

WOODGAS POWERED VW'S AND OTHER VEHICLES

Click [HERE](#) for an 86K JPG image of a wood gas generator equipped Kubelwagen and Type 60 Beetle.

Fuel shortages during WWII prompted searches for alternative fuels in England, Germany, Scandinavia and many other countries. One of the most unusual solutions involved the modification of vehicles for use with wood, charcoal, or coal. Typical modifications included A) a gas generator; B) a gas reservoir; and C) carburetor modifications and additional plumbing to convey, filter, and meter the gas into the engine.

The gas generator was an airtight vessel into which was introduced a charge of wood, charcoal, or anthracite coal. Heat was applied to the fuel either internally or externally to initiate a self-sustaining gassification of the fuel in an oxygen deprived environment. The resulting "woodgas" was piped to the reservoir, or in the case of small engines, directly to the engine carburetor. Wood-gas modified vehicles were therefore technically a "dual fuel" vehicle in that a self-sustaining gassification of the wood charcoal, or coal required another fuel to start the process.

Gas reservoir sizes depended upon vehicle, engine, and gassifier size. Small vehicles and engines could be supplied directly from the gassifier, thus eliminating large reservoirs. Larger, more powerful vehicles required separate gas reservoirs to compensate for gassifier outputs which were less than the fuel consumption rate of the engine. These larger reservoirs usually took the form of gas bags that were attached to the roof or rear end of the vehicle. The largest mobile reservoirs were gas bags fitted to busses which were often several feet in diameter and as long as the vehicle.

Although the designation T230 was used to indicate woodgas fuel systems fitted to both Kubelwagens and KdF Wagens (Type 60 wartime Beetles), surviving phototgraphs reveal that a variety of gas generator designs and hood sheet metal were employed. Vehicles so equipped are easily recognized by the [vehicle's modified hood](#) (28K JPG). Some photos show that the fuel loading hatch protruded from a port in the hood, while others illustrate an unbroken hoodline which completely enclosed the generator. Generally the woodgas fuel system comprised a [gassifier container](#) (20K JPG) approximately 18 to 24 inches in diameter and 30 to 36 inches in length (height) fitted into the nose of the vehicle. Both Kubelwagens and Beetles equipped with the T230 gas generator located the generator vessel ahead of the front axle beams where the spare tire was formerly located. Type 60's relocated the spare tire, along with extra bags of fuel, to a [roof rack](#) (28K JPG) on the roof of the vehicle. The bottom of the gas generator also extended below the original bodywork at the front of the vehicle, thus decreasing obstacle clearance.

Other components of the VW T230 woodgas fuel system included:

1) a large (8" diameter by 30") gas filter cannister located just ahead of the windshield (and under the hood, in the case of the Type 60)

- 2) a secondary, rectangular gas filter (about 12" by 2" by 48") located crossways beneath the car behind the front wheels
- 3) a gas pump or fan located behind the rear torsion bar tube
- 4) a small final cannister filter in the engine bay
- 5) a fuel mixer at the engine intake manifold.

Click [HERE](#) for an 80K GIF of a wood-gas powered Kubelwagen.

Click [HERE](#) for a 77K GIF of a wood-gas powered VW Beetle that probably was fitted with four wheel drive!

My thanks for Chris Horn for loaning me his copy of VW Beetle At War by Dr. Hans-Georg Mayer (ISBN: 0-88740-400-6), from which much of the information on this page was gleaned. If you are interested in learning more about wartime VW Beetles, I highly recommend Dr. Mayer's book, available from Schiffer Publishing Ltd., 1469 Morstein Road, West Chester, PA, 19380, USA.

Information on wood gassifer equipped vehicles is limited, and I am currently looking for gassifer construction details, fuel metering details, and pictures of vehicles so equipped. If you know of any such information, or if you can direct me to manufacturing firms who currently produce such systems, please [let me know!](#)

