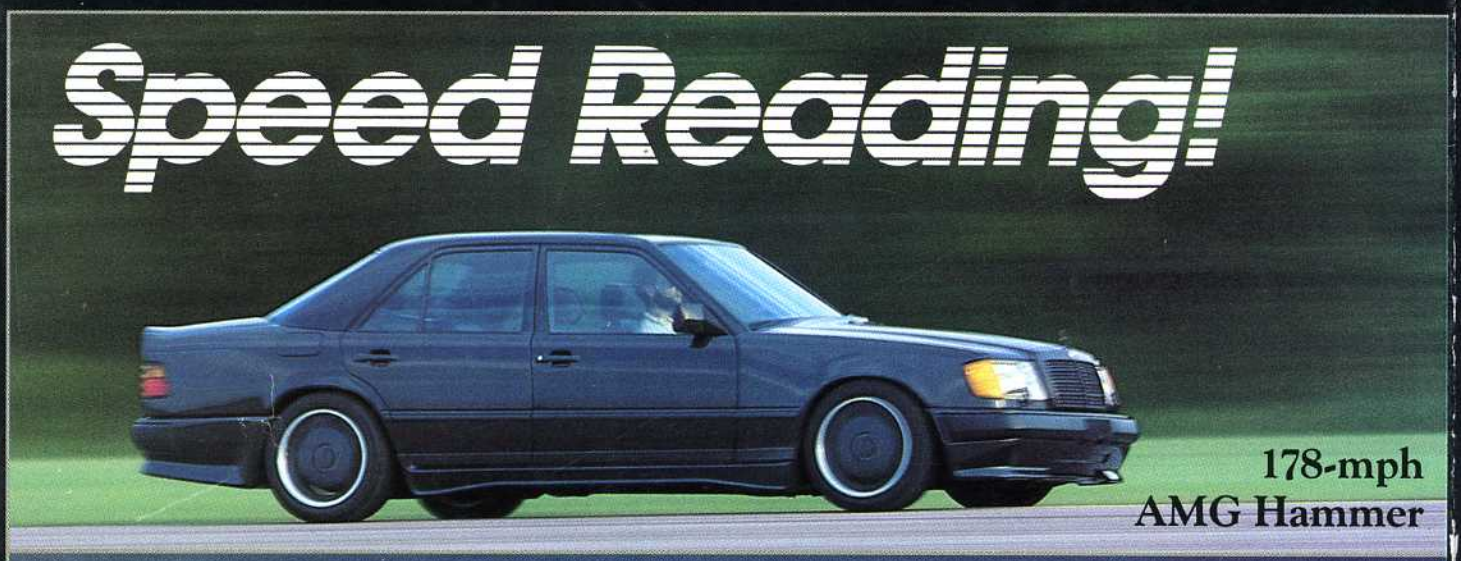
1987 European Preview Issue

CAR AND DRIVER

DECEMBER 1986 • $2.50

Speed Reading!



