



August 1994

Zündfolge



*The Future
from BMW*

*Concours
Coverage*

*Sunset Dinner
Coming Up*



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Cover:
A flow-through
aerodynamic study.

Zündfolge

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Calendar

- August 24** Track Night at SIR. Your last chance until 1995!
- August 26** Deadline for September *Zündfolge*.
- Sept. 1** Board Meeting hosted by the Heltons.
- Sept. 11** Sunset Dinner at the top of Crystal Mountain. See Dan Alvis' article for details.

BMW ACA events are partially supported by a generous grant from BMW of North America, Inc.

Crystal Mountain Sunset Dinner

September 11th is the Sunset Dinner at Crystal Mountain Summit House. This will be a spectacular event for the eyes and taste buds.

The dinner is scheduled for 5:00 pm. But the drive up to the base lodge is at least one hour and 20 minutes from Seattle. Then there is an approximately ten minute ride on the chair lift to the top of the mountain. So, you should plan to leave home about 3:30 pm at the latest to be on time to the parking lot of the base lodge.

To get to Crystal from where you live, take the fastest, most convenient route to Enumclaw, State Route 410. Then follow Route 410 for 36 miles until you see the Crystal Mountain road which turns left off of 410. Follow the mountain road up to the lodge where you will be met by the staff. They will direct you to the Quad chair lift which will take you to mid-way. From there you will board the Rainier Express high speed Quad chair, which will whisk you

up the top in about two and a half minutes. Once at the top you will have a breathtaking view of the east side of Mt. Rainier. It looks so close you can touch it. (Great photo opportunity.) We will then move into the rustic wooden lodge and be seated for a gourmet meal with some of the best coffee I've ever had.

After dinner there will be time for picture taking of the sunset over the top of Mt. Rainier (hence the name, sunset dinner), dessert and short strolls outside of the lodge. This is an event you will not want to miss.

The dinners vary in price from eight dollars to the max of seventeen dollars. The ride to the top costs a mere four dollars. If you have a season pass it is still good for the lift ride.

To reserve your place at the top you must send in the reservation form below with a check for \$4 per person, by the 5th of September. Space is limited to twenty couples, however, you need not come as a couple. If you have any questions please call me: Dan Alvis at (206) 582-0803.

Crystal Mountain Sunset Dinner

Name _____
 Number of Persons Attending _____ Phone # _____
 Address _____

 Amount Enclosed _____

New Members

Member	Referred By	BMW's
Paul & Suzanne Sandys	Dan Patzer	'78 320i, '76 2002, '76 530i
Michael & Sherrie Staeps	BMW Seattle	'71 Bavaria '79 528i, '74 2002tii
Henry Sanders & Lori Sargent		'88 M5
Kevin Rainge	BMW Seattle	'93 325iC
William A. Mekle	BMW Seattle	'94 540i
James Rippick	BMW Northwest	'91 318i, '80 320i '78 530i
Guy Peters	Dan Alvis	'83 533i
Steve Valentinetti		'82 320i
Troy Whitbread	CCA	'78 320i
Manfred Richter	Dan Alvis	'93 525i
Scott Harrison	Greg Mierz	'85 318i
Rhodney Duell		'92 525 i
John & Terri Clevenger	Lightfoots	'70 2800CS
Judy Mendoza	Bill Proud	'91 525i
Ralph Gordon		'84 633 CSi
Edward Hopkins	BMW Seattle	'91 318is
Jon & Suzanne Murray	Siegels	'94 325i
William Lovell	BMW Seattle	'89 635 CSi
Suzanne Skone	BMW Seattle	

Crystal Mountain Summit House

Dine high on the hog — elevation 6,872 feet, to be exact — at **Crystal Mountain Resort's Summit House**. You can order the Glazed Pork Tenderloin for your Sunset Dinner, but also consider the specialty, Mountain Blackberry Chicken baked in a puff pastry shell. Sterling Blackheart is the chef. Guests board a chairlift for their climb of nearly 2,500 feet to the restaurant. Seatings are from 5:30 to 8:30 pm every day through Sept. 11. The restaurant, only a dozen air miles from the summit of Mount Rainier, also is open for cafeteria-style meals from 10:30 am to 3:30 pm.

— *The Seattle Times*

In Memoriam

We note with sadness the passing of John Martin. John, and his wife, Nancy have owned a Frazer-Nash-BMW 328 for over 40 years. The car was fully restored for its 50th anniversary and placed second in class at the Pebble Beach Concours.

John and Nancy have resided on Mercer Island for many years. Their 328 has often been seen at club functions. We express our sympathies to Nancy Martin and their son, John Jr.



Stalls

By Thomas B. Nast

Those of you who made it to the winery July 31st know that, once again, I was roped into misjudging the concours (and my wife thought those were sun burns!). My thanks to all those who left tokens of their appreciation for the judges (and next year remember, we work in teams of three, so leave it in fives and tens, or better yet, Islay single-malts). And as always, be assured that the final results were completely independent of my findings (I can't speak for others in this regard).

Having spent hours examining your cars, from bonnet to boot, I thought I might pass along a few quality tips (better known as "Q tips") for next year's entrants.

Going for a fling. As tires rotate, they develop something known to Richard Feynman and his friends as "centrifugal force." Oddly enough, this has importance even to car polishers. Some car polishers, for reasons poorly understood by all except Estee Lauder, think that tire sidewalls look better if a coat of shiny Armorall is applied, making the tires look as natural as a Guernsey cow with fresh shoe polish, though the bovine will not slip as much during vigorous cornering. If you feel compelled to generously apply Armorall to the tires, you might consider putting it on **after** you park for the concours. Much less of it will fling onto the sides of the car than if you apply it **before** going to the show.