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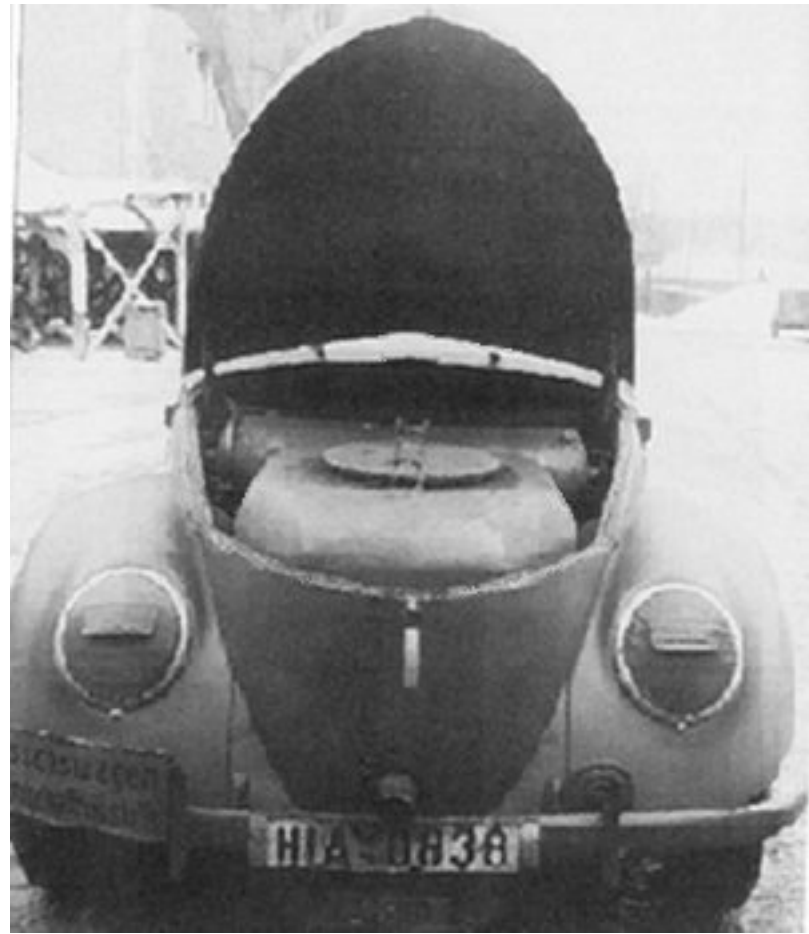
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James Lux, April 25, 1996











THE VW TYPE 181 "THING"

Click [HERE](#) for a Thing GIF (57K)

So you can tell one "Thing" from another...

The Volkswagen Type 181, variously known as the Thing, the Trekker, and the Safari, is a vehicle developed for the civilian market in the 1960's from the Type 82 Kubelwagen used by Germany during WWII as a light field transport vehicle. The Type 82 was derived from the KDFwagen chassis platform, a mass produced "people's car" for German families designed by Ferdinand Porsche (father of the Porsche marque) at the request of Adolf Hitler. As part of the increase of German military power in the 1930's, a military adaption of the KDF platform was suggested in 1934. But it was not until January 1938 that the German military presented Porsche with the specifications for what was to become known as the Type 62. Porsche called on the Trutz company of Gotha to design a special light weight body to be used on the KDFwagen platform, and two prototypes were produced in February of 1938. One of the prototype body styles featured a rounded body and fenders, while the other had a more angular body. Both mounted the spare tire in a recess in the vehicle's front hood (bonnet). Both prototypes were rejected by the German military, however, which requested a more "military" body style. The resulting redesign, even boxier and more angular, received acceptance and field testing was begun.

Click [here](#) for a 50K GIF of a Type 62.

Field tests of the Type 62 resulted in a request for better off road performance, and Porsche responded by fitting spur gear reduction units to the outer rear wheel hubs, and by redesigning the front hubs. These changes lowered the final gear ratio and increased the ground clearance of the Type 62 by two additional inches, producing the desired off-road performance improvements. Combined with a cam-type limited slip differential and hydraulic steering damper, the Type 62 demonstrated off-road performance equal to, and in some cases better than four wheel drive alternatives. The Type 62 utilized a 985cc, 24 hp VW engine and a four speed, unsynchronized transmission. The first Type 62's were delivered to the Army in December 1939 and given the official designation Type 82. A convertible canvas top was fitted, but heaters were not fitted until later in 1940. By the end of 1940, over one thousand Type 82's had been produced. The early Type 82 dash panel was small, and included only a speedometer, but was increased in size in 1941. Other changes to the basic Kubel included a larger 1131cc engine of 25 hp which was introduced in March of 1943.

Click [here](#) for a 45L GIF of a standard Kubelwagen.

