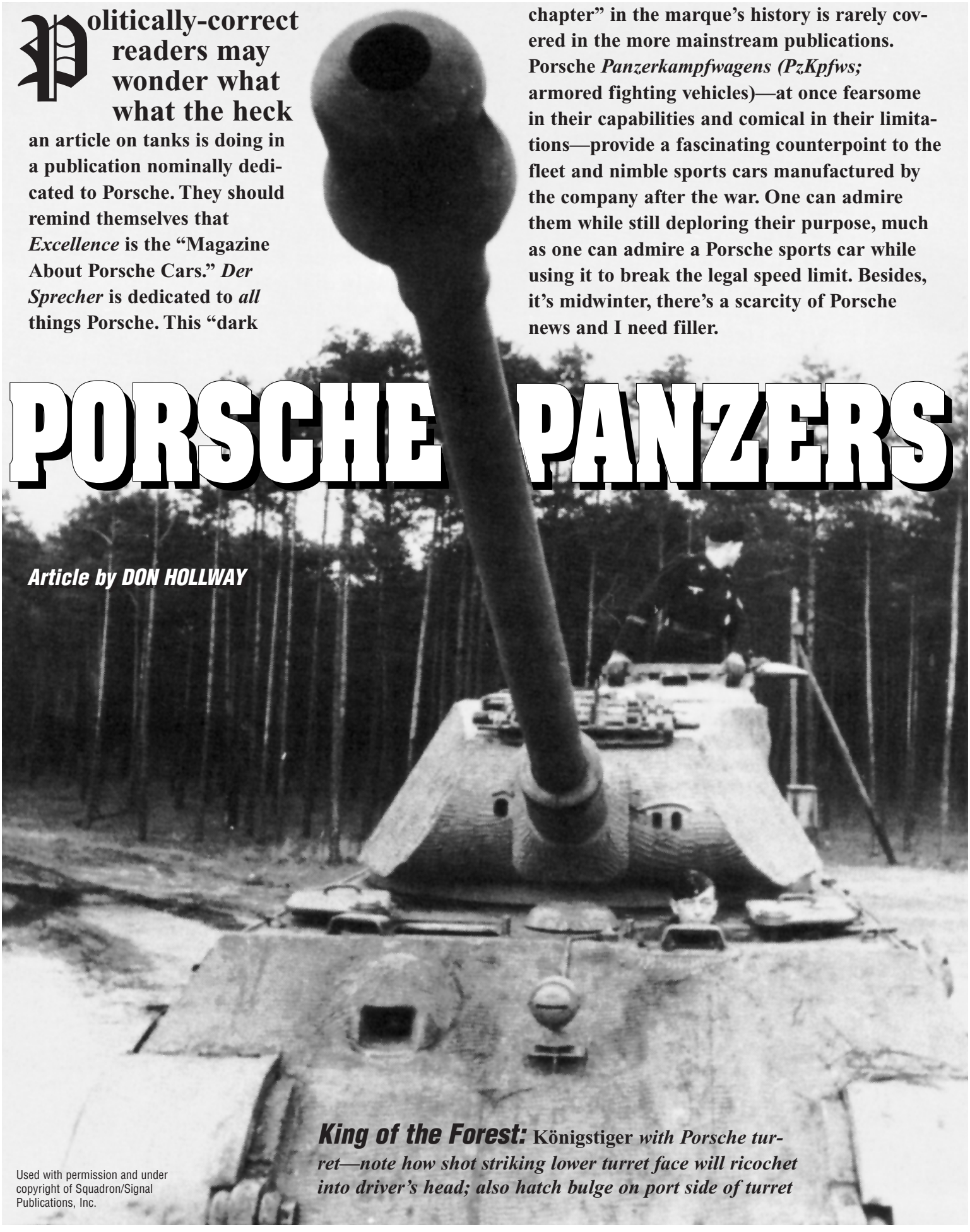
PORSCHE PANZERS

Article by DON HOLLWAY

Politically-correct readers may wonder what what the heck an article on tanks is doing in a publication nominally dedicated to Porsche. They should remind themselves that *Excellence* is the "Magazine About Porsche Cars." *Der Sprecher* is dedicated to *all* things Porsche. This "dark chapter" in the marque's history is rarely covered in the more mainstream publications. Porsche *Panzerkampfwagens (PzKpfws;* armored fighting vehicles)—at once fearsome in their capabilities and comical in their limitations—provide a fascinating counterpoint to the fleet and nimble sports cars manufactured by the company after the war. One can admire them while still deploring their purpose, much as one can admire a Porsche sports car while using it to break the legal speed limit. Besides, it's midwinter, there's a scarcity of Porsche news and I need filler.



King of the Forest: **Königstiger** ***with Porsche turret—note how shot striking lower turret face will ricochet into driver's head; also hatch bulge on port side of turret***

War was already inevitable in 1939, when the design bureau of Dr. -Ing. h.c.F. Porsche, KG, started work on its first *panzerkampfwagen*. It was natural that Adolf Hitler would ask his favorite engineer, Prof. Ferdinand Porsche—designer of the People's Car, *der Volkswagen,* and chief engineer of the government-backed Auto Union team which dominated auto racing through the 1930s—to lend his natural talent to tank design. The Army Ordnance Office, the *Heereswaffenamt,* had issued a requirement for a heavy "breakthrough" tank—surely unnecessary for a purely defensive military, as Germany's was supposed to be—packing a 75mm gun and designated VK3001: *Vollkettenkraftfahrzeug* (fully tracked experimental vehicle), 30 tons, design #1.

VK4501(P) (Porsche Typ 101): ***At Rastenburg, 20 April 1942***

The Porsche submission, VK3001(P), was known within the company as the Typ 100 or "Leopard." It featured a number of innovations stemming from Porsche's automotive background: externally-mounted, longitudinal torsion-bar suspension and two ten-liter V-10 air-cooled engines delivering 200 horsepower each at 2,500 rpm. These were not linked directly to the treads, but supplied power for generators driving