Don't give a dam. Air dams (1) look nice, (2) are low to the ground to prevent air from passing beneath the car, which causes lift, and (3) are effective curb locators. It is the latter point on which I wish to dwell. When relatively immovable objects are located by the air dam, certain telltale signs are left on the air dam, such as chunks missing, replicas of the Grand Canyon, and a surface resembling pubescent skin, only much less responsive to curative lotions. No amount of water over the dam can wash

away these flaws. Perhaps the dam is best left behind at showtime, to avoid a reservoir of point losses.

Flaps. On the rear right side of most BMWs (Bavarias, 2002s and Isettas excepted) is a small panel which opens up. It is called a gas flap by many, even though the full translation from the German word is, "Cover for Unleaded Only Bitte Petrol Tank Up-Filling." Many entrants misread this word, thinking it was translated, "Cover for Opening and Armorall Onto the Filthy Rubber Gasket Squirting." Such are the vagaries of German syntax. Do not mislead be.

Chip off the old block. It is well-known among entrants that cleanliness of the battery is scored. Inspection of one battery revealed a little piece of the Black Forest, expressed as a length of 2" x 4". It was not a bad piece of wood, mind you, being free from rot and infestation, but it was unwaxed, unpainted and unsanded. Perhaps the entrant was from Leavenworth, where we are traditionally introduced as the "British Motor Works" club, thus implanting the confusion between bodywork and framing still exhibited at the Morgan works. If you must veneer your battery, at least polish the nails.

On the level. A little-known category that is scored is the fitment of body panels. It is a poorly-understood fact that the hood, trunk, doors and gas filler flap (see above) have two discrete states: Open and Closed. You leave your car for us to inspect with the hood and trunk Open. At some point, we Close them. We do this (1) to leave fingerprints on them, so we have a reason to deduct more points, (2) so you won't notice CDs missing from the changer, and (3) to see if the panels line up. This (checking alignment, not purloining CDs) is something you can do at home, without adult supervision. Your attention is especially directed the bottom lip of the

trunk lid and (if your car has a hood that opens from the front) the bottom lip of the hood. These are easily adjusted with small rubber bumpers installed for the purpose, which you will have no trouble locating provided the panel is Open. When the panel is Closed, you can determine if the edges line up. Gosh, those Germans are clever!

Sonic booms. Visual aesthetics are not a matter we are left to judge; it is possible for pearlescent cars, cars the color of a lime left in yesterday's gin and tonic, even for red cars, to win trophies, provided no cat hair is found in them. (I parenthetically note that fly-yellow cars seem to be making a comeback, though I personally will not be seen in one lacking a hook and ladder.) It is the quality of craftsmanship and detail, not the misbegotten conception, which is judged. No such injunction prevails in the area of audio aesthetics, however. Tammy Wynette at 95db is guaranteed to lose you twenty points, thirty if it is unleashed while the string quartet is attempting the "Grosse Fugue." On the other hand, if you happen to play "Babar Layar" during an interlude, you might pick up 15 points from the engine compartment judge. But since the exterior judge is holding out for "Dark Star", he will uncontrollably spill some iced coffee onto your center console, causing a large net loss to be imposed by the interior judge. Perhaps it is best to leave the audio system parked, after all. De gustibus non est disputandum.

No doubt you will have some tips of your own. I am certain that Al Lancaster will want to see them, so put them in a shoebox and send them in care of this publication to his attention. My mail is aged until the body is nicely rounded, then screened both by metal detectors and trained dogs before decanting, so you needn't bother to write to me.

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1994 Concours d'Elegance

By David Lightfoot

The concours is always a great event, but nice weather sure helps. We seem to have this weather thing figured out — we just schedule the same weekend as the Bellevue Arts and Crafts Fair. We're planning the same weekend next year.

For the second year, our concours was held at the lovely Columbia Winery in Woodinville. The turnout was excellent with 24 cars being judged and loads of spectators. It's impossible to know how many club members were there since the winery had a dessert fair going on and the Spirit of Washington dinner train visited.

Throughout the judging we had a classical string quartet playing. They were sheltered by a blue and white canopy in the middle of the field.

About a dozen children took part in a coloring contest. There were three classes, up to age twelve, and prizes awarded.

It was difficult to decide how to structure the classes for judging. We ended up with a Vintage class consisting of everything through the 2002 and Bavaria. Then there was a class for all 3-series cars and a third class for the big cars (5, 6, 7 and 8-series). The trophies were beautiful — heavy etched glass on a glass base.

Bob Logan from Bellevue BMW brought out an M3 in Dakar yellow for display. Kevin York from BMW Seattle brought out a Touring and a BMW Mountain Bike. Steve Norman, with wife Annie, owners of BMW Seattle, arrived direct from a rally in Oregon, driving the famous Red Dog, hero of the Alcan Rally. Exeter Garage had a large display of Meguiar's products and helped with final prep of the cars. They also donated a full detail won by Steve Melrose.

BMW sells more 3-series cars than all others combined. But, again this year, this was our smallest class. Plus, there were no E21 or E36 3-series, only the E30s were there. Only five cars entered and the class was won by Al and Bea Lancaster.

The Vintage class had four 2002s, three coupes and an Isetta. The Isetta was a very rare Convertible model; it was the same car featured in the Kustom Kulture art show. Tom Nast brought his supercharged 2002. Joe Feldhaus brought out his 2000 CS, which old

timers will remember as belonging to Joe Sr. It last competed in the 1983 concours. The class was won by the Fishers' gorgeous red 3.0 coupe. The car had been restored from the ground up and had not been driven until the morning of the concours.

