you don't see, looking at the standard side-view photo of an R90S, is that the bike really is very narrow. Sure, the cylinders jut out like finned fire plugs, but you don't have to straddle them with your knees. All you have between your legs and feet is a tall, narrow fuel tank and an equally tall, narrow engine/transmission casing. There's only 12 inches separating the footpeg rubbers, which is about five inches closer than the same between-pegs gap on a Kawasaki Z-1. The BMW's fuel tank holds 6.3 gallons—a half-gallon of that being reserve—but the capacity is obtained with height and length, not width.

There's only one rider-contact area on the R90S wider than the average for motorcycles and that's the seat, which is a boon to tender backsides. BMW has made the R90S seat a bit thinner than those on its other models, and used a more dense foam for padding. And the differences seem to zero out, because the R90S impressed us as offering a rider perch every bit as comfortable as the soft-saddle R90/6—which is better than just about anything. Passengers will notice some difference, as there's a fender-clearance groove in the rear of the seat pan that thins the padding at that point. Owners of earlier BMWs should take notice of the lateral-pattern ribbing on the seat surface, which has been introduced in response to complaints that the old smooth-top seats didn't offer enough grip to keep R90S riders from slipping back toward the passenger grab-rail under full-throttle acceleration. This, despite the step in elevation between the rider's and passenger's portions of the seat.

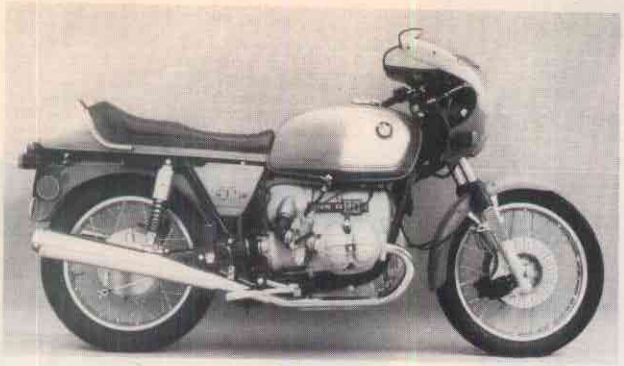
Ride an R90S and you'll appreciate how one could become a backslider, both literally and with respect to speed limits. The engine may have only those two cylinders, but they're biggies, fed from a pair of 38mm Dellorto "pumper" carburetors, and working with about as much compression (9.5:1) as a 90mm-bore engine dare have in a world with fuels not always equal to their octane promise. We don't know how much horsepower the R90S engine makes. Bikes with chain driven rear wheels we test on Webco's dynamometer, but the shaft drivers would require special and very expensive couplings. It probably doesn't matter much with regard to the BMW: the drag strip figures say there's a goodly amount of sheer horsepower available, especially as compared with the bike's weight; more important to the realities of highway travel is the *kind* of urge the engine develops. The BMW's power simply is always there. You don't have to downshift two gears before the bike will respond to a big handful of throttle. Kawasaki's Z-1 will do the R90S right in the eye at the drag strip, but the BMW pulls smartly away from the Z-1 in a top-gear 60 mph roll-on. It cranks up a lot of power without having to be spinning lots of revs. Open the throttle, and the R90S moves out in a flurry of emphatic, closely-spaced thuds.