A two wheel drive Africa Korps Type 82 was captured by the Allies early in the North African campaign, and in 1941 was shipped to the Aberdeen Proving Grounds in Maryland for testing and evaluation. Tests proved that although the two wheel drive Type 82 could not quite equal the American GP "Jeep" in extreme conditions, it's cross country capability was none-the-less remarkable, and it possessed several advantages over the Jeep including: several hundred pounds less weight; less material used in its production; nearly double the fuel mileage; very simple to operate and maintain; very rugged; sufficiently room for four occupants; and more agile than the Jeep. Official judgements on the cross country capabilities of four wheel drive Type 82's with their standard cam-type locking differentials both front and rear were either nonexistent, or have been lost in antiquity. However, given the

nearly equal performance of the two wheel drive Type 82's compared to the Jeep (with locking differentials neither front nor rear), it is not unlikely that the four wheel drive Type 82 could outperform the Jeep under nearly all conditions. (See below for standard Jeep dimensions and history.)

As Germany had pressed many captured vehicles into service during its initial territorial expansion, so too did the Allies attempt to use captured Axis vehicles to their own benefit. To this end the War Department issued a series of Restricted Technical manuals prefixed by the letter designation "E" (for "Enemy") covering the operation and maintenance of captured enemy vehicles and equipment. After being tested, the captured Africa Korps Type 82 was disassembled, and a manual—TM E9-803—was issued that included a general description; operating instructions; a troubleshooting section; first and second echelon maintenance instructions; shipping instructions; and a list of standard American equipment which could be used with the Type 82. The Type 82 is mechanically very similar to Volkswagens produced after the war, and TM E9-803's repair and maintenance sections could easily be mistaken for those of the early Volkswagens.

TM E9-803 lists the following specifications and capabilities for the Type 82:

- Weight (empty): 1598 pounds
- Weight (loaded): 2557 pounds
- Net Load: 992 pounds
- Ground Clearance: 11.4"
- Wheelbase: 94.5"
- Length: 147"
- Width: 63"
- Height (top up): 63"
- Height (top and windshield down): 44"
- Wheel track, front: 53.4"; rear: 53.5"
- Tire Size: 5.25 - 16
- Wheels: pressed, disc
- Road brakes: cable operated, mechanical, on all four wheels
- Parking brake: cable operated, mechanical, on all four wheels
- Ground clearance: 11.5"
- Fording depth (without wetting engine): 17.7"
- Fuel capacity: 30 liters; 7.925 gallons
- Fuel consumption: 30 mpg (approx)
- Theoretical range: 238 miles
- Maximum speed on roads: 49.7 mph
- Minimum speed: 1.8 mph
- Climbing capability on the road: 45 pct.
- Climbing ability in loose sand: 40 pct.

The interior of the Type 82 was spartan. The individual front seats were framed from tube steel, bolted to the floor, and topped with removeable cushions which were removeable for access to stowage areas beneath. The front seat brackets captivated wooden floor covering grates. The rear seat cushions set directly into the bodywork, and the upright rear cushions tilted forward for access to a storage area.

The instrument panel of the tested Type 82 featured a centrally mounted faceplate containing (clockwise, from the 12 o'clock position): a speedometer; the left directional signal indicator light; high beam indicator; ignition key;

dashboard light switch; oil pressure warning light; and ammeter warning light. the faceplate was mounted to an instrument panel that contained two fuse boxes, one on either side of the faceplate; a starter motor push button; a trouble lamp socket; the right directional indicator light; and a multiple with an "Off" position, a position to energize the blackout driving and tail light, and a position to energize the headlamps. The foot operated high beam switch was located on the bulkhead just ahead of the foot pedal cluster, and the engine choke and parking brake were located on the central tunnel. Two self contained, electric windshield wipers were set into the windshield frame and connected to the main wiring harness.

The Type 82 became popularly known as the [Kubelwagen \(64K GIF\)](#) , *Kubelsitzer*, or simply *Kubel*, names which derived from "Kubelsitzwagen," or "bucket seat car," even though many German military vehicles were equipped with bucket seats. The Kubelwagen's aircooled engine enabled it to operate effectively in the both the heat of the Saharan Desert and the cold of Eastern Europe, and the vehicle proved to be agile and tough. The Kubelwagen was outfitted in four basic configurations: four seated car; a four seated survey vehicle; an ambulance, having two seats in tandem on the left side of the vehicle, and a litter on the right side; and a three seated radio car. Total production of the basic Kubel amounted to about 55,000 vehicles.