The big car class was our biggest - eleven 5 and 6-series. One might think this was the M class since seven of the cars were stuffed with the 24-valve 6-cylinder Motorsport engine. There were four M5s, two M6s and an M635. This class had enough power to light up a small town. But the winner was a 1979 528i in extraordinary condition. Richard Brown's reseda 5 made up for any lost ground with bonus points awarded for age and mileage. Richard won the most competitive class and the Best of Show

trophy. The Best of Show trophy was a beautiful soapstone carving donated by Gail Davidson in memory of her husband, Andy.

Entrants' Choice was won by Richard Pelman and his '71 2002. This was a real emotional choice since Richard had owned his car since new and it had been his daily driver until recently. The Spectators' Choice was the beautiful red coupe of Steve and Zoe Fisher.

Event chairs Al and Bea Lancaster have done it again, another super event. Thanks to the judges and scorers who worked in some pretty warm weather. Thanks to Columbia Winery for providing the site. And thanks to all who entered cars or came as spectators. Let's do it again!

1994 Concours d'Elegance Results

Best of Show	Richard Brown	'79 528i
Entrants' Choice	Richard Pelman	'71 2002
Spectator's Choice	Steve/Zoe Fisher	'72 3.0CS
Vintage Class	1. Steve/Zoe Fisher	'72 3.0CS (red)
	2. Milo Johnstone	'58 Isetta (white)
	3. Tom Nast	'72 2002SC (white)
3-series Class	1. Al/Bea Lancaster	'86 325es (bronzit)
	2. Brent/Betty Wilde	'85 325es (black)
	3. Tony Niolu	'91 318is (white)
Big Car Class	1. Richard Brown	'79 528i (reseda green)
	2. Brian Yotz	'88 M6 (red)
	3. David/Lucetta Lightfoot	'88 M5 (black)





The Future According to BMW

By David Lightfoot

BMW recently held a one day engineering conference on the future of the automobile, as BMW sees it. The introductory address was made by BMW's Head of Research, Professor H. H. Braess.

Dr. Braess pointed out the tremendous amount of progress that has been made. Prior to World War II, the BMW 326 had 50 hp and consumed fuel at the rate of about 16 mpg. In 1966, the BMW 2000 had 100 hp and got about 24 mpg. Today, the Euro 520i with 150 hp achieves about 32 mpg. And, of course, the levels of comfort, safety and practicality have improved immeasurably.

But, as Dr. Braess pointed out, what has increased even faster are motorists' expectations. The public, at least in Europe, would like 70 mpg, zero emissions, current performance levels, 100% recyclability of the vehicle, and a lower initial cost.

The conference, being devoted to engineering, remained within the realm of what can reasonably be expected, in the near term and in the coming decades. The conference specifically focused on issues relating to drive energy and drive systems.

However, BMW did, with typical thoroughness, explore the overall energy issue. Questions considered included: How long can today's types of energy still be used? What alternative types of energy might be used? When should we start using such energy? How must future transportation systems be conceived?

One conclusion that was reached, was that the explosive growth of the world's population seems certain to overwhelm virtually any progress that science can make. Maybe we're working on the wrong part of the problem here, folks.

Still, BMW is diligently pursuing progress in mobility in general, and the automobile in particular. The conference gave a glimpse into what to expect from BMW in the near term (before the end of the decade), the mid-term (within ten to twenty years), and BMW's vision for the long-term (fifty years out).

Overcoming Resistance

Near-term improvements in fuel consumption will come from further refinements of existing technologies. Apart from the engine itself, better fuel economy can be achieved by reducing rolling resistance, reducing air resistance, using waste energy,

and increasing the efficiency of the drive mechanism.

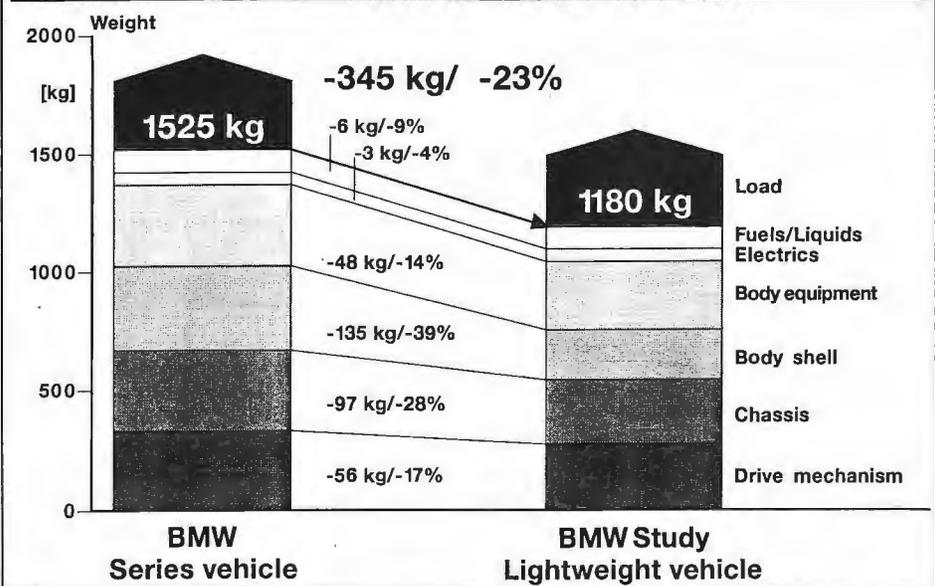
One of the major factors affecting rolling resistance is vehicle weight. BMW employs an "intelligent" mix of materials. That is, the most suitable material is used for each component, taking all requirements into account.

A model study carried out by BMW has shown that the weight of a modern production car can only be reduced by about 23 percent without affecting something the driver would notice. (Other than the price!)