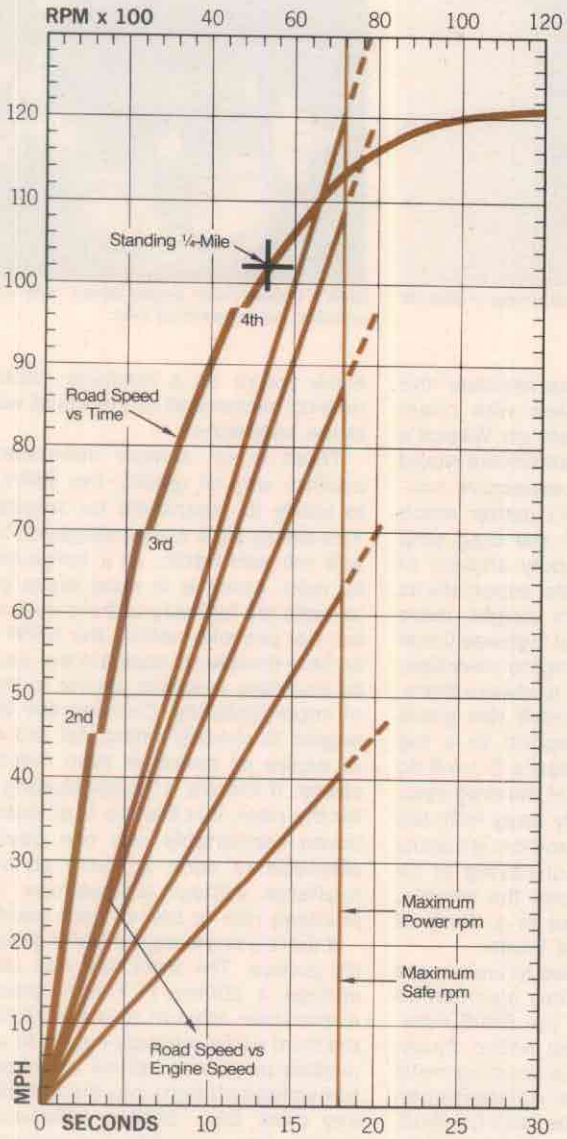
Those thuds can be used to embarrass other Superbike riders; they also can be a source of irritation for the R90S rider. They are very substantial 449cc thuds, and they react into the surrounding metal to produce a strong lateral vibration when the engine is at full throttle, and full thud. This vibration may be minimized by closing the gap between thuds, done by using lots of revs, which gets converted by the BMW's tall overall gearing into speeds that will blow transistors in every police radar unit within a hundred miles. The R90S will do those speeds safely, economically and without seriously taxing its engine or rider, and the bike must be an absolute wonder in the *laissez-faire* atmosphere of autobahn touring in its native land. You can't get away with that sort of mach-number cruising here, except in short, furtive spurts, but it's kind of exciting/intriguing/frustrating (choose one) to know you're on a machine capable of making mincemeat of the usual time-distance equations.

There is, on a more mundane level, another way of getting the BMW R90S to justify its reputation for smoothness. You simply click the transmission into 5th and roll with traffic. At a fudge-factored 60 mph, which is in most areas enough to make the highway patrol's eyes narrow but not provoke action, the BMW needs so little throttle to maintain the pace that its thudding weakens almost to the level of imperceptibility. Cruising like that the engine is virtually idling, far more likely to expire of boredom than mechanical stress. If there's a compensating factor for the rider, it is that he is at least being bored comfortably and can devote full attention to such scenery as may be available without distractions from a jouncing ride or bed-of-nails saddle.

If there's anything the BMW doesn't do, it's jounce. The front fork has ultra-soft springs, a 200mm (7.9-inch) travel, and a miniscule amount of static friction, so the front wheel willingly moves to accommodate pavement ripples that would get transmitted straight into the handlebar of any other bike. BMW's offset-axle fork design has a number of advantages, among them is that fore/aft loads are carried over a greater length of fork slider; also that the slider can be bored straight through, instead of being a blind hole, and its actual internal diameter machined to more precise tolerances.

There's an unusual degree of precision in the rear suspension, too, along with a pair of shocks that provide a 125mm (4.9-inch) travel. The swing arm pivots on tapered-roller bearings, and rear wheel alignment is built-in because the shaft-driven axle doesn't have to slide to allow for chain tension adjustments. So the





BMW R90/S

Price, suggested retail	$3965
Tire, front	3.25 x 19 H Continental
rear	4.00 x 18 H Continental
Brake, front	1.375 x 10.24 in. x 4 (35 x 260mm x 4)
rear	1.18 x 7.87 in. (30 x 200mm)
Brake swept area	111.7 sq. in. (720.7 sq. cm.)
Specific brake loading	6.0 lbs./sq. in. at test weight
Engine type	Opposed four-stroke twin, OHV
Bore and stroke	3.54 x 2.78 in. (90 x 70.6mm)
Piston displacement	54.8 cu. in. (898cc)
Compression ratio	9.5:1
Carburetion	2; 38mm; PHM Dellorto
Air filtration	Dry paper
Ignition	Battery and coil
Rake/Trail	28°/3.5 in. (90mm)
Mph/1000 rpm, top gear	16.7
Fuel capacity	6.3 gal. (24 liters)
Oil capacity	4.7 pts. (2.25 liters)
Transmission oil capacity	1.7 pts. (0.8 liter)
Electrical power	240 watt alternator
Battery	12V, 2.5 AH
Primary transmission	Helical gears
Secondary transmission	Shaft, spiral-bevel gears, 3.0:1
Gear ratios, overall	(1) 13.20 (2) 8.58 (3) 6.21 (4) 5.01 (5) 4.50
Wheelbase	57.7 in. (146.5cm)
Seat height	32.0 in. (82.0cm)
Ground clearance	6.5 in. (16.5cm)
Curb weight	500 lbs (227.2 kg)
Test weight	665 lbs (320.1 kg)
Instruments	Tachometer, speedometer, tripmeter, ammeter, clock
Standing start ¼-mile	13.18 sec.; 102.04 mph
Average fuel consumption	46 mpg
Speedometer error	30 mph, actual 26.30 60 mph, actual 54.24