178-mph
AMG Hammer

238-mph
Mazda RX-7 Turbo

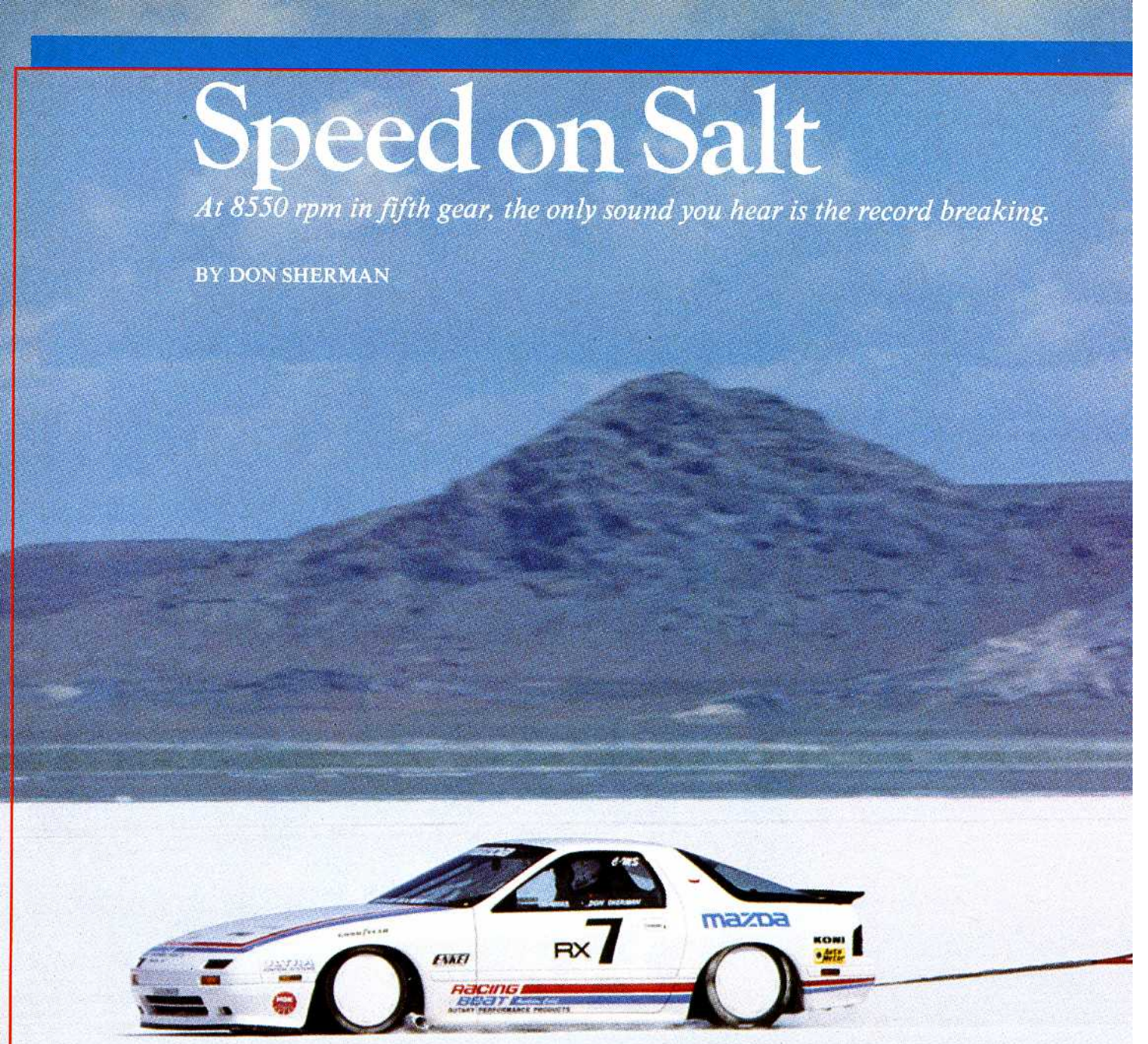
165-mph
Porsche 928S4

PLUS:
Citroën CX, Renault Medallion, Mercedes 300TD, Alfa Romeo Milano, 1886 Benz, and a token Honda

Speed on Salt

At 8550 rpm in fifth gear, the only sound you hear is the record breaking.

BY DON SHERMAN



• Picture a scene bright enough to be a bleach commercial: azure skies, air so clean you can almost reach out and touch the purple-mountain majesty, enough sunshine to jump-start a nuclear reactor. As far as the eye can see, the ground is pure white salt, as flat and as crisp as a starched bedsheet.

A small crowd assembles at this desolate setting in northwestern Utah every year for but one purpose: to speed across the salt flats as fast as their tuning abilities will carry them. Sponsored by the Southern California Timing Association and Bonneville Nationals, Inc., Speed Week is motorsports competition in its simplest form: go when the man at the starting line says to, stand on the gas to your heart's content, and don't lift until you break a record.

Twice before in the past dozen years, the sirens of Bonneville beckoned us. Each time we answered the call with velocities worthy of the record book, but the 1986 event will be the one we won't soon forget. On the way to a 244-mph blitz, we will encounter our share of hurdles: poor traction, debris on the course, and an unscheduled parachute test prompted by a 200-mph spin-out. When our hotel is evacuated at midnight because of carbon-monoxide poisoning in the air-conditioning system, we will begin to wonder if a fishing trip in the Rockies wouldn't have been a better idea.