Rolling resistance can be improved considerably by using silica on the surface



Weight reduction potential

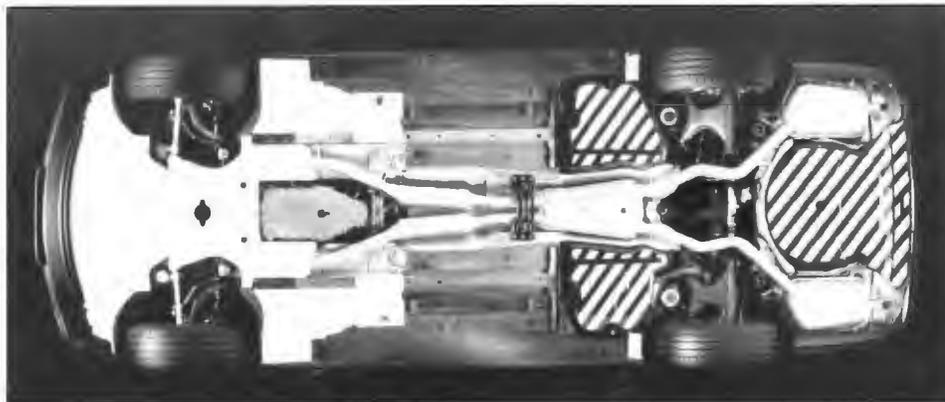


The aerodynamic model is the yardstick for the development of the series. When developing new series vehicles, BMW's designers and engineers aim to come as close as possible to the extremely low Cd-value of this model.

of the tires. This is supposed to also increase running smoothness and wet weather performance. The potential is there to reduce rolling resistance by 30 percent and improve fuel economy by four percent. That's a lot for just a change in tires.

Improved aerodynamics has been an important aim in the development of new BMWs for some time now. With the current notchback design of BMWs, about 40 percent of the drag comes from the outer skin, the underfloor accounts for another 40 percent, and the remaining 20 percent comes from flow losses through the car (to cool the engine, brakes and provide interior ventilation).

BMW has reached the point where improvements from the outer skin are very limited. In the underfloor area, two-thirds of the drag comes from the wheels and wheel arches. Again, there is little room for practical improvement in this area. BMW plans to smooth the underfloor area even more and use large panels to tidy up this area. Also, axles and exhaust systems will be designed to merge smoothly into the other underside parts of the car.



The underfloor accounts for 40% of aerodynamic drag.

Offering perhaps the greatest potential for improvement is the air flowing through the car. Improvements in this area require a lot of detail work. The cover photo shows a working model being used to study improvements in air flow through.

By exploiting all potentials, BMW expects to achieve coefficients of drag of less than 0.25 on future models. This compares to current models that are generally in the range of 0.32 to 0.36.

Surprisingly, one of the best ways to save fuel is to retain waste energy otherwise lost and then using it later on. This will be done on future BMWs via a newly patented latent heat reservoir. This reservoir is non-corrosive, environmentally compatible, chemically stable and fully

recyclable. When there is heat in the reservoir, this heat can be used to provide heat to the passenger compartment quicker and to demist windows. The heat also allows more efficient engine operation, including improved economy and reduced emissions.

Engine Technology--Power from Fuel

The heart of every BMW is its engine; "motor" is BMW's middle name. BMW sees a number of opportunities to increase combustion efficiency in both its gas and diesel engines. Diesels continue to grow in Europe due to their inherent efficiency and the high cost of fuels in Europe. BMW's engine specialists anticipate an increase in fuel economy of more than 20 percent just from improvements in diesel engine efficiency.

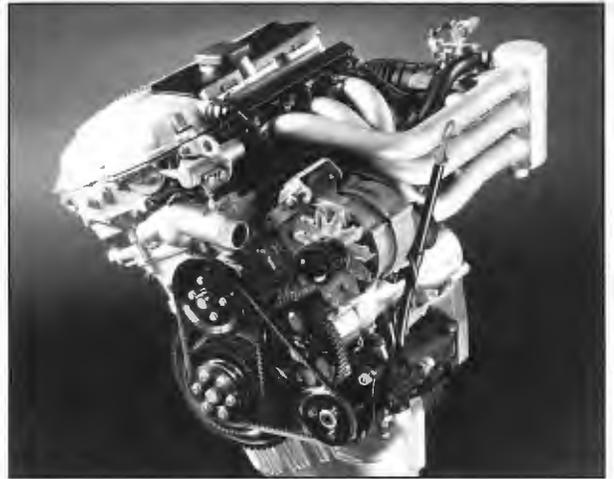
The innovations to be used to improve diesel performance include better turbu-

lence chamber combustion, direct fuel injection, exhaust gas turbos with variable turbine geometry, and electronic wastegates for the turbos.

BMW has experimented with temporary engine switch-off. In taxi fleet tests a 30 percent savings was realized. However, BMW notes that consumers seem unwilling to accept an engine that shuts off every time the car is at rest.

Theoretically, fuel economy should be able to be doubled before the physical limits are reached. However, as a practical matter, engines do not always run at their optimum level in the real world. Continuously variable transmissions help to keep engines in the most efficient rpm range.

For future small cars, BMW is devel-



A concept study of a three-cylinder gasoline engine.

oping both a gas and diesel three-cylinder engine. These are small engines that utilize a compensation shaft to dampen vibrations. These engines, now being developed, will probably find their way into the BMW 2-series and a small Rover vehicle, perhaps the new Mini. BMW has committed to a vehicle that achieves about 70 mpg being on sale in about six years.



The experimental three-cylinder diesel engine.

Closer to introduction is a new four-cylinder diesel. This engine will be introduced at the end of 1994 in the 318tds. The current 325tds has been popular in Europe due to its excellent performance and extraordinary fuel economy. The 318tds should perform like, well, like a 318. But it will achieve over 50 mpg at a steady 56 mph. The car would not be sold in North America unless diesels make a comeback here.