One variant of the Kubelwagen, the Type 166 amphibious Schwimmwagen, was produced in large numbers. A production run of 150 Porsche prototypes was made under the designation Type 128 for field trials in 1940, but this design was not chosen for production. The Schwimmwagen employed the KDFwagen platform fitted with four wheel drive and a boat-like body with full length fenders. Propulsion in water was provided by a three bladed propeller geared to the engine and mounted on a hinged arm. Schwimmer maximum speeds were 6 knots in water and 50 mph on land. Some 14,265 Schwimmwagens were produced between 1942 and 1944.

Click [here](#) for a 45K GIF of a Schwimmwagen.

Several other variants of the Kubelwagen were produced as prototypes, including a half-track version, a version designed to run on railroad tracks, and a version with a 29" shorter wheelbase, but none of these were produced in any numbers. Field modifications were common, such as additional armor plating to protect occupants from small arms fire.

An updated, civilian version of the Kubelwagen with new bodywork was renamed the Type 181 and introduced in the U.S. in the late 1973 as the Thing. Changes included a more modern and complete dash; 40 hp engine; synchromesh transmission; spare tire lodged under a raised front hood; squared fenders; re-shaped doors; new door latches; re-hinging the front door by its forward edge (as opposed to the original Kubel's rear-hinged, "suicide" hinge configuration); headlights mounted in, rather than on the front fenders; the addition of bumpers; and an optional hard top and gas cabin heater. Other changes included the deletion of rear hub reduction gears at the end of 1973, and the deletion of the limited slip differential. All Things imported to the US by VW were produced in Mexico, and importation ceased in 1974.

Click [here](#) for a 36K GIF of Chris Smith's red Thing, with the top down.

The VW Thing is built on a chassis pan similar to, but different than that used in the Karman Ghia, and the running gear shares some parts with Beetles and Busses, while including other parts that are unique to the 181. Being built from the same basic chassis pan, the Thing's [specifications](#) are similar to those of the Beetle and Microbus. Importation into the US ceased in 1974, though Type 181's continued to be built and sold in Mexico and Brazil for several year thereafter.

A loyal group of Thing owners exists, and can be contacted at the [The Internet Type 181 Club Homepage](#) which also includes many links to related 181 web sites.

The data for this page was obtained or inferred from The Observer's Fighting Vehicles Directory by Barth Vanderveen; from the March 1995 issue of VW Trends; and from Volkswagen for the Wehrmacht (TM E9-803). My thanks to Chris Horn for lending me his copy of Dr. Mayer's book. The VW Trends article has a number of very interesting Kubel photos. Information regarding Kubels is sketchy and often contradictory. All information I have included here is thought to be correct, but I will gladly amend any information that is proven to be wrong. If you have further Kubelwagen information, please contact me by clicking [here](#).

Comparisons between the Type 82 and American Jeep continue to be made, and a little information on the Jeep seems appropriate here. In 1939, then Chief of Staff George Marshall requested that the Army's Utility Vehicle Committee draw up specifications for a Light Command and Reconnaissance Car. The resulting specifications approved by Marshall were sent to 135 US automobile manufacturers and suppliers for bids on seventy vehicles. The committee's specifications were daunting: vehicle weight of 1300 pounds; wheelbase of 80 inches or less; a payload of 600 pounds; an engine producing at least 85 foot pounds of torque; a minimum speed of three miles per hour, and a requirement of four wheel drive. But the most difficult requirement was the timeline: the first vehicle would have to be delivered in only 49 days, with the remaining sixty-nine vehicles to be delivered in an additional 26 days. So imposing were these requirements that only two firms returned the bid forms: Willys-Overland, and the smaller American Bantam company, which had each researched and produced very small automobiles.

Almost immediately, the two primary designers—Berney Roos for Willys, and Karl Probst for Bantam each made an important decision. Roos decided that the Army's timeline was impossible. And Probst decided that the 1300 minimum weight was similarly impossible. Probst, aware that Bantam was a small company that needed new business, did adhere to the production timeline, and ultimately was responsible for Bantam's rollout of the first BRC (Bantam Reconnaissance Car) on September 21, 1940, just 47 days after Bantam had signed the production contract. The first BRC was tested and adjusted for two days, and then driven directly to Camp Holbert, Maryland for Army testing. Testing was successful, and even though the 1840 pound weight exceeded the original design specifications, approval for another 70 BRC's was given to Bantam.

Although Bantam had produced the first of what would become know as "GP's", or "Jeeps", production demand soon exceeded Bantam's capability, and Army contracts were let to Willys-Overland and Ford who each produced a slightly different version. Unable to satisfy ever increasing production numbers, Bantam's production percentage dwindled, and the Willys MA version of the BRC became the recognized standard.