electrical transmissions (remember, Porsche was by training an electrician), which turned the sprocketed drive wheels. Two prototypes, sans turrets, were built by the Steyr-Daimler factory at Nibelüng. Extensive testing throughout 1940-41 proved the concept sound, but the engines unsatisfactory. By that time, however, VK3001 itself was obsolete. The invasions of France and Russia had changed very the definition of "heavy tank."

VK4501(P): ***At a sustained 30mph, the sports car of Porsche Panzers***

British and French tanks already outgunned and outarmored German *panzers;* only a high degree of training and *blitzkrieg* tactics emphasizing speed and maneuver enabled the *Wehrmacht* to conquer France. And the Russians had unveiled their revolutionary T-34, an evolution of an unused American design but heretofore unknown in the West. It weighed just 27.6 tons and featured wide treads and a 500-hp V-12 diesel for mobility in Russian mud and snow. A low profile and thick, sloped armor warded off enemy fire. The heavier KV-1, though not as sophisticated in concept, was the most formidable tank in the world. Both mounted a high-velocity, 76.2mm cannon, which could penetrate *panzers* from over 1,000 yards away; at this point few German tanks packed as much as a short-barreled, low-velocity 75mm. Luckily the Soviets deployed their tanks in piecemeal fashion, for even one at a time they were nearly unstoppable. The first T-34 ever met by the 17th Panzer Division, near Senno on the Dneiper River on 8 July 1941, singlehandedly drove over nine miles into the German lines, shooting up everything in its path and actually *rolling over* a 37mm antitank gun (which the Germans would soon refer to as their "Army doorknocker"), until finally shot from behind by a 105mm artillery piece. On 23 June a single KV-1, wedged in a defile in front of the 6th Panzer Division, had held up the German advance for two days, its thick armor shrugging off all attempts to destroy it. Finally, while its Russian crew were busily destroying some *Wehrmacht* light tanks, the Germans maneuvered one of their 88mm antiaircraft guns within 900 yards. With its 17-foot barrel, the high-velocity, flat-shooting "Eighty-Eight" could hit a bomber five miles up; it also succeeded in penetrating the KV right through the front.