Fortunately, *C/D* is allied with a winning team. We began preparation for the 1986 Speed Week more than two years ago by assembling an unholy triumvirate: Mazda Motors would supply the turbocharged-rotary-engine technology, Racing Beat would prepare the engines and wrap them in a competitive car, and *Car and Driver* would show up with helmet in hand for the fun part—driving at insane speeds. Jim Mederer, Racing Beat's chief engineer, would manage the project from start to finish, making sure everybody did what he was supposed to at the critical instant. Without his guidance, we'd still be fumbling around square three, wondering if the parachute goes on the front or the back bumper.

Thanks to Mederer's master touch, we smack the salt with the sleekest speedship this side of an SR-71. The Racing Beat crew started with a 1986 Mazda RX-7—no slouch itself—jacked up the body shell,

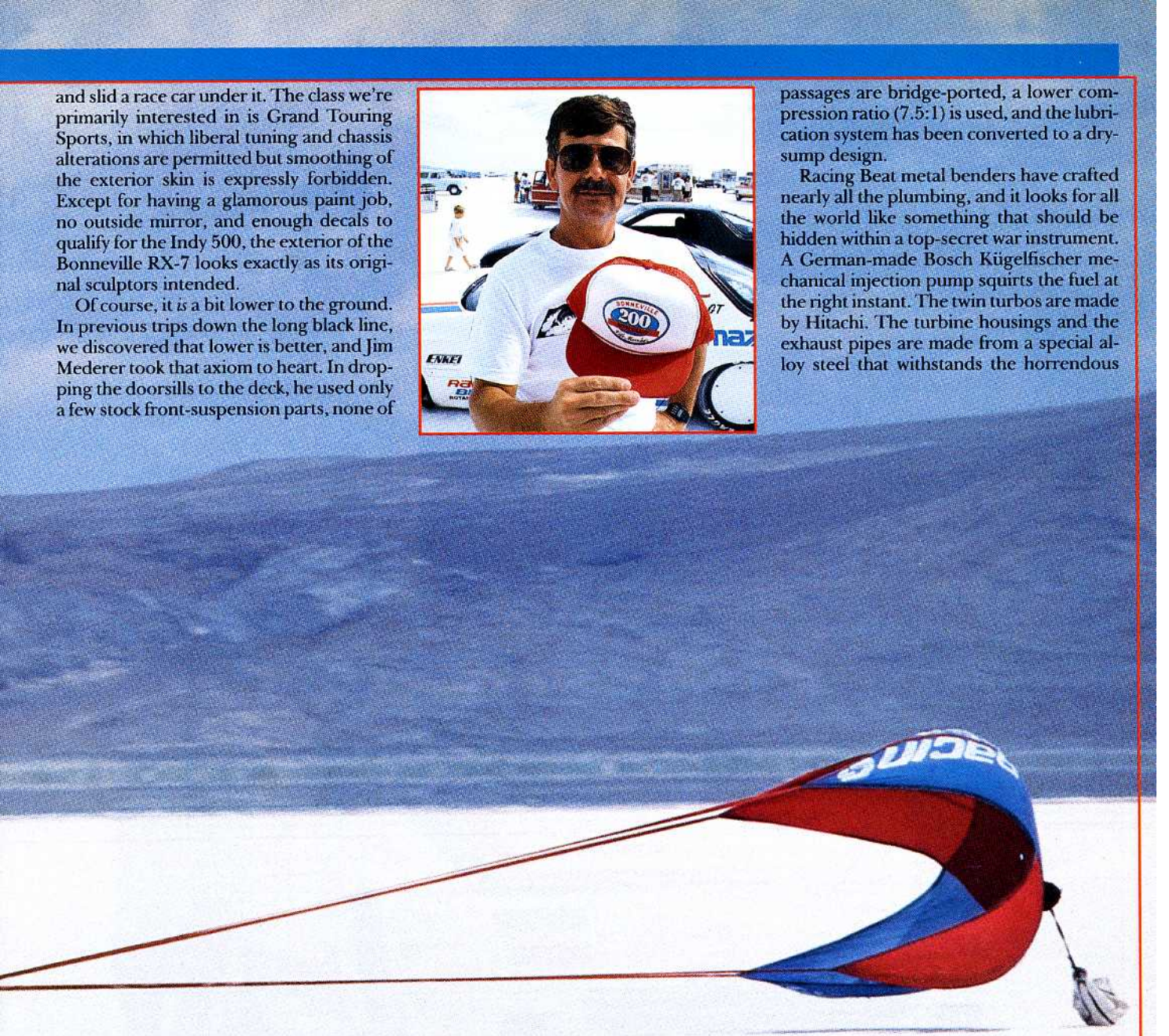
PHOTOGRAPHY BY GEORGE LEPP

and slid a race car under it. The class we're primarily interested in is Grand Touring Sports, in which liberal tuning and chassis alterations are permitted but smoothing of the exterior skin is expressly forbidden. Except for having a glamorous paint job, no outside mirror, and enough decals to qualify for the Indy 500, the exterior of the Bonneville RX-7 looks exactly as its original sculptors intended.

Of course, it *is* a bit lower to the ground. In previous trips down the long black line, we discovered that lower is better, and Jim Mederer took that axiom to heart. In dropping the doorsills to the deck, he used only a few stock front-suspension parts, none of