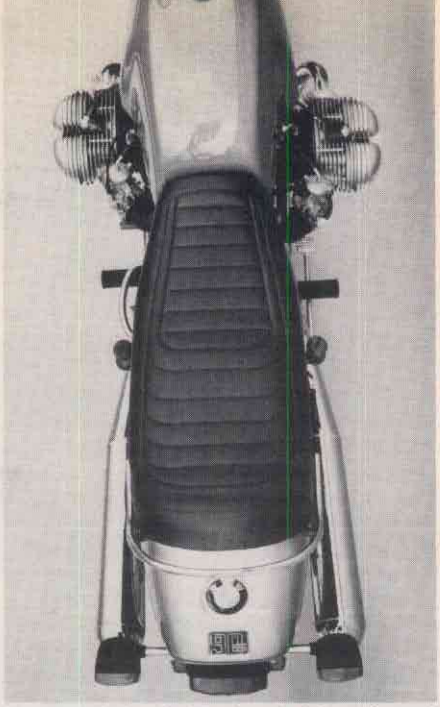
BMW gives you soft springing, more wheel travel at both of its ends than anything this side of a new-generation motocrosser, and wheels so precisely aligned that you can tighten the throttle set-screw, lean back and ride for miles without touching the handlebar grips.

Compliance-oriented suspensions and shaft-driven rear wheels have distinct advantages; they also bring with them a couple of penalties. BMW's engineers have integrated the R90S rear hub elements—brake drum, shoes, bevel gears, etc.—into a fairly light assembly, but it still is heavier than its chain-drive counterpart. There are times, as when going quickly over choppy road surfaces, when the BMW's unsprung rear wheel masses get to be a bit more than its springs and shocks can control. And when going quickly you also discover that really hard braking loads the front suspension almost to the compression stops, and that the R90S then acquires a very steep steering-head angle—a hair too steep for steadiness if you're banking into a turn at the same time.

Right here would seem to be the appropriate point to deal with the R90S's handling, which is apt to be the subject of some highly personal judgements. The whole matter can be resolved if everyone understands that the BMW is a sport model, not a racing machine, made for the sporting rider, not racers. It's a question of riding style: racers, especially those of the modern school, sail into corners with brakes applied hard and will use a lot of brake all the way to a turn's apex; the sporting rider tends to do his braking upright, then flop the bike down into whatever attitude conditions require and proceed around under steady throttle until he can see straight road. Assuming approximately equal levels of enthusiasm and skill, there isn't as much difference between the two styles' here-to-there effectiveness as you might suppose. Not unless you're riding an R90S, which is—heart and soul—prepared to give the sporting rider all the cooperation he could ask, but gets all sulky and confused by the racer's overlapping demands.

It is right and proper that the R90S should be suited to the sports rider rather than racers. The latter, with rare exceptions, never have much money left after offering up their bank accounts as sacrifice to their art, and the BMW's price places it exclusively among the fat-wallet crowd, which is far larger than we had imagined. Our first report on the R90S wondered "if the day of the $3000 motorcycle is here." BMW's subsequent sales figures proved that the day had indeed arrived and more recent history, which has brought further price increases, is evidence that there are more motorcyclists among the megabucks bunch than we thought, and that they'll pay whatever is asked for what they want if they think the package justifies the price. BMW's R90S is highly priced . . . and fairly well justified in terms of features and craftsmanship.

One look at the BMW and you know it has quality. There is that almost indefinable something we'll call tidiness, and wherever you look pieces fit and sparkle. You get items like the twin brake discs, which have been perforated (a hundred holes in each) to make them lighter and more effective in a streaming rain. Look closely and you'll see that the discs have been cadmium-plated before being surface-ground; BMW doesn't want unsightly rust inside those punched holes. And since the first R90S was introduced the caliper and master-cylinder piston diameters have been increased, because that change improves the brakes' feel. The BMW front brake always worked just great; they thought it should feel more solid. Another feature you could miss is the master-cylinder location, which is under the fuel tank. BMW builds bikes with short handlebars, and they like everything tidy, so instead of attaching a lumpy mechanism at the brake lever pivot they tucked the master-cylinder out of sight, connected it to the lever with a cable—and installed a brake fluid level sensor and warning light.