But each 88mm gun weighed nearly five tons and requiring towing. What was needed was a tank capable of packing this heavy weapon. In fact, one month prior to the invasion of Russia, on 26 May 1941, the *Waffenamt* had issued a requirement for such a tank, designated VK4501. Among others, Porsche and heavy-equipment manufacturer Henschel und Sohn (which had also attempted a VK3001 design) accepted the challenge. At the time, the only urgency was that the new prototypes had to be ready for demonstration by *der Führer's* next birthday—20 April, 1942. It would take porsche and *Nibenlüngenwerke* all eleven months.

To begin with, a muzzle brake went on the end of the gun, to deflect propellant gases rearward and thereby shorten recoil in a crowded turret. The turret itself, designed by Porsche and built by the Krupp armaments works, was enclosed within a single piece of steel, three inches thick and bent into a horseshoe shape. Taken together, this massed some 20 tons and necessitated a low-geared power traverse mechanism. Porsche also enlarged each V-10 to 15 liters, good for 320 hp at 2,500 rpm, and reportedly considered abandoning his electrical transmission for an hydraulic system. Time constraints dictated that he simply scale up the Typ 100. As a result the final product, the Typ 101, exceeded its weight requirement by some 12 tons.

On the day before the demonstration both the Porsche and Henschel prototypes were transported by rail flat car to Rastenburg, still almost seven miles from Hitler's headquarters. Upon offloading via crane, the Typ 101 sank up to its belly in soft ground. Henschel engineers offered the use of their prototype to tow it out—rather overconfidently, as the VK4501(H) was no lighter, posessed fewer horses, and had yet to be driven under its own power. (For the record, Porsche refused their help.)

On the trip to headquarters both tanks broke down multiple times and required overhauls. On the next day, however, the Porsche made a 1,000-yard speed run at a sustained 30mph. The Henschel could do no more than 900 yards at 25 mph, and its single watercooled, 21-liter, 600-hp Maybach V-12 overheated near to catching fire. But it had eight forward and four reverse gears, and a novel suspension of eight independently

Elefant, after stepping on a mine: ***Distinguished from Ferdinand by hull-mounted machine gun, raised commander's cupola and extra armor plate in front of gun mount. Note* zimmerit *anti-mine paste on lower hull***

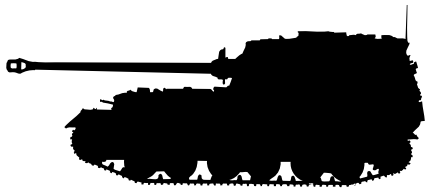
sprung torsion bar axles per side, with three rubber-rimmed roadwheels per axle, in an interleaving arrangement. This made it more maneuverable and better-riding than the Porsche—no small considerations in a 50-ton tank. It was selected to become the *PzKpfw* VI, the famous Tiger (though it retained the Porsche turret, with some minor modifications to the roof line, and its engine was later upgraded to 23 liters and 700hp).

As a sort of consolation prize (and just in case the Henschel project suffered unforeseen delays—building each Tiger required some 300,000 man-hours) Porsche was contracted for 90 examples of his own design. He completed five (slated for the North African front, where their air-cooled engines might prove advantageous), but he was unable to resolve the model's drivetrain problems. Production ceased in October. 85 uncompleted chassis went into storage at Nibelüng; the completed models went instead to the training center at Döllersheim.