passages are bridge-ported, a lower compression ratio (7.5:1) is used, and the lubrication system has been converted to a dry-sump design.

Racing Beat metal benders have crafted nearly all the plumbing, and it looks for all the world like something that should be hidden within a top-secret war instrument. A German-made Bosch Kügelfischer mechanical injection pump squirts the fuel at the right instant. The twin turbos are made by Hitachi. The turbine housings and the exhaust pipes are made from a special alloy steel that withstands the horrendous



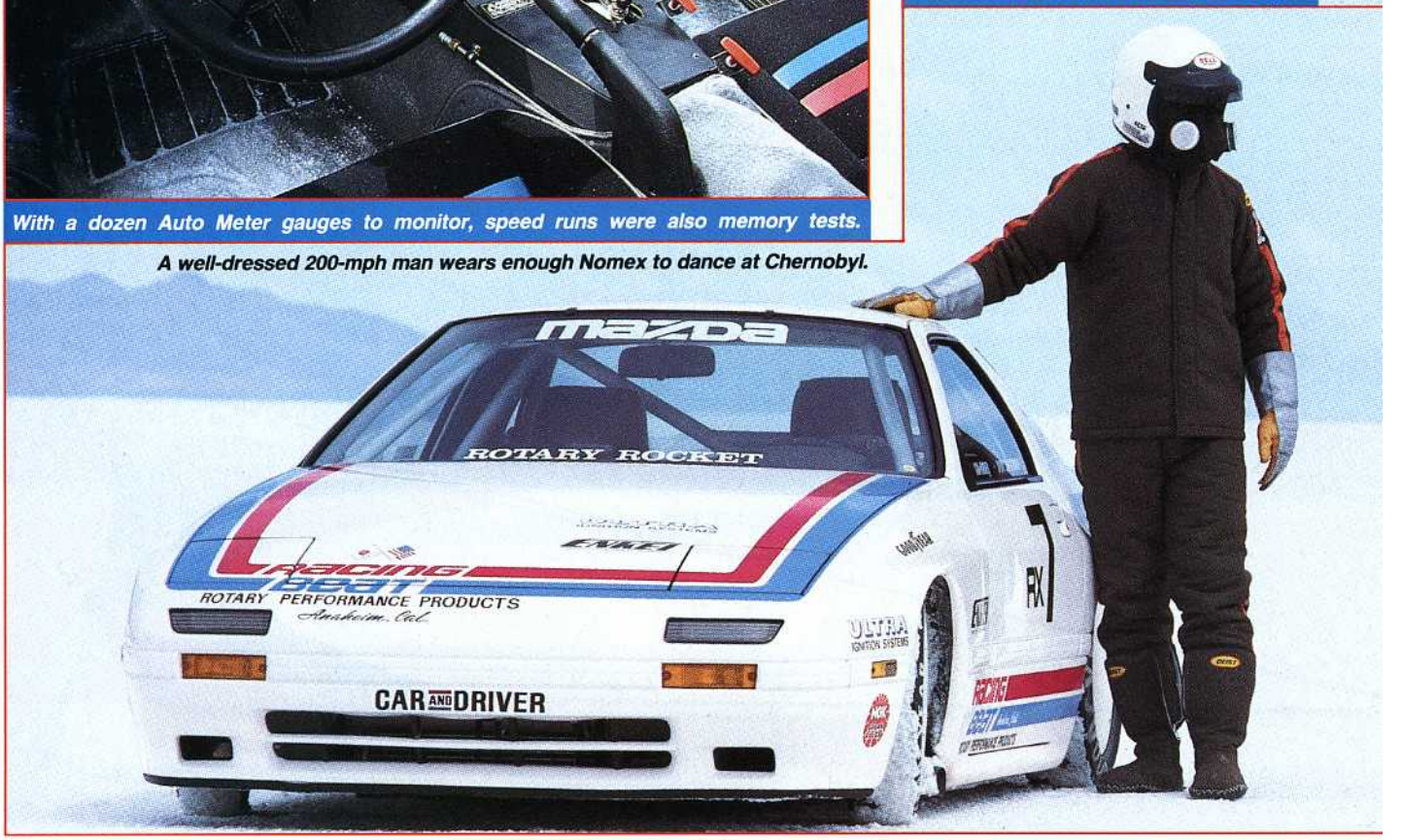
the RX-7's rear suspension, and a very special set of tires. We aroused the interest of the Goodyear Tire & Rubber Company, and it responded with tires that will make major contributions to both our speed and our safety quotient. The rear rubber is a standard design normally used at the front of a Funny Car. The front tires were specially made. Although normal road-racing tires have all the speed and load-carrying ability we would need, they're typically too wide for Bonneville, where practically no cornering is necessary and where every square inch of frontal area counts against you. To serve our special needs, Goodyear baked up a few front tires that measure 21 inches in diameter and only 5.5 inches in maximum section width. The rubber will prove to work beautifully.