But the quickest way to improve emissions is not through engine technology at all, but through reformulated gasoline. The advantage is that the effect is realized immediately, and in existing automobiles. The USA is in the lead in this area. By



New Diesel engine for the BMW 3 series: for the BMW 318 tds — a lively 4-cylinder diesel.

changing the characteristics of fuel, emissions can be reduced by one-third. California is expected to be the first to mandate reformulated fuels with other states to follow. Introduction in Europe is expected by 2000.

Natural Gas

Natural gas is available in virtually unlimited quantities. Already, over 800,000 vehicles use natural gas in the US, Argentina, Italy, and Russia. Existing engines need little modification to run on natural gas. Emissions are mostly methane, which is produced by nature in large quantities.

BMW has three vehicles running on natural gas on a daily basis. The biggest problem with natural gas is the elaborate tanks required. There are two possibilities for the tanks: compressed natural gas (CNG) in high pressure tanks or liquefied natural gas (LNG) in cryogenic tanks. Both systems require sophisticated pressure reducers, metering systems, and injection valves. CNG requires tanks able to withstand tremendous pressures. LNG needs extraordinary insulation of the tank to minimize heat gain.



BMW 316i Compact is powered by compressed natural gas (CNG). This concept vehicle's gas tank is located in the equivalent back seat area of the series vehicle.

All this equipment takes up a lot of space in the car. Additionally, the delivery infrastructure would need to put in place. Natural gas is not a short-term solution, but it has potential for the long-term. BMW continues to study natural gas with their three test cars.

Dreaming about using hydrogen as an automotive fuel.

Hydrogen

Automotive engineers are dreaming about using hydrogen as an automotive fuel. Hydrogen is one of the most common elements in the world, is light, and is derived from water and oxidates back to form steam in the combustion process.



This 316i Compact is powered by compressed natural gas. Refills are through the front kidney.



BMW's "Hydrogen Fleet": three generations of the big BMW series and a 5-series from the Seventies (in the background), all alternatively powered.

The big issue with hydrogen is once again the tank. The only practical way to store hydrogen in a passenger car is in liquid form. Tanks have been developed which hold about 38 gallons of liquid hydrogen, which has the energy equivalence of about 11 gallons of gasoline.

Liquid hydrogen is -250° C when put in the car. The temperature rises about 1° C per day. Thus, if the car is not driven, pressure builds up and must be bled off. Other potential tank problems include fire, mechanical damage and pressure if all relief valves are blocked. BMW, working with specialist companies and public authorities, believes it has solved these problems.

Many problems remain to be solved

and hydrogen as a vehicle fuel is probably decades away. BMW continues to learn from its hydrogen fleet, which consists of the larger cars since they have more room for the equipment.

Currently, hydrogen is the only fuel that qualifies a combustion-engined car as a zero emissions vehicle. Long-term, BMW sees the ideal solution as hydrogen-powered cars, with the hydrogen being produced with electricity from solar power plants.

Electric Cars

BMW has over 20 years of experience with electric cars. An electric 2002 was



The tank for the deep-cooled liquid hydrogen is a highly-insulated vacuum. In terms of cost, weight and volume, this tank system is one of the best that can be used in hydrogen driven automobiles.

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used in the Munich Olympics in 1972 to lead the marathoners. The lack of emissions made for easier breathing for the runners.

The most recent BMW electric is the E1. The E1 is a fully developed car that is virtually production ready. But BMW sees the future of electric vehicles as limited. Because of the range limitations imposed by batteries, BMW sees the pure electric car as a niche vehicle for urban purposes.

Because BMW must have an electric vehicle for California sale by 1998, BMW engineers are proceeding from the current state-of-the-

art. All components of the car are final, other than the battery. One of the most critical is the drive system. BMW has developed a synchronous motor which they feel is the best compromise between weight, size and performance.

All alternatives for the choice of battery are being considered. Currently, all leave a lot to be desired. BMW has also made the point that the electricity must come from somewhere, and usually there are emissions from the powerplant. Plus, there are the energy demands of producing two vehicles (one for urban use, the other for the open road) when one would otherwise be sufficient. Finally, BMW has serious doubts as to the market acceptability of electric vehicles given their many limitations.

Hybrid Drive

BMW believes very strongly in hybrid drive being a workable solution in the near-term. Hybrid drive combines the advantages of various drive systems.

BMW proposes that the best solution is a vehicle with a combination of a combustion engine, electric-drive and batteries. Such a vehicle could run free of emissions in town while offering the usual



BMW Electric Automobiles: three generations of the small series and E1 (in front).



The E1 study was unveiled at the IAA '93 in Frankfurt/M. It shows how a smaller BMW vehicle could be achieved, driven either by an electric motor, a hybrid system or an internal-combustion engine, as can be seen here.

range on longer trips. The challenge is to minimize the weight and size of the system.

While hybrid systems could be built in almost unlimited combinations, there are two basic approaches, both of which are

being pursued by BMW.

The first is parallel hybrid drive with a combustion engine and electric motor acting jointly on the drive train. The electric motor is positioned parallel to the axis of the combustion engine. The electric motor is then connected directly to the conventional drive train via a high-performance drive belt.

The two drive systems can be used together when peak performance is needed. When only the combustion engine is powering the car, the batteries can be recharged by switching the electric motor to generator mode. In electric drive mode there are, of course, no emissions.

is testing a new asynchronous electric motor with integral power electronics for the parallel hybrid system. This motor would be located between the combustion engine and the gearbox and would not require the separate belt system to transfer power.