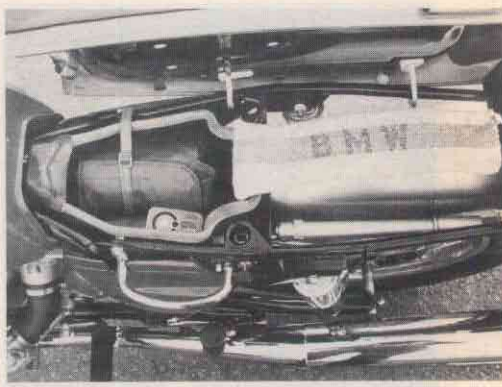
It's not an illusion: the bike is made left-peg-forward; it's also narrow, which is nice.

The brake warning light is up on a panel that carries the speedo and tach, other warning lights for the generator and oil pressure, an amber light that flashes when the turn signals are going, and a green light that's supposed to come on when the transmission is in neutral—but sometimes doesn't. This neutral indicator is in the circuit that energizes the starter solenoid, which means that even if you've found neutral (no mean feat, in the case of our test bike) you can't get any action by thumbing the starter button unless you pull the clutch lever. There's another switch included in the clutch mechanism to override the neutral indicator, so you can leave the bike in first, leap aboard, pull the clutch, hit the starter and make a stylishly fast getaway.

(Continued on page 82)

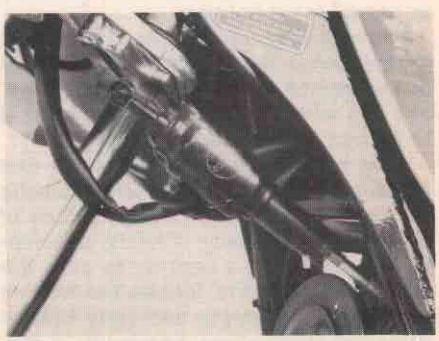
PHOTOGRAPHY: DALE BOLLER, DAVE HOLEMAN, PAUL R. HALESWORTH, BILL DELANEY

The lift-out tool compartment contains more than two-dozen items, and an official towel.



There are two under-seat storage trays, each with carefully contrived weather sealing.

Instrumentation included an accurate clock, and a grotesquely inaccurate speedometer.



A slotted, knob-controlled device moves the steering damper pivot to give three settings.

BMW R90/S ..... *continued from page 53*

Those who buy an R90S should consider leaving it in first-gear anytime it is parked leaned against its side stand. BMW's generally masterful way with machinery seems to have deserted them in the design and execution of the hardware intended to hold the bike upright in its rider's absence. The side stand is a teetery, spring-loaded strut that is just diabolically eager to fold when you want it to hold. Let the R90S roll forward a couple of inches and the next thing you know it has clunked over and is nuzzling the pavement with its left rocker cover. A couple of very near misses persuaded us to make maximum use of the center stand; that was no joy either. Before you can get the center stand deployed it is necessary to grope around under the bike with your toe, like a Romeo trying to play footsy with some lady two chairs away at a crowded dinner party. Once contact is made you work the stand down easily enough—only to find that there's something amiss with contact arcs and fulcrums and you have to haul like mad on the grab-handle above the left side-cover to get the bike's weight up, over and resting securely on the two-legged prop.

Getting the R90S primed to ride is a lot easier than propping it up after you've finished. They've done away with the old side-winder kick-start pedal (which may rightly be considered an anachronism), boosted the starter motor's output by about 20 percent and installed a battery that looks big enough to give the BMW a 50-mile electric-power range after the gasoline is gone. The battery's size reflects undue pessimism on their part. After you've hit the lever that opens the Dellorto carburetors' starting enrichment passages and given the throttle grip a couple of quick twists to prime the cylinders, no more than a touch of the starter button is needed before you get fire and rotation. When the engine is still semi-warm, ignore the choke and just prime the engine with throttle. The BMW R90S carburetors are virtually unique in the motorcycle field in having accelerator pumps, which give each cylinder 0.4cc-squirt of fuel every time you wind the throttle open.

Throttle actuation on the first R90S was mournfully, painfully slow, taking more grip rotation than the human wrist could hope to supply in less than two tries. They've fixed that, and the new throttle mechanism—which still features a pair of bevel gears, and a cam winding in a chain to give progressive action—takes hardly more than a quarter-turn to pull the slides all the way up. This, combined with the excellent response to throttle provided by the Dellorto's accelerator pumps, could have made the bike a bit too sudden for comfort. But the first few degrees of throttle grip rotation give relatively little lift at the slides, due to the camming action of the twist-grip mechanism. It's only when you move the grip farther around that slide movement becomes more rapid. The arrangement is neither as simple nor as cheap as those found on other motorcycles; it does work uncommonly well, and helps explain why the BMW finds so many buyers despite its intimidating price.