Racing Beat has outdone itself with the driveline. Since we would be using no moving parts from the stock RX-7, every new component had to go under the flinty engineering gaze of Jim Mederer. The turbocharged engines (four in all) were developed originally for GTP endurance racing by Mazda's competition department in Japan but were shelved when they proved less durable than necessary. Fortunately, much less staying power is needed at Bonneville, so the exotic powerplants were imported to the U.S. for additional development on the Racing Beat dynamometer. The basic components—rotors, housings, and eccentric shaft—are very similar in design to stock RX-7 pieces, but they've all been thoroughly massaged to produce unheard-of levels of horsepower. The intake

2100-degree-Fahrenheit exhaust temperatures without scaling (loose flakes of metal would foul the turbine wheels) or losing strength. The cool side of the turbo system has enough intercooling to sustain an over-the-road reefer unit. On the way to the engine, air from the compressors is ducted to a medium-sized underhood box containing an air-to-water intercooler and three gallons of chilled water. This cooling medium is in turn circulated by electric pumps to the rear of the car, where a 25-gallon reservoir holds a mix of ice and water. The system is replenished with ice cubes immediately before a run; even though the heat transferred by the intercooler melts some of the solid water, the temperature of the circulating fluid stays near 32 degrees. This arrangement is so

With a dozen Auto Meter gauges to monitor, speed runs were also memory tests.

The rear brakes are the aerodynamic type.



A well-dressed 200-mph man wears enough Nomex to dance at Chernobyl.

effective that air leaving the compressor outlet at 280 degrees is cooled to 45 degrees before induction. A significant side benefit is that the ice-water tank adds 200 pounds of ballast over the drive wheels.

Ready to rip, the remarkable rotary produces about 530 horsepower at 8500 rpm with one atmosphere (14.7 psi) of boost. That's not bad for two rotors and 80 cubic inches. It's easy to see why the SCTA factors rotary-engine displacement by three for class assignment.

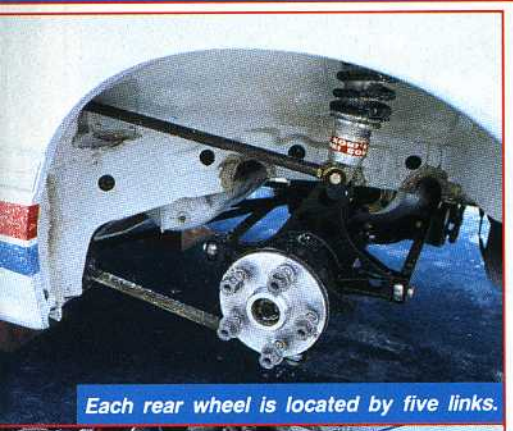
To pass the power on, Racing Beat has manufactured an all-new driveline. A five-speed racing gearbox made by Weismann Transmissions was selected for two reasons: its simple design and Weismann's reputation for reliability, won in IMSA road racing. It's a crash box (no synchros) with face-dog engagement and dry-sump lubrication. The gear ratios and the bell-housing flange have been tailored specifically to our application.