Because batteries continue to be the weak link, BMW is exploring other accumulator systems. A super-capacitor has been considered and rejected for the foreseeable future. More promising are flywheel accumulators. In this case, electrical energy is converted by an electric motor into rotational energy and stored in a flywheel. Such systems are currently

flywheel is made in one process as a thermoplastic part from glass and carbon-fiber. Another important step is the development of a hybrid bearing, a combination of permanent-magnetic and electromagnetic bearing units. These bearings run without any contact or wear.

Summary

The conclusion to the engineering day was a speech by Dr. Wolfgang Reitzle, BMW AG board member in charge of development, purchasing and technology. Dr. Reitzle announced that during 1995 BMW will begin selling BMWs running on natural gas to fleet operators.



Concept studies for the BMW Hybrid Automobiles: the 3-series is driven by a series hybrid system and the 5-series by a parallel hybrid system.

The other approach is serial hybrid drive. In this case, the all-electric drive system is supplemented by a combustion engine with a direct-drive generator. The benefit with this system is that the generation and use of energy are completely separated.

The combustion engine may be run within a very limited engine speed range. This range would be where the engine has peak efficiency. The combustion engine can be simplified and the emissions can be reduced significantly. In fact, because the combustion engine would only operate at optimum levels, the serial hybrid car qualifies as an ultra-low emission vehicle.

These hybrid vehicles are showing much promise. Standard production depends on further development of the key electrical components, mainly the motor and battery system. BMW, with partners,

available.

BMW has developed a system using a low-cost production technique where the

On the mileage front, Reitzle promised that by 2000 every BMW would achieve over 22 mpg and that there would be a



The integral engine: a new kind of electric motor whose design offers advantages for the parallel hybrid system. The engine and controller are housed together in one unit.

BMW and/or Rover for sale delivering 70 mpg.

Dr. Reitzle also called for a political consensus on the energy issue, a long-term policy, and clear-cut economic conditions in general. He spoke in terms of 50 year planning so that the world could develop alternatives to fossil fuels as they are depleted.

Perhaps it is possible to achieve a long-term consensus in Germany, but Americans wouldn't be able to do this for two years, much less 50. And a consensus for the whole

world is out of the question. Instead, I suspect the solutions will be found by a combination of politics and the marketplace. And judging by what is being developed, it doesn't look good for you shade tree mechanics.



The flywheel reservoir: Applying this principle, electrical energy is converted into rotational energy by means of an electric motor and stored in the flywheel.



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From Left to Right: Barbara Guinn, Greg Pardee, Nelson Nakasone

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Barbara Guinn



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INFORMATION

...from the editors

8-Series Successor

BMW boss Bernd Pischetsrieder has given the green light to a radical new V8-powered convertible to replace the slow-selling 8-Series in late 1997.

Codenamed E51R and based heavily on the next-generation 5-Series, the new 2+2 employs a roof-folding mechanism that can quickly turn the car into a full-fledged coupe—very similar to the Mitsubishi 3000GT convertible set for introduction later this year.

It will join the smaller U.S.-built BMW Roadster and, though contemporary in design, will be positioned much like the V8-powered 507 model of the 1950s.

By using the same rear-drive platform as the eagerly-awaited 5-Series, E51R profits from sophisticated underpinnings that promise to provide it with levels of ride and handling better than the much larger and heavier 8-Series.

And even though it is derived from the smaller 5-Series, BMW intends to position the new roadster as its premiere model in direct competition with the Mercedes SL. As a result, expect pricing to remain in the current \$65,000-\$100,000 range of the 8-Series.

The front end features a MacPherson strut system mounted on an external sub-frame to reduce vibration and improve steering response, while the rear end uses a complex multi-link system with integral rear-wheel steering based on the kinematic axle on the 850CSi.

Other features that carry over from the 5-Series include an improved version of BMW's Automatic Stability and Traction Control (ASC+T), and a new five-channel antilock braking system.

BMW considered potential engines for its new convertible knowing stringent new European Community fuel consumption regulations would not favor the thirsty 5.4-liter V12 from the 850CSi. So it has chosen two new V8s instead.

Both engines—a 3.5-liter with 240 hp and 4.5-liter with 300 hp—will first appear in next year's 5-Series and, provided BMW can keep the E51R's weight down, the car should at least match the 8-Series' 0-60 mph time.

Other engines, including a 160-hp

turbocharged 2.8-liter diesel, are being considered but have yet to gain the blessing of Pischetsrieder, who would like BMW's new coupe to project an image of contemporary performance, something the 8-Series has failed to do in its four years of European sales.

Mated to the E51R's V8 engines is an all-new transmission which, like Porsche's proven Tiptronic system, combines sequential manual shifting with BMW's five-speed automatic. A six-speed manual will also be available.

Insiders point out that BMW's styling team, headed up by American Chris Bangle, has worked hard to distance the E51R from the 5-Series by providing it with a distinctly rakish appearance that mixes bold shapes and colors with the traditional BMW styling cues—such as a kidney-shaped grille and round headlights.

Insiders admit the decision not to produce an 8-Series cabriolet, after spending millions of dollars developing and testing it, hurts the viability of the flagship coupe line and was one of the factors that made the E51R and its convertible hardtop a go project.

The E51R is considerably more compact than the oversized 8-Series, but clever mechanical packaging means it is able to allow for small rear seats despite the inclusion of the complex rear suspension and hydraulic roof-folding mechanism.

Inside, it gains high quality plastic moldings for the dashboard and door panels, with traditional analog instruments and switches borrowed from the next-generation 5-series.