Meanwhile the Russians were busily upgrading their T-34s with an 85mm gun that could, at close range, penetrate even a Tiger. Keeping them at arm's length required German tanks to pack an even more powerful gun. Lengthening the 88's barrel to 20' 7" would impart to a 19 1/2-pound shell a muzzle velocity of almost 3,700 feet per second—enough drill half a foot of sloped, homogenous armor plate 2,200 yards away. But there was not yet a tank turret capable of holding such a long, muzzle-heavy piece; even with a double-baffle muzzle brake, recoil could reach nearly two feet.

The solution was to build a tank *without* a turret—simpler, stronger, cheaper. The 85 chassis at Nibelüng came out of mothballs. Dr. Porsche oversaw the conversions himself, and the new *jagdpanzers* (hunting tanks) took his name: Ferdinand.

A roomy superstructure, 9 3/4' tall, was installed where the Porsche V-10s formerly resided: at the far rear, where it minimized the immense overhang of the gun. The gun's limited traverse—14° up, left and right and 8° down—was partially offset by the extraordinary armor thickness of almost eight inches on the front surfaces (thicker than on some First World War battlecruisers) and a little over three inches on the sides and rear. Two 11.8-liter, watercooled Maybach V-12s yielding 300hp apiece—but still linked to the electrical drive—went into the former fighting compartment in the center of the tank. Whether or not moving from a rear- to a mid-engined layout improved handling, as power went down and weight went up (to 71 tons!), the new *panzer* was even less mobile than the Tiger. The factory standardized its color selection on Panzer Grey and Sand Yellow (Guards Red and Fly Yellow evidently proving too garish for gunshy crews), but in winter months customers would often add a snow-colored overcoat of whitewash—a style of the times which has not caught on among postwar Porsche owners.



Elefant: ***Armor thicker than a battlecruiser, gun able to take out T-34s from three miles away***

In summer 1943 the Ferdinands were rushed to central Russia, where, with armor impervious to frontal fire and guns able to take out T-34s from *three miles* away, they should have reigned as supreme standoff weapons on the open steppes. Instead they were used to spearhead the greatest tank battle in history: Kursk. Pushing in among the massed Russian defenders they proved all too vulnerable. Typical shooting range fell to less than 100 yards—for tanks, point-blank—and the lack of rotating turrets left the Ferdinands wide open to flanking fire. Tank-hunting parties of Russian infantrymen draped explosive charges over the gun barrels or attached them to the hull sides. (The corrugated appearance of many German tanks derives from a coating of *zimmerit,* a paste intended to prevent enemy soldiers from attaching magnetic mines to their hulls.) A crucial oversight in the Ferdinands' redesign was the lack of a machine gun with which to sweep aside enemy infantry; crews were said to have used their gunsights to spot Russian troops, and then spray machine gun fire down their gun barrels—a technique which Colonel-General Heinz Guderian referred to as "quail shooting with cannon."

However, more Ferdinands fell to mechanical difficulties than enemy action. The small number produced meant there was a dearth of spare parts; those which broke down were cannibalized rather than repaired. The Ferdinand has the unfortunate distinction of being the conspicuous failure in a battle which was a turning point of the war. That this was a product of misuse, rather than a failure of design, was not lost on the German high command. Survivors of Kursk were taken back to Nibelüng to have machine guns mounted in their hulls, extra armor plates added to their gun mounts, and cupolas installed atop the superstructures for better visibility. Renamed *"Elefant,"* they were redeployed to Italy, a mountainous country in which they were relegated to (barely) mobile pillboxes. Ironically they found their niche in this defensive role: Firing from fixed, strategic positions, they made short work of the Americans' thinly armored, highly combustible Sherman tanks, at least until they broke down or were outflanked.