The final-drive unit is a creative blend of off-the-shelf racing components and Jim Mederer's fertile imagination. A Stock Car Products center section supports a five-inch pinion gear. Custom side plates machined by Racing Beat carry a massive ten-inch ring gear and a Summers Brothers spool drive (permitting no differential action whatsoever) in Porsche "instrument grade" bearings. While the typical production automobile uses a hypoid design, which positions the driveshaft lower than the axle's center line to maximize passenger room, the Arrow Gear Company cogs in the Bonneville RX-7 are a simple spiral bevel gearset with a 2.00:1 ratio. Such a design positions the input and output shafts in the same plane and avoids the substantial friction penalty that is inherent with hypoid gears.

Various off-the-shelf Porsche pieces carry the torque from the final drive to the wheels. The rear suspension—five tubular links on each side between fixed points on the chassis and the Porsche 911 stub-axle carriers—is a pure and simple Racing Beat design. So simple, in fact, that no brakes are used in back.

For those of you wondering about the cost of a competitive Bonneville runner, let the record show that a Weismann gearbox runs $6000 and the custom-made final-drive gears cost another thousand. The exotic metals in the Hitachi turbos aren't available in the U.S. at any price. Start saving early for next year's attempt.

The cabin of the Bonneville RX-7, even though most of the stock trim is intact, looks more like the command center of a Trident submarine than the cockpit of an



Each rear wheel is located by five links.

Enkei wheels performed flawlessly.

Two turbos, two rotors, and 80 cubic inches of displacement produce 530 horsepower.

Saltshakers of the rotary persuasion: Steve Ward, Jim Mederer, and Hiroshi Tamura.

automobile. What space isn't taken up by the roll cage is full of fire extinguisher, fuel and intercooler plumbing, enough switches to manage the lights at Carnegie Hall, and a gauge for everything but the odds against a jackpot in the Wendover, Nevada, slot machines. Getting to know and love the dials is no small undertaking.

Jim Mederer took the first ride during shakedown tests at the Transportation Research Center in Ohio. Fresh off the trailer, the Bonneville RX-7's gauges registered properly, and in a matter of a few laps of the huge oval, Mederer had twisted the big tach in fifth gear to the equivalent of 231 mph. Considering the 201.213-mph record we were challenging in the C/GT class at Bonneville, we have arrived on the salt with high hopes.

Speed Week cranks up with tech inspection on Saturday. The first qualifying runs take place on Sunday. Setting a record is practically a day-long process. The first step is to qualify with any speed higher than the existing mark. Then, the following morning, each qualifier must tank up with Bonneville Nationals gasoline and make two more passes, one in each direction. Speeds are clocked in one-mile-long traps on five miles of prepared course. The fastest two-way pair of trap speeds that are recorded at equal distances from the starting line are used to determine the average that is compared against the existing record. Run a big number and you get your name in the book and a nifty trophy.

Early Sunday afternoon, the fun begins. The Racing Beat crew rolls the Mazda missile toward the starting line, lights the fuse, and points to the driver's seat. The raucous rotary sounds like an atomic jackhammer, with a *rat-tat-tat* that could hack through pure kryptonite. Now it's my turn: time to don the fire suit, drop the visor, and buzz the timing lights.

Imagine a 170-pound gingerbread man with enough Nomex insulation to bake from the inside out. Add silver gloves, brown booties, goggles, and a face mask ugly enough to scare off the Grim Reaper. Wrap it in a 250-mph envelope, shove it off the starting line, and stand back!

That's what our program looks like from the outside. On the inside, life is a whole lot more complicated. The clutch has to be slipped to get us rolling, the shifts have to be finessed without benefit of synchros, twelve gauges have to be monitored and their readings memorized, and an involved procedure for shutting the engine down at the end of the run has to be learned. Somehow, in the midst of all this, I casually cruise up to 6800 rpm in third

gear for a 151-mph checkout pass. Logbook notes: "Easy rear spin; wobbly over 100 mph."