The R90S is delivered with other price elevating/justifying features. Like its light aluminum-alloy wheel rims, which follow latest motocross practice in being free of the once-common reinforcing ribs that always collected unsightly muck. And the wheel spokes are made of stainless steel, which is a small item, but important. Other small, important touches are things like the weather sealing that keeps water out of the lift-out tool tray and the odds-and-ends compartment incorporated in the fairing behind the seat. That fairing is, by the way, made of the same impact-resistant molded plastic as the side covers and the small handlebar fairing/windshield. Plastic is a good material in those applications, just as cast aluminum is right for the cleated brake pedal.

BMW has followed long-time habit in making the grab-it end of the ignition key shaped like an instrument knob (black plastic, round and with non-slip serrations) and said key makes an unusually lumpy object in one's pocket ("Are you a BMW owner or are you just glad to see

me?") But you do get a pair of separate fork-lock keys, and the seat latch may be left unlocked, like a car's glove-compartment door. You can get at the tools without killing the engine because you don't have to use the key to spring the lid.

Plan to spend your first weeks of BMW ownership in frequent reaching for the tool kit. Not because the bike will need attention; you simply won't be able to resist showing the kit to your friends. It has everything: combination wrenches all the way from 7mm to 22mm in size, a couple of double-end sockets, a set of feeler gauges for setting valve clearances and spark plug and contact breaker gaps, a set of allen wrenches, the expected pliers and screwdrivers, an odd-looking device used to tighten steering-head bearings and remove fork tube caps, and two very nice tire irons. You will find that the feeler gauges are labeled in German, and we think it only fair to tell you that "Hauptbremszylinder" on the forked feeler means you use it to adjust the free play at the brake master cylinder.

With all these wonders, which tend to make us firmly believe in our theory about the likelihood of a given motorcycle needing roadside repair being in inverse ratio to the quality of its tool kit, perhaps the most impressive item in the tool tray is the hand towel with "BMW" woven right into its fabric. The towel is just the right touch, and all the more impressive after you discover that it is wrapped around a small box of tire-repair patches, and then notice the tire pump clamped handily in place under the bike's seat. You get all these tools, and they mean something, because the BMW owners' manual really is useful. It's the best; better than many workshop manuals we've seen.

This latest BMW R90S is improved over the first version, which we also liked a lot. Much of the bike is all but unchanged—it still has the small clock, which still keeps time accurately—but there are differences and most will not be found looking at the machine in the dealer's showroom. The engine's crankcase castings, for example, have been modified for added stiffness, and the front main bearing, pushrods, cam followers and rocker arms upgraded. There are some detail improvements in the transmission, which did not prevent our test bike from being iffy about engaging 5th gear, and the clutch linkage has been rearranged, in minor fashion, to broaden the engagement point and smooth away some of the clutch grab.

One of the nicest changes is in the front fork damper valving, which has been remetered to provide an extra measure of compression damping, which doesn't keep the R90S from doing a nose-dive under hard braking but does keep it from happening quite so abruptly. Stiffer fork springs are available, and these would make the bike steadier under the pressure of a maximum-effort charge; they'd also make it harsh in ordinary cruising, and harsh just isn't BMW.

We note that some of the BMW R90S models now have Continental tires; others are fitted with Metzlers. Our test bike had Continental tires, and we think their performance, on dry roads at least, is superior. It may well be that the Metzlers are better in the wet, and we'd expect them to be longer wearing because the rubber compound seems to be a bit harder. You pays your money and gets whatever tires happen to come on the bike your dealer has in stock—unless you can argue him into a swap, one way or the other.

With either kind of tire, the R90S is going to be a remarkable time/distance machine. The low, narrow bars hunker you down where the small fairing deflects the worst of the wind-blast away from your torso, and the ride and seating will let you stay with it for hours, as will the huge fuel capacity. Roads stream by under the flashing spokes, the exhaust is a civilized, subdued basso rumble. There's power to spare, reliability unquestioned, and only the omnipresent possibility of red light twinkling in those big rear-view mirrors to keep you from giving the R90S its head and letting it do what it does best—which is to devour miles in giant bites, in style and at gas mileages that would make the average sedan owner think he'd died and gone to heaven.