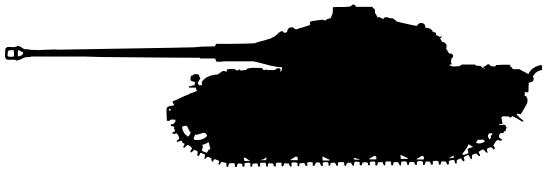
But now the tide had turned against the Germans. The Tiger's Henschel suspension,

RAC tank museum

Königstiger, Normandy 1944: ***Note long gun barrel, curved turret face and rotation of turret—outflanked & shot from behind?***

with its multitude of roadwheels, proved too easily jammed with mud and snow—particularly in the Russian wastes, where the enemy attacked at dawn when Tiger treads were frozen solid. Its slow turret traverse allowed the enemy to get round it and attack from the rear. With the British and Americans obviously gearing up to invade Europe, the Germans needed to mount the *Elefant's* tank-killing cannon in a more conventional, more mass-produced *panzerkampfwagen,* and quickly.

Prof. Porsche had already solved the problem. The gun's immense length would cause it to bear hard on the leading edge of a finely-machined turret ring mechanism; his solution was to spread the load by extending the turret both to the front and rear. The rear bustle, with armor three inches thick, provided extra room for ammo storage; the front (armored to over four inches) and sides were ballistically sloped and curved to deflect shot. This complicated manufacture and induced flaws yet to be revealed, but Porsche was sure enough of a production contract to undertake construction. He produced a hull design in two variants: the Typ 180, with the turret mounted in the hull center, and the Typ 181, with a rear-mounted turret. Despite a wartime shortage of copper, he'd persisted in trying to work the bugs out of his electrical drive—unsuccessfully.



Königstiger with Porsche turret:
More than enough to defeat Allied tanks

As a result, a new Henschel hull design, with sloped armor like the T-34's and a simplified roadwheel arrangement, was selected to become the Tiger II, also called the *Königstiger* (King or Royal Tiger), the most powerful tank of the war. At 75 tons, it was also the heaviest; a 23-liter Maybach V-12 averaging 600 horses (and peaking at 700) could theoretically move one at 35mph, but only on solid, level ground. Mere transportation and deployment involved numerous difficulties, not the least of which was that drivers had to take care, when negotiating rough ground, not to dig the long gun's muzzle into the dirt. The first *Königstigers* rolled off the assembly line in January 1944, but didn't reach combat units until June.

Once in action their gun/armor combination was more than enough to defeat the newest Allied tanks, yet was not invulnerable. A full 360° rotation by the two-speed power traverse still took at least 19 seconds, and more usually up to 75, hardly fast enough to follow a speeding Sherman or T-34. But manual rotation of the turret required both the loader and gunner to turn hand cranks—680 times for the former and 700 for the latter! It was said that more *Königstiger* crewmen died of overwork than enemy action. On the other hand, enterprising gunners found that if they removed the cannon's spent-shell deflector shield and opened the rear turret hatch, sheer recoil was sufficient to kick empty casings completely out onto the rear deck.

More seriously, combat showed up the flaws in the Porsche turret itself. A bulge accomodating the commander's cupola tended to catch shells skittering along the port

PORSCHE TRIVIA

Est. fuel economy, Porsche 993:
13 mpg city, 19 highway
Est. fuel economy, *Königstiger:*
.47 mpg road, .33 cross-country

0-60mph, '96 911 Turbo:
4.4 seconds
0-60mph, 88mm shell:
.0000045 seconds
0-60mph, Porsche panzer:
Never

Lap around the Old Nürburgring (14-mile *Nordschliefe* circuit):
1937 Auto Union C: ***10.3 min***
1970 Porsche 908: ***8.3 min***
VK4501(P) *(theoretical):* *28.3 min*

Length, gun barrel, *Elefant:* *20' 7"*
Length, overall, Porsche 928: ***14' 9"***

Armor thickness, *Elefant:* *8"*
Armor thickness, Porsche 911: ***.05"***

Power-to-weight ratios:
1996 911 Turbo: ***242 hp/ton***
Jagdtiger: ***8 hp/ton***

Number which slid off tight turns:
Porsche 911: ***More than 911 drivers like to admit***
Jagdtiger: ***Zero***

Horsepower,
Maus* air cooler:** ***150
1965 Porsche 911: ***130***

50 tons of *Maus* turrets: ***1***
50 tons of 1996 Porsche 993s: ***32.6***

PORSCHE TYP NUMBERS

Typ 7: ***Wanderer car chassis (actually the first Porsche design; numbered 7 instead of 1 to create an impression of experience among customers)***

Typ 22: ***Auto Union Grand Prix car***

Typ 52: ***mid-engined, V-10, three-abreast sports car (Wonder if McLaren copied the blueprints for their F1?)***

Typ 60: ***People's Car***

Typ 80: ***Daimler-Benz land speed record car***

Typ 82: ***Kubelwagen jeep (later resurrected as the Volkswagen "Thing")***

Typ 101: ***Tiger tank prototype***

Typ 110: ***farm tractor***

Typ 111: ***farm tractor***

Typ 112: ***farm tractor***

Typ 113: ***farm tractor***

Typ 135: ***Wind-driven generator***

Typ 136: ***Wind-driven generator***

Typ 137: ***Wind-driven generator***

Typ 180: ***Tiger II prototype***

Typ 181: ***Tiger II prototype***

Typ 205: ***Superheavy tank Maus***

Typ 212: ***700-horsepower diesel engine for*** **Jagdtiger**

Typ 323: ***11-horsepower diesel tractor***

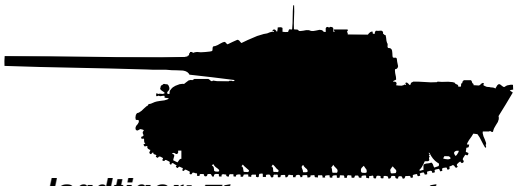
Typ 360: ***Cistalia race car***

Jagdtiger tamed: ***Under examination by American troops, 1945.***

turret side, and there was a major shot trap below the curved gun mantlet, where incoming shells were deflected not away but *down,* through the thinly armored roof and into the driver's compartment.

Armored combat no longer forgave such flaws. The Russians had already introduced their "Josef Stalin II" tank, with a brutal 122mm gun. The British had taken to APDS shot (armor-piercing discarding-sabot; essentially an inert casing, or sabot, which fell away after exiting the muzzle and left a slim tungsten-carbide dart to proceed to the target at almost 4,000 feet per second). Shaped charges, which did not rely on velocity and could be fired by one man from a recoilless, shoulder-held rocket launcher (bazooka), attacked armor plate with a jet of superhot gas and molten metal and overpressures of up to 2000 tons per square inch. With all these weapons arrayed against the tank, no lack of protection could be taken for granted. As a result—collectors, take note!—only the first 50 *Königstigers* carried the Porsche turret; the rest (439) carried a redesigned Henschel turret, with a flat face and simpler sides. But manufacturing a *Königstiger* still absorbed much time and material that could been better used in producing a simpler, less impressive design, and consumed the Henschel facilities.

So it fell to *Nibelüngenwerke*—and Porsche—to entertain the increasingly rabid fantasies of the German high command. If a Tiger could be upgunned to make a Ferdinand, they wondered, what could be made of a *Königstiger?* The "next gun up" from the "88" measured an incredible 128mm across the bore—five inches, approximately the same as that on a typical naval destroyer—with a barrel *23 feet* long. It could out-range any other gun and penetrate any other tank, even at maximum range—slamming a 75-pound shell through almost six inches of sloped steel at over 2,000 yards. But its recoil alone measured three feet—what monstrous vehicle could fire it? From this pointless exercise arose the incredible *Jagdtiger* ("Hunting Tiger"), the most stupendous armored fighting vehicle of the war—indeed, of all time.



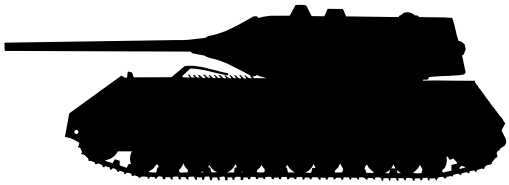
Jagdtiger: ***The most stupendous armored fighting vehicle of all time***

Dr. Porsche's close relationship with the factory allowed him some leeway in tampering with the design. He started with a slightly lengthened *Königstiger* hull, extending the sides up to form another blocky superstructure where the turret used to be. The front of this he armored to almost *ten inches* of steel. Weight, of course, went up yet again, to 77 tons, more than another other widely used armored fighting vehicle before or since. To move this mass, Porsche designed a 700-horsepower diesel engine, the Typ 212; to bear it (and to conserve interior space and manufacturing time) he redesigned the *Königstiger's* suspension, using sprung rollers and nine small(er) road wheels per side instead of the *Königstiger's* eight large ones. Two *Jagdtigers*—serial numbers

305001 and 305004, for you Porsche trivia buffs—were built with this suspension, and possibly one of these with this engine. During testing, however, one of them snapped off a set of wheels. To avoid getting sidetracked in a design exercise—at this point in the German war effort, time was increasingly crucial—it was decided to stick with the existing suspension and the *Königstiger's* gasoline engine. Production went on apace with that of the *Königstiger* and the prototype was completed in April 1944. 150 production models were ordered but only about 60 were available in time for the Ardennes offensive—the Battle of the Bulge—in December of that year.

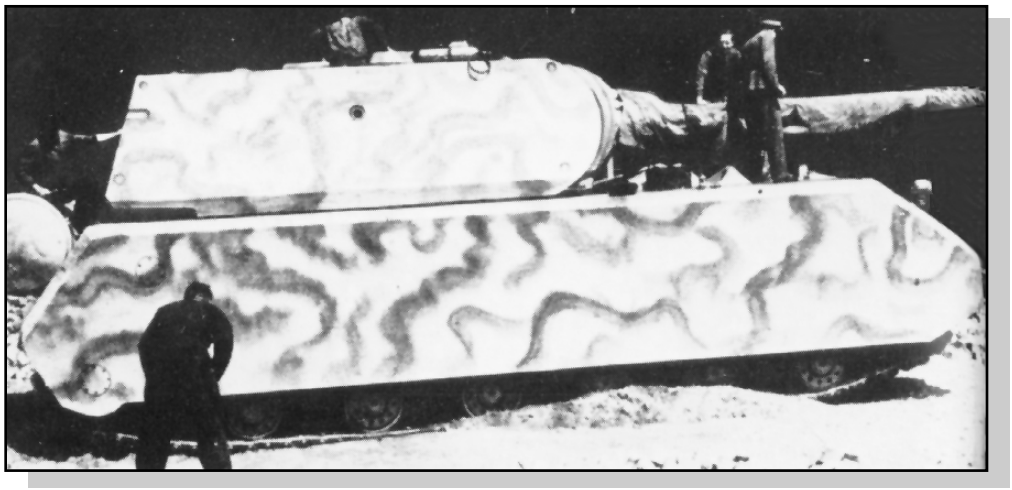
In action the *Jagdtiger* was difficult to hide from Allied aircraft, which had complete control of the air and could destroy it with a well-aimed bomb on the roof. It also suffered frequent breakdowns of overstressed engines and suspension. Top speed, on paper, was a blistering 23mph; on asphalt it was nearer 9mph. In fact a single *Jagdtiger,* straddling a Belgian road, once completely stopped the American advance *despite the fact that it had been abandoned.* The Americans simply couldn't move it aside. They finally had to build a new road *around* it.

Hitler was already contemplating even more outlandish and impractical *panzers*. As early as June 1942 he'd personally authorized Porsche to design a new class of tank, the superheavy. The resultant Porsche Typ 205, codenamed *Mammut* (Mammoth) would mount at least the 128mm cannon (150mm and even 170mm guns were considered) with a 75mm—the heaviest tank gun available at the beginning of the war—as a coaxial *secondary* armament. Armor was to be on the order of ten inches on the hull front, 9 1/2 inches on the turret face, eight inches elsewhere. As might be expected, Porsche envisioned longitudinal torsion bar suspension, an air-cooled engine and electrical transmission. Over the objections of the *Waffenamt,* who now took Porsche's ideas with a grain of salt (and in fact embarked on their own superheavy tank project with Henschel, which never reached completion), in August 1943 Hitler gave him the go-ahead to produce prototypes.



Maus: ***The mother of all Porsches***

As the first one took shape it was renamed, with evident cynicism, *Maus* (Mouse). It weighed no less than 207 tons—



Maus ***(Porsche Typ 205):*** ***Turreted version on trials, June 1944***

the turret alone, some 10 feet across, weighed 50 tons, and just its *air cooler* required 150 horsepower! Porsche's engine and suspension never worked out. There wasn't room enough for all the necessary torsion bars, so the prototype rolled on 48 road wheels and a volute suspension designed by the Czechslovakian firm Skoda. Its 1,080-horsepower Mercedes-Benz aircraft engine still powered a Porsche electric drive, which was now essential: Since no bridge could support the *Maus,* it was intended to cross rivers up to 25 feet deep by *rolling across their bottoms,* breathing through a snorkel and drawing electrical power via cable from a second *Maus* on the riverbank! Completed in November 1943, the prototype tested in December with a mock turret, and again in June 1944 with a turret and armament. A second, turretless model began testing that September, but its Benz diesel engine was accidentally destroyed and went unreplaced until April 1945; Hitler had ordered all superheavy tank projects set aside to concentrate production on existing tanks. Still, two more *Maus* hulls were under construction when the Soviets threatened the Krupp testing area at Meppen. To prevent them from capturing the prototypes, all were blown up.

Porsche himself referred to these projects as mere mobile fortifications, but who was he to deny the *Führer's* wildest wishes? Captured at war's end were plans for a *Maus* with a 12-inch mortar, called *Bär* (Bear), and a preliminary layout for a 1,500-ton monster tank powered by four U-boat diesel engines (keep in mind that most U-boats only used two), with ten-inch armor and three turrets—a pair of 150mm guns and a main, 800mm cannon. Compare this bore—31.4 inches—to the 380mm (15in.) main guns on the German battleship *Bismarck,* and you'll begin to understand the extent to which the Nazi high command were deranged. Perhaps the war would actually have been shortened, had such projects gone into production—no doubt the entire German labor force would have been tied up in bringing them to fruition.

In April 1944 the Porsche facility at Stuttgart had been hit by American bombs and the company had since moved to the famous abandoned sawmill outside Gmünd, Austria. To keep busy it designed and repaired farm tractors and wind-powered generators. When the Allies finally advanced into Gmünd the Professor was briefly detained, investigated for war crimes, and freed. The French, however, lured him, his son Ferry and son-in-law Dr. Anton Piëch to France to build some kind of French People's Car, and threw them into prison. French reasoning remains unclear. It's a fact that Dr. Porsche had taken up the cause of French workers at Peugeot when that company was under control of the German SS. Possibly the French auto industry wished to eliminate potential competition. If so, they failed. Ferry Porsche, freed early on, ran the company in concert with his sister Louise and raised the half-million francs bail money by designing a racing car, the Typ 360, for the Italian firm Cistalia. After two years the French dropped all charges but never repaid the money; and upon his release the Professor, at over 70 years of age, soon realized their fears. For the Gmünd factory had already embarked on the first car that would bear the Porsche name: the Typ 356.