The seats incorporate the same integral seatbelt mechanism used on the 8-Series and form part of a impressive safety package that includes the active roll-over bars originally developed for the aborted 8-Series cabriolet together with driver and passenger airbags. (*AutoWeek*)

➤➤➤ Coming within a year: BMW plans to offer a Porsche Tiptronic-like automatic transmission for the 850Ci and 750iL. (*Automobile*)

👁️ **BMW's next 5-Series lineup, making its debut at next year's Frankfurt show, offers something for everybody. It will come in sedan, wagon, coupe and convertible body styles, with six engines — four gasoline, two diesel — to choose from. The overall size of the 5 will remain the same, but the wheelbase will be longer. (*Road & Track*)**

❖❖❖ **BMW chairman Bernd Pischetsrieder bristled at suggestions that Honda was supplying components to then partner Rover at below-market prices. "In some component prices, they are anything but competitive," he said, citing Honda-supplied anti-lock braking systems that are 40 percent more expensive than Bosch's. The only way BMW would continue buying Honda parts for Rovers in the long term would be if Honda shares in the development of future cars, he said. (*Automobile*)**

Europeans are discovering minivans, finally. Nearly every European manufacturer plans to introduce a minivan in the next few years. For the late nineties, BMW is expected to cede its minivan development to Rover; Land Rover's development program was more advanced, and the brand was considered more appropriate for people movers. (*Automobile*)

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R1 REVISITED

Last month we ran photos of the R1 roadster and said they represented the final production version. Well, close.

The photos were spy shots from *Auto Motor und Sport*. They had photographed a near final version of the car, with tape covering some of the details. The photos were scanned into a computer and digitally "untaped."

BMW NA spokesman Rob Mitchell says the photos were very close, but that



Munich-based Group C and F2 constructor Peter Stuertz has built a WSC car powered by a BMW 4.0-liter V8. The car took about eight months to complete before Stuertz showed it at Lime Rock. BMW said the car is not a factory effort, but was done "with our blessing because we thought the project had merit." Stuertz will have John Paul Jr. test the car over the next six to eight weeks, though there is no firm date for it to race. (*AutoWeek*)

BMW NA plans to establish a racing headquarters in the U.S. in conjunction with construction of the Spartanburg factory. A World Sports Car (WSC) program will pit BMW against the factory Ferraris. The U.S. race headquarters would build engines and service competitors in IMSA's Supercar, Firehawk and GTU. The company is expected to launch a major effort in the Firehawk series. The 4.0-liter BMW V8 is estimated to produce 580 hp in race trim.

Proposals have been made by Hendrick Motorsports and former Mazda motorsports manager Dick St. Ives to BMW regarding a possible U.S. race shop. Hendrick is best known for success in NASCAR. Hendrick expects a major budget from BMW to support a complete new physical plant.

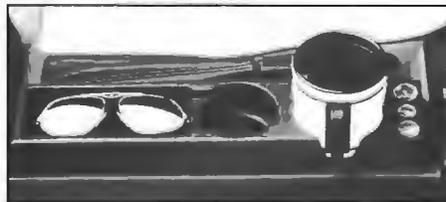
Unlike previous North American race programs, the program under consideration calls for establishment of an on-going involvement based on the release of new performance cars. It is thought that this will provide stability. (*On Track*)

Console Valet and Cupholder for New 3-series

BMW of North America introduces a new accessory for its popular 3-series model range. The Console Valet and Cupholder can be installed in any model of the newest 3-series, providing easily accessible storage space between the front seats. In addition to a storage well for items such as sunglasses and a garage door opener, there are also two cupholders and an illuminated coin or token dispenser. The storage well and one cupholder can also be used as a mounting location for a cellular telephone.

The Console Valet is made of durable molded resin, matching the grain of the existing material in the 3-series dash and shift console area. The surface resists spills from hot or cold liquids and is easily cleaned. Installation of the Console Valet without a cellular telephone, is a snap in procedure, requiring no cutting, drilling or screws. The Console Valet comes with all the necessary hardware to mount a cellular telephone or relocate the ashtray to the storage well area.

The BMW Console Valet, part number 82 11 1 468 391, is available from all BMW dealers at a suggested retail price of \$139.00. (BMW NA)



the car will be even better looking. Production is to start in September '95 for shipment to Europe. U.S. cars will be available in early 1996.



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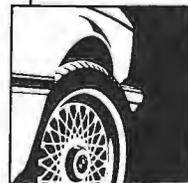
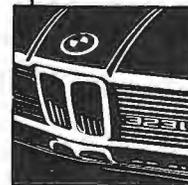
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►►► Dan Tackett, Pacific Region VP of the BMW CCA, recently toured the Spartanburg facility and filed this report: It was not at all what I expected. When I think "German," I think of extreme technology, conformity, and stoic efficiency. But this plant is about people — "associates" work in teams, everyone (including the President!) wears a white jacket with only their first name on it, and all parking is on a first come first served basis. There are no walls in the 1.2 million sq. ft. facility (even the ultra-modern painting facility is glass-enclosed). And most importantly, the assembly line crosses in two places so every "associate" sees the cars at or near completion to feel connected to the whole process. Our host said that "this plant is not about technology, it's about communication." BMW will use several US suppliers and involve them in designs to keep them accountable for quality.

The building itself is completed now, and equipment is being installed. The Vehicle Preparation Center for "imported" BMWs in the Southeast will be on site. Cosmolene shipping wax will be removed from them, recaptured, and sprayed on the cars that leave the plant. Power is provided by steam and electricity generated on site by natural gas-powered turbines. Air leaving the paint area (all water-borne) will be filtered through water filters before leaving the plant cleaner than it entered. The Visitor's Center/Museum is called Zentrum, and will include static displays, paintings by local artists, and an auditorium. Plant tours will be conducted in English, German, and Southern. We wondered whether the "Southern" tours would take longer than the others. The first cars, 318i 4-doors, will roll off this Fall, with the now-public Roadster to begin production for the entire world in the Fall of '95.