Prophetic words, those. The first two miles of the course is rutted and loose as if salt has been chewed up and spit out by some crude farm implement. The track turns into a billiard table at the two-mile marker, but we need 200 mph in the shortest possible distance in order to save the engine for the record runs. On the second attempt, we aim for 175 mph or better but achieve only 155 because of traction and stability problems. Then, on our third try, the double whammy smacks us where it hurts. Debris is scattered all over the course from a blown engine on the previous run. Even though I manage to navigate through the shrapnel, the RX-7's sweet song turns sour between the second and third mile markers. The timing slip reports 177 mph—not enough to qualify for Monday's record runs. What's worse, one mighty engine is kaput.

146-MPH GAS ROADSTER


117-MPH VINTAGE SEDAN

187-MPH FUEL COUPE


164-MPH THREE-WHEELER

203-MPH COMPETITION COUPE

The Racing Beat is indeed a happy hum when you leave the salt with a 238-mph record.

That means a grumpy night in the Racing Beat camp and a long wrench session instead of a record attempt the following morning. Fortunately, we have come to Bonneville with plenty of spares and an able crew of mechanics.

The engine transplant goes well, and I finally qualify the rejuvenated RX-7 at a heady 229 mph. It takes a light throttle foot through the first two miles, careful attention to the wobblies, and a hard charge to the three-mile marker. We've added more ballast to the back of the car (spare transmission and final-drive components), and this helps screw the 530 horsepower into the salt. Visions of a spectacular speed record dance in our heads.

All systems are go for Tuesday morning's record run. I carefully negotiate the loose salt, work my way up to fourth with part throttle, and then steadily ease the pedal toward the floor. The rubber-to-salt grip feels solid. Then suddenly, without warning, that critical traction link snaps. The tail steps to the right and a counterclockwise merry-go-round begins. Lifting, steering, praying, and finally cussing do nothing to slow the whirligig ride. The windows turn opaque in the salt cloud, and after what feels like 200 or so degrees of rotation at 200 or so mph, I pull the parachute release.

Mr. Mederer is not amused by my escapades. We both know that another crucial day of Speed Week has been lost. Fortunately, the car is intact, and during inspection we discover vast amounts of wet salt packed underneath it, supporting my theory that perhaps the course conditions should be blamed.

We chalk our mishap up to experience and return to the starting line. The rules specify that any interruption of a run terminates the record attempt, so we must requalify before we can try again. After an uneventful pass at 205 mph, we're ready to split the Wednesday-morning record runs open at the seams.

And so we do. Jim Mederer and his partner Ryusuke Oku get their heads together and determine that it's go-for-broke time. I am authorized to use a full five miles of track for accelerating, two more than I've been allowed previously. The day is right, the salt is dry, and all heavenly bodies are in proper alignment. I tiptoe through the tough stuff, get the car on a firm footing in fourth gear, squeeze the pedal down, and sign on for the long haul. The orange tach needle sweeps surely and steadily to eight grand in fourth. When the engine pulls as if possessed by demons in fifth, I have to lift off to stabilize the speed at 8100 rpm, within reach of the 8000-rpm redline we have agreed upon for the first leg.

With 232.753 mph in the bag, we are slightly less considerate of the machinery on the run home. Jim Mederer calls for 8000 rpm in the first four gears and all that can be mustered in fifth. That's exactly what he gets. The tach needle rushes past 8000 rpm in fifth as if on its way to some crucial appointment. Smoothly, sweetly, swiftly it climbs, finally meeting its match with the wind at 8550 rpm.

In ground speed, that's 244.132 mph. The two runs average 238.442 mph, winning us both a spot in the record book and entree to the prestigious 200 MPH Club. All in all, a gratifying accomplishment for a Wednesday morning.

But why stop with success? We peel the GT-class stickers from the car, move over to the Modified Sports class, in which bodywork alterations are permitted, and set our sights on smashing the 207.320-mph record. The boost knob will be advanced a whisker at a time until the time slips read 250 mph.

Unfortunately, someone upstairs says enough is enough. On Wednesday afternoon, it rains. That night, an unseasonal storm deluges the flats. We return on Thursday to find a not-so-great salt lake.

Speed Week 1986 has lasted a mere three and a half days. Luckily, we've taken our share early. ●