The general specifications of the standardized Jeep, Willys MA version, were as follows:

- Engine horsepower: 61
- Engine torque: 103 foot pounds
- Wheelbase: 80 "
- Track: 48.25"
- Width: 62"
- Length: 132.75"
- Height (to top of cowl): 40"
- Height (to top of steering wheel): 50.75"
- Height (overall with top): 70.125"

- Shipping weight: 2072 pounds
- Road weight: 2160 pounds
- Gross weight: 2800 pounds

Historical information on Jeeps was derived from The Complete Four Wheel Drive Manual by John Gunnell.



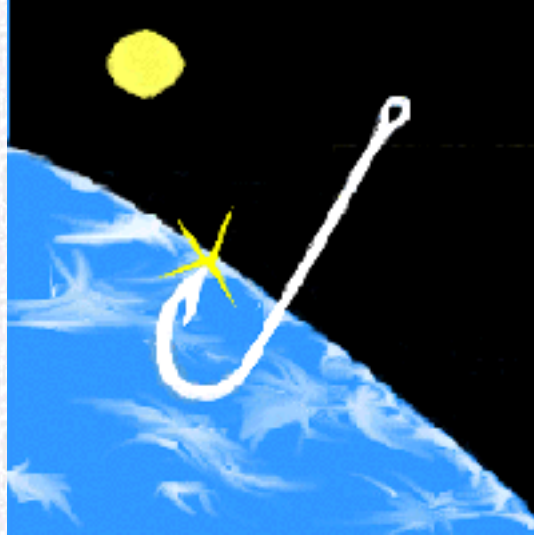
Other related links include:

- The [VW Museum](#)
- The [VW Microbus Web Page](#).
- The [Aircooled VW Page](#).

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James Lux, January 12, 1996

LIGHTHOOK'S CAR PAGE



Cars have been an integral part of the American dream for nearly a century, but we are poised at the edge of a new era in which personal transportation is going to change a great deal. Here you'll discover links to my dreams of the past and visions of the future!

Dr. Ferdinand Porsche was the father of not only the marque which still bears his name, but also the KDF Wagen, the precursor to the Volkswagen Beetle, Microbus, and Karman Ghia. A pictorial glimpse of Porsche's endless desire to adapt the KdF Wagen to new uses and markets can be seen in the [Historic VW Image Archive](#). Dr. Porsche's contribution to the German Wehrmacht in the late 1930's was a vehicle derived from the KDF Wagen, but designed for the battlefield. Generally termed the Kubelwagen (or simply "Kubel") in reference to the bucket-type passenger seats which it employed, this auto was designed as a lightweight, robust, and simple utility vehicle. Some 70,000 were built during WWII, including 15,000 amphibious variants (Schwimmwagen), and the design was updated and released to the American market in the late 1960's as the Type 181 under the name "[The Thing.](#)"

The [Datsun 240Z](#) ushered in a new age of sports cars where leaky convertible tops, so-so handling, and spartan creature comforts gave way to a *gran tourissimo* for the masses. The 240Z was an instant hit, and has since carved a unique niche in automotive history.

Light cars, especially three wheeled cars, have always fascinated me, and variations on the trike theme have been produced as long as there have been cars. Two of the most intriguing trike-car marques have been [Messerschmidt Kabinroller](#) (as seen in the movie "Brazil"), and the [Morgan](#), which used a front mounted Matchless V-twin to drive the single rear wheel (Note: the Morgan server can be sloooow).

I think we'll find that what comes next in cars will be *very* different from what we currently define as

state-of-the-art "cars". U.S. citizens now use more petroleum per day than ever before, and sooner or later, something will interrupt the flow of cheap fuel. If you are lucky enough to remember the gas crunch of 1973-1974, you know that our fuel supplies are amazingly fragile. We know that cars of the future will be lighter and more efficient, and the next major fuel "shortage" or cost increase will provoke "car" designs that will be very similar to the [Hypercar](#).