I came away from BMW Manufacturing very impressed.

🏠 The BMW Manufacturing Corporation plant in Spartanburg, South Carolina is on target for completion in early fall. The first car built will be 3-series four-door sedans. Already 266 "associates" have been hired, including 89 who have received extensive hands-on training in Munich. About 35 new associates are hired each month.

After the factory has been "validated," the factory will begin producing the R1 roadster. The roadster will be produced in the U.S. for all markets worldwide. (BMW Magazine)

NAFTA OR NO, CURRENT REGULATIONS STATE THAT MANUFACTURERS MUST BUILD CARS IN MEXICO IF THEY WANT TO SELL CARS IN MEXICO. BMW MAY RESPOND BY ERECTING AN ASSEMBLY-ONLY FACILITY INSIDE THE COUNTRY. THE RESULTING PRODUCTS WOULD BE SOLD WHOLLY SOUTH OF THE BORDER. (SPORTS CAR INTERNATIONAL)

LIGHTFOOT TECHNIQUE?

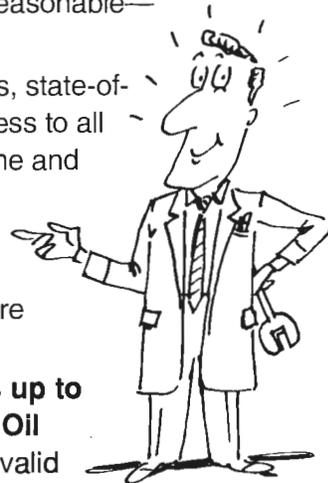
AutoWeek tested the new M3 and came away as impressed as everyone else. They called the car a "true five-seat sports car." They also said it was very close to being the perfect enthusiast's car. The testers found the new M3 to be far more civilized than the old M3, much faster, priced the same, and even economical. "We averaged close to 25 mpg. Rest assured, precious little of that is due to lightfoot (Ahem-ed.) driving techniques.

Ultimately, BMW wants the M "brand within a brand" to outsell Porsche. It will take more than the M3 to do that. Coming soon will be an M3 with a five-speed automatic transmission (probably January '95), a four-door M3 and a convertible M3.

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It's such a breakthrough, Mercedes-Benz and Bosch call "it the airbag of active safety." So it should come as no surprise that Mercedes was incensed when it discovered that BMW planned to be the first to offer journalists a drive in a car equipped with its so-called intelligent braking system.

Mercedes still believes that BMW stole some of the kudos for anti-lock brakes after primarily Mercedes and Bosch developed the technology. So this time, Mercedes was determined to get it first. They hurried and organized a test drive of its system in Sweden ten days before BMW's planned event.

Mercedes says it's been working with Bosch since 1987 on an automatic braking system designed to prevent excessive oversteer and understeer. The device will be offered as a \$3000 option on V-8 and V-12 S-class cars later this year.

The system is a further development of ABS and traction control. It works by selectively applying or releasing the brakes on individual wheels in order to hold the driver's chosen course. It uses steering angle and throttle-opening sensors to monitor driver intentions. Yaw-rate and lateral-acceleration sensors monitor the car's behavior.

The system takes some getting used to. One has to gain confidence in the system and fight the urge to correct oversteer with opposite lock.

BMW hasn't said when it will offer its version of the system. Called DS C3, it uses the same Bosch hardware as the M-B system.

BMW has taken a more active-driver approach than Mercedes — the BMW system can be switched off. BMW engineers say it's possible to write computer programs that allow the driver to decide exactly how much drift s/he wants before the system intrudes.

Look for it on the biggest Bimmers in '96. (*Car & Driver*)

☆☆☆☆☆Dr. Karl Sommer has been appointed executive vice president of BMW (U.S.) Holding Corp. and chief financial officer for BMW's North American activities. (*AutoWeek*)

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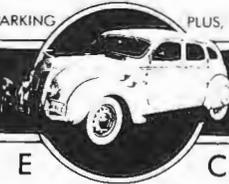
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'80 320i engine, instruments, front brakes and suspension, left side sheet metal. Ted Rodgers 230-9006 eves.

'77-'79 320i Calloway turbo kit with inter cooler and fuel enrichment system. Turbo needs rebuild. \$500. Call for full details. Paul 752-7549.

'77 320i beige, Metric Mechanic 4-sp. transmission and 155 hp sport motor with Weber downdraft and/or Weber 40 DCOE sidedrafts. New brake system complete, Koni shocks and progressive springs. Left front fender crunched but can be driven, great parts car. \$2000 takes it all. OBO. Tom 509-548-4494 after 6 pm. Must sell.

320i parts: new air filter \$7, new oil filter \$3, bra in very good condition \$35, '79 distributor \$25, upper strut bearings \$15, factory floor mats \$10. Paul 752-7549.

1600 parts: disassembled engine, transmission, differential. Ted Rodgers 230-9006 eves.

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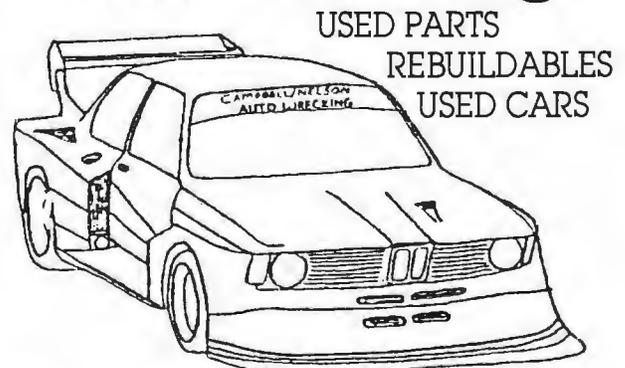
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