Do we have to wait for the "Big Three" to finally offer us truly advanced transportation? I don't think so. Check out the [Personal Transporter!](#)



OTHER AUTOMOTIVE LINKS

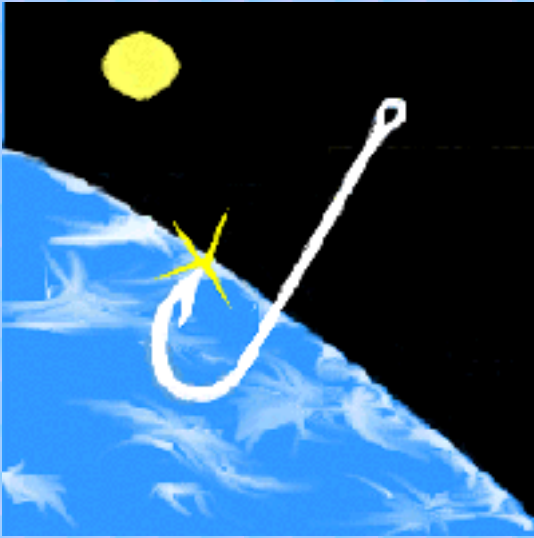
- [Discount Tires](#): Looking for tires for your buggy?
- [K&N Filters](#): High quality air and oil filters to keep your engine in top shape.
- [The National Motorists Association](#)
- [The Legends Homepage](#): Legend race cars were designed to offer an inexpensive racing engine and chassis combination. The cars are modeled after autos of the '30's and '40's, are run on dirt and asphalt tracks, and are powered by motorcycle engines.
- [The World Wide Web Virtual Library: Autos](#)
- Introduction to the [Sports Car Club of America](#).
- [Vollensport's Formula 1](#).
- [Chevy Camaro Technical Database: Manual Transmissions](#)
- [Split Cycle Engine Page](#)
- [Alternative Fuels and Vehicles Technology](#)
- [Electrathon: Electric Vehicles](#)
- [Do It Yourself Fuel Injection Page](#)

*"You only have enough horsepower
when you can burn the tires all the way down the straightaway.
And then you don't have enough."
--Mark Donahue*

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James Lux, January 13, 1997

THE LIGHTHOOK PAGE

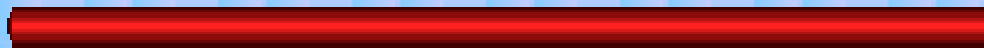


Welcome to the Lighthook Web Site! You'll find info, links, and things to provoke your mind and help it wander in new directions! This site is designed for the [Netscape 2.0](#) Web browser. Other Web browsers may not provide all graphic features.

*"The man who views the world at 50 the same as he did at 20
has wasted 30 years of his life." -- Muhammad Ali*

- The [Underlying Parable](#) of the Lighthook Web Site: The Parable of the 23rd Century Man.
- [Sustainable Society](#): Making long term decisions *work*. Sustainable society means choosing actions that don't get in the way of our future. Here's where you'll find an introduction to sustainable society ideas and methods, and ways you can brighten the future of your children's children.
- [Strawbale Houses](#): As the availability of wood decreases and its cost increases, the search is on for an alternate home building materials. One very promising possibility is straw, an annually renewable resource that offers many advantages over wood.
- [STRAP](#) is an acronym for the Strawbale Regional Assistance Program. What does that mean? People helping people build their own homes.

- [Natural Pain Relief!](#) Do you, or does someone close to you, suffer from chronic pain? Has the medical community been unable to eliminate the pain you suffer? Are you tired of paying for expensive pain relieving drugs, and of their unwanted side effects? If so, there is another, better way.
- [Car Talk!](#) Here are my favorites, from the past into the future: Type 181 and other air-cooled VW's, Datsun 240 Z's, Messerschmidt Kabinrollers, and Hypercars. You'll find specifications, *lots* of information, and a raft of links to great information sources.
- [The Cyberbeat Columns:](#) From 1992 to 1996, the Island Independent newspaper, based in Langley, WA, offered incisive, wide-ranging commentary on community and bioregional issues, and evidenced a literary panorama and level of excellence which was sorely needed, and is sorely missed. Cyberbeat was a column I wrote for the II that explored the human element of mass electronic communications.
- [The Top Fifty](#) Songs? Movies? Recipes? Movies Stars? Nope. This one will make you think.
- [Lighthead's Quotes](#)
- [Didjeridoos!](#) The Australian Aboriginal didjeridoo, one of the oldest musical instruments, can humble, perplex, and entrance. I make didjeridoos and teach people how to play them.
- [Lighthead's Books and Movies](#)
- [Lighthead's Links: Web Pointers for Inquiring Minds.](#)
- [The Family Album!](#) Photos of Jim, Annette, and Nathan.



Where are all the cool graphics? Click [HERE](#) to find out about the design philosophy of this site.

curious people have accessed this page since March 8, 1996.

If you like what you've found here, please [let me know!](#)



James Lux, January 